The Meeting of Minds: Journal of Undergraduate Research is a joint publication of the University of Michigan-Dearborn, the University of Michigan-Flint, and Oakland University.

Copyright: Copyright for the materials within these pages belongs to these institutions jointly. Questions regarding the copyright should be addressed to the campus representatives listed below. Copyright 2009, University of Michigan Board of Regents and Oakland University Board of Trustees

University of Michigan Board of Regents
Julia Donovan Darlow
Laurence B. Deitch
Denise Ilitch
Olivia P. Maynard
Andrea Fischer Newman
Andrew C. Richner
S. Martin Taylor
Katherine E. White
Mary Sue Coleman (ex officio)

Oakland University Board of Trustees
Henry Baskin
Monica Emerson
Richard Flynn
Michael Kramer
Jacqueline Long
Ann Nicholson
Dennis K. Pawley
Gary D. Russi (ex officio)

The University of Michigan-Dearborn Executive Officers
Daniel Little, Chancellor
Edward Bagale, Vice Chancellor for Government Affairs
Thomas Baird, Vice Chancellor for Institutional Advancement
Robert Behrens, Vice Chancellor for Business Affairs
Stanley E. Henderson, Vice Chancellor for Enrollment Management and Student Life

The University of Michigan-Flint Executive Officers
Ruth Person, Chancellor
Gerard Voland, Provost and Vice Chancellor for Academic Affairs
Vahid Lotfi, Associate Provost and Dean of Graduate Programs
David Barthelmes, Vice Chancellor for Administration
Mary Jo Sekelsky, Vice Chancellor for Student Services and Enrollment Management

Oakland University Executive Officers
Gary D. Russi, President
Virinder K. Moudgil, Vice President for Academic Affairs and Provost
John W. Beaghan, Vice President for Finance and Administration and Treasurer to the Board of Trustees
Rochelle A. Black, Vice President for Government Relations
Susan Davies Goepp, Vice President for University Relations and Executive Director, Oakland University Foundation
Mary L. Otto, Vice President for Outreach
Mary Beth Snyder, Vice President for Student Affairs and Enrollment Management
Victor A. Zambardi, Vice President for Legal Affairs and General Counsel and Secretary to the Board of Trustees

Meeting of Minds Campus Representatives
UM-Dearborn
Jennifer Zhao
Susan Gedert
(313) 593-5490
UM-Flint
Terry Van Allen
André Louis
(810) 762-3383
Oakland University
Robert Stewart
Laura Schovan
(248) 370-2140

The University of Michigan and Oakland University, as equal opportunity/affirmative action employers, comply with all applicable federal and state laws regarding nondiscrimination and affirmative action, including Title IX of the Education Amendments of 1972 and Section 504 of the Rehabilitation Act of 1973. The universities are committed to a policy of nondiscrimination and equal opportunity for all persons and do not discriminate on the basis of race, color, national origin, age, marital status, sex, sexual orientation, gender identity, gender expression, disability, religion, height, weight or veteran status in employment, educational programs and activities, and admissions. Inquiries or complaints may be addressed to the University of Michigan Senior Director for Institutional Equity and Title IX/Section 504/ADA Coordinator, Office for Institutional Equity, 2072 Administrative Services Building, Ann Arbor, Michigan 48109-1432, 734-763-0235, TTY 734-647-1388 or Oakland University’s Director of Diversity and Compliance, 203 Wilson Hall, Oakland University, Rochester, Michigan 48309-4401, (248) 370-3496.
The *Meeting of Minds Journal of Undergraduate Research* is specifically designed to offer undergraduate students the opportunity to experience the manuscript submission and review process. Students who participate in the Meeting of Minds conference are invited to submit a written version of their presentation to the Journal Review Board for publication in the volume which corresponds to the presentation year. The initial volume published in 1998 incorporated submitted papers from the inception of the conference through the past year (i.e., 1993-1998). This volume presents papers from the seventeenth annual conference held at the University of Michigan-Flint in May 2010.

The articles in this journal represent the work of undergraduate students, each with the assistance of a faculty mentor. The authors are all undergraduate students. The faculty mentor is clearly listed at the beginning of each paper, as is the academic unit and institution.

This journal represents the culmination of many years of experience in the collaboration process between three undergraduate universities in Michigan. It also represents a strong personal commitment of many individual faculty members to undergraduate research and creative endeavors.

The Meeting of Minds conference and this journal are a shared responsibility between the University of Michigan-Dearborn, the University of Michigan-Flint, and Oakland University. Each university accepts the responsibility to host the conference and subsequently to publish the journal on a rotating basis. The order of the responsibility follows the subsequent pattern: the University of Michigan-Dearborn in 2009, the University of Michigan-Flint in 2010, and Oakland University in 2011.

**Manuscript Guidelines:** Students’ papers were to be submitted in MS Word or a pre-approved format determined by the student, faculty sponsor, and the MOM Editorial Board. The text of all manuscripts was to be no more than 10 double-spaced pages typed in 10-12 point font size with one-inch margins. Images and graphs were to be incorporated into the text where possible. The instructions for preparing the manuscript are provided by the designated editor for a particular volume. Completed “Permission to Publish” and “Faculty Mentor’s Approval” forms must also be included with the manuscript. These forms are available to students with the conference registration materials. The Editorial Board reviews submissions for documentation and compliance with manuscript guidelines. The authors are ultimately responsible for the content, information, and any interpretation within the manuscripts. Manuscripts accepted for publication become the property of the Journal Editorial Board. For each of the accepted manuscripts, a single complimentary electronic copy of the published journal is given to each author and faculty sponsor. Electronic copies of the journal are also available on the Meeting of Minds websites of each of the partnering institutions.
Preface

As institutions committed to academic excellence, the University of Michigan-Flint, the University of Michigan-Dearborn and Oakland University fully recognize the critical role research plays in the education our students receive. Undergraduate students who participate in research and creative activities develop skills and qualities necessary to compete in an ever-changing, fast-moving world. We pride ourselves in offering learning environments where our students have an opportunity to grow as scholars, innovators, explosive thinkers, and leaders.

This year, over three hundred students, faculty, staff, and guests gathered on the campus of the University of Michigan-Flint to celebrate the 18th annual Meeting of Minds Undergraduate Research Conference. We were very privileged to host 170 oral and poster presentations; all professionally conducted by students working in direct partnership with members of each of our institution’s faculty. The intellectual findings shared by our students were put on display for hundreds of people to observe.

Many of the students who presented at the event demonstrated further commitment to excellence and scholarship by submitting manuscripts from their projects. Gathered within the pages of this journal are forty-four high quality examples of the hard work of some of our student participants. As you will discover in reading this journal, the manuscripts cover a broad range of topical areas; showcasing our dedication to the interdisciplinary pursuit of knowledge. From biology to sociology, from art to business, our students offer significant contributions to research; contributions shared by us all. It is in this collection of knowledge that the future of our state, our nation, and indeed in our entire civilization rests. In that spirit, I would like to offer my thanks and congratulations to all of the student authors and faculty who have devoted the time and effort required for this type of work. These manuscripts are a product of your diligence.

I would like to express my appreciation to the executive officers at each institution for the many ways in which you contribute to the success of the event and to undergraduate research in general. Additionally, I would like to thank all the people directly responsible for the ongoing success of the Meeting of Minds Undergraduate Research Conference. My colleagues at Oakland University (Laura Schovan and Robbie Stewart) and the University of Michigan-Dearborn (Sue Gedert and Jennifer Zhao) are to be commended for faithfully serving on the planning committee and for offering their continued support. Additional thanks go out to the faculty who offered comments, evaluation, and editing for the papers selected for this publication. Finally, we acknowledge the hundreds of students and faculty at our respective campuses who engage in outstanding research and activities. The wide assortment of exciting, innovative, and quality research you offer leaves an indelible mark on the academic community, and the world as a whole.

Thank you all for helping us to sustain a rich legacy of research and scholarship!

Andre Louis, Process Manager
University of Michigan-Flint
Office of Research
Art History, Philosophy, and Literature

The Cultural Landscape of Cardiff Castle ................................................................. 1
Author: Thomas Synder
Faculty Advisor: David Wigston (deceased) and Lauren Friesen
Department of History, University of Michigan-Flint

The Pagan Influences on Christian Art in Ireland ..................................................... 9
Author: Caitlin Hutchinson
Faculty Advisor: Shelley Perlove
Department of Art History, University of Michigan – Dearborn

Memory and Metaphor on Roman Funerary Monuments ....................................... 18
Author: Jessica Hull
Faculty Advisor: Melanie Grunow Sobocinski
Department of Art History, University of Michigan-Dearborn

Psychological Continuity, the Circularity Objection, and Quasi-Memories ............ 21
Author: Michael Pauldine
Faculty Advisor: L. Nathan Oaklander
Department of Philosophy, University of Michigan-Flint

How We Put It: An Analysis of Wittgenstein’s “Language Games” and Their Relation to Skepticism ............................................................... 26
Author: Aaron Usher
Faculty Advisor: Maureen Linker
Department of Philosophy, University of Michigan-Dearborn

Evaluating Freedom .................................................................................................. 31
Author: Kathleen Pullen
Faculty Advisor: Maureen Linker
Department of Philosophy, University of Michigan-Dearborn

Machismo to Mask Inferiority .................................................................................... 34
Author: Sydney Wissman
Faculty Advisor: Aldona Pobutsky
Department of Modern Languages and Literature, Oakland University

Gretchen as Tragic Heroine in Goethe’s Faust, Part I ............................................ 39
Author: Grace Gahman
Faculty Advisor: Ingrid Rieger
Department of Modern Languages and Literature, Oakland University

The Historical Development and Social Meaning of the Faust-Figure .................. 42
Author: Caitlin Koseck
Faculty Advisor: Ingrid Rieger
Department of Modern Languages and Literature, Oakland University
Nationalism in *Sab, La Clase Media, and María* .......................................................... 46
Author: Kristin Castelvetere  
Faculty Advisor: Cecilia Saenz-Roby  
Department of Modern Languages and Literature, Oakland University

Religious Elements in *Sab and La Clase Media* .......................................................... 51
Author: Laura Spangler  
Faculty Advisor: Cecilia Saenz-Roby  
Department of Modern Languages and Literature, Oakland University

**Tom Stoppard’s Mirror: How Stoppard’s Rosencrantz and Guildenstern Are Dead and Travesties Are a Reflection of the Modern Man** .......................................................... 56
Author: Nusrat Hossain  
Faculty Advisor: J. Caitlin Finlayson  
Department of Literature, Philosophy, and the Arts, University of Michigan-Dearborn

Good Heartedness and Virtue in Henry Fielding’s Tom Jones  ........................................ 62
Author: Mary Kathleen Angel  
Faculty Advisor: Brian Connery  
Department of English, Oakland University

**Breath-molecules: Order and Chaos in Jorie Graham’s Overlord** .................................. 66
Author: Benjamin Malburg  
Faculty Advisor: Gladys Cardiff  
Department of English, Oakland University

**Business and Social Studies**

Attitudes on Dating Violence Among African-American Adolescents  ................................ 72
Author: Teila S. Pickett  
Faculty Advisor: Pamela McAuslan  
Department of Behavioral Sciences, University of Michigan – Dearborn

**Fighting Corruption: Should We Rely on Altruistic Punishment?** .............................. 81
Author: Jonathan M. Bertin  
Faculty Advisor: Natalia V. Czap  
Department of Social Sciences, University of Michigan – Dearborn

**Vision and Commitment in Transformational Change: Workers’ Perceptions of Management’s Leadership Abilities** .......................................................... 89
Author: Natalie Lowell  
Faculty Advisor: Thomas Callahan  
College of Business, University of Michigan-Dearborn

**Student Success and Professor Salary: A Statistical Analysis** ...................................... 96
Author: Michael El-Zein  
Faculty Advisor: Patricia Smith  
Department of Economics, University of Michigan-Dearborn
Rethinking “Rosie the Riveter”: The Intersection of Propaganda, Actual Experience, and the Women of Ford’s Phoenix Mill in the History of Women’s Involvement in World War II .................................................................105
Author: Tiffany A. Baugh
Faculty Advisor: Pamela Pennock
Department of American History, University of Michigan-Dearborn

Role of the Prime Minister in Contemporary Japan .................................................................112
Author: Lana Brown
Faculty Advisor: Seigo Nakao
Department of Modern Languages and Literature, Oakland University

The Republic of Mauritius ........................................................................................................118
Author: Rashard L. Wagner
Faculty Advisor: Dauda Abubaker
Department of Africana Studies, University of Michigan-Flint

Computer Science, Engineering, and Physics

Experimental Determination of Viscoelastic Relaxation Modulus of Polymeric Materials .........................................................................................................................122
Authors: Ravil Patel and Michael Isaac
Faculty Advisor: Olanrewaju Aluko
Department of Computer Science, Engineering and Physics, University of Michigan-Flint

Microstructural Changes and Hardness Response of Hardenable Steels to Heat Treatment .........................................................................................................................129
Author: Joseph Wilkinson
Faculty Advisor: Dr. Olanrewaju Aluko
Department of Computer Science, Engineering and Physics, University of Michigan Flint

Displacements Caused by Eddy Currents Induced During Magnetic Resonance Imaging .........................................................................................................................136
Authors: Yuwen Mei and Bradley J. Roth
Faculty Advisor: Bradley Roth
Department of Physics, Oakland University

Muon Transmission Through Lead ........................................................................................144
Author: Shawn Zaleski
Faculty Advisor: Chris Pearson
Department of Computer Science, Engineering and Physics, University of Michigan Flint

Chaotic Pendulum .....................................................................................................................150
Author: Eric Christopherson
Faculty Advisor: Chris Pearson
Department of Computer Science, Engineering and Physics, University of Michigan Flint
How Cyberanthropology Relates To MMORPGS and METAVERSES ........................................159
Author: Tim Elliott
Faculty Advisor: Michael Farmer
Department of Computer Science, Engineering and Physics, University of Michigan Flint

Language and Communication

Meaning and Understanding of Messages Received In Face-To-Face and Computer-Mediated Communication .................................................................169
Authors: Theresa M. Nutten and Aarre Laakso
Faculty Advisor: Aarre Laakso
Department of Behavioral Sciences, University of Michigan – Dearborn

Is the Patriot Act Terrorizing Our Right to Privacy? ..............................................................175
Author: Allegra Rowan
Faculty Advisor: Kellie Hay
Department of Communications, Oakland University

The Effects of Sarcasm: A Rhetorical Analysis of Ann Coulter’s “Godless: The Church of Liberalism” .................................................................183
Author: Amanda Deschamps
Faculty Advisor: Dana L. Driscoll
Department of Writing and Rhetoric, Oakland University

Intuitive Writing: When Environment Influences Style .............................................................186
Author: Myron Manns
Faculty Advisor: Stephanie Roach
Department of English, University of Michigan-Flint

Natural and Environmental Science

Shooting Up: The Sugar Addiction ...................................................................................190
Author: Bri L. O'Connell
Faculty Advisor: Arthur Bull
Department of Chemistry, Oakland University

Soils Analysis and Species Distribution in the University of Michigan-Dearborn Floodplain Forest ................................................................................197
Author: Tristen B. Roberts
Faculty Advisor: Orin Gelderloos
Department of Natural Sciences, University of Michigan-Dearborn

PBB Contamination of Cattle Feed in Michigan, 1973 ........................................................203
Author: Susan Dykstra
Faculty Advisor: Marlos Scrimger
Department of Earth Resources and Science, University of Michigan-Flint
Psychology and Behavioral Sciences

Correlations Among Psychosocial Factors and Do Not Resuscitate Order Decisions in a Sample of Independent Elderly ................................................................. 213
Author: Donya Sorensen
Faculty Advisor: Thomas Wrobel and Eric Freedman
Department of Psychology, University of Michigan-Flint

Particular Gender Differences within Appearance Accuracy ........................................ 224
Author: Carl Bastien
Faculty Advisor: Terrence Horgan
Department of Psychology, University of Michigan – Flint

Posttraumatic Growth, Perceived Directness of Traumatic Events, and Religious Strength Among Students .......................................................... 233
Author: Lynn Jarrell
Faculty Sponsor: Kanako Taku
Department of Psychology, Oakland University

The Effects of Living Arrangement and Nation on Posttraumatic Growth .................. 239
Authors: Lauren Rogers, Sean Callan, and Melanie Phillips
Faculty Sponsor: Kanako Taku
Department of Psychology, Oakland University

Differences between the Most Experienced Traumatic Events on Posttraumatic Growth .......................................................... 247
Authors: Brenton R. Yanos, Melanie Phillips, and Lauren Rogers
Faculty Sponsor: Kanako Taku
Department of Psychology, Oakland University

Art that Really “Grabs” You: Using the Environment to Prime Concepts in a Creative Generation Task .......................................................... 252
Authors: Angela Hasman, William Fuss, Caitlin Kleist, Yvonne Miles, and Stephanie Camarata
Faculty Sponsor: Cynthia Sifonis
Department of Psychology, Oakland University

Individual versus Social Responsibility: Paradigms for Health Education .............. 260
Authors: Amal Alsamawi and Nitya Sethuraman
Faculty Advisor: Nitya Sethuraman
Department of Psychology, University of Michigan-Dearborn

Lithium in the Treatment of Bipolar Disorder: Evidence of Intracellular Mechanisms that Substantiate Two Prominent Theories of Action ...................... 264
Author: Hayley Amsbaugh
Faculty Advisor: Keith Williams
Department of Psychology, Oakland University
Public Health and Health Services

Importance of Health Literacy and Effective Communication Within the Relationship between the Physician and Older Patient to Improve

Patient Health Outcomes and Quality of Life
Authors: Jessica L. Harshfield and Rie Suzuki
Faculty Advisor: Rie Suzuki
Department of Public Health and Health Studies, University of Michigan-Flint

The assessment of physical accessibility at the Urban Health & Wellness
Center for People with Disabilities, Part 1
Tracy Sweeney and Rie Suzuki
Faculty Advisor: Rie Suzuki
Department of Public Health and Health Studies, University of Michigan-Flint
The Cultural Landscape of Cardiff Castle

Thomas Synder

Faculty Advisor: David Wigston (deceased) and Lauren Friesen
Department of History
University of Michigan-Flint

Abstract

Cardiff Castle is selected as a specific example for how Cultural Landscapes are defined. Its origin is from the Roman Fort built on the River Taff in the first century C.E. and the structure was abandoned until the Norman Conquest when a wooden keep was built; a stone structure was later built in 1140. The subsequent history shows how a cultural landscape such as this can change with time. These changes are described including the influence of the Age of Enlightenment under the landscape architect, “Capability” Brown, in the 1770s. Later began the major Victorian transformation under the first Marquess of Bute, John Stuart. The economic influence of the Industrial Revolution, the inspiration of the Arts and Crafts Movement and the resurgence of interest in Norse mythology is illustrated within the castle walls. Today, Cardiff Castle is the only castle in Britain owned by a city.

Cultural Landscapes

“Cultural Landscapes” can be defined in one of many ways. The term, “cultural,” is defined as the refinement of intellectual and artistic taste, customary beliefs, social forms, and material traits of a racial, religious or social group. “Landscapes” on the other hand are defined as natural inland sceneries that can be modified by grading, clearing, or decorative planting. Therefore, a cultural landscape is anything within anthropogenic origins or beliefs of any ethnicity, people or religions that is constructed, irrigated or manipulated. This is done within the region or society to fit a particular group’s need, interest or belief. In short, diverse societies design their environments to satisfy any cultural means.

For cultural landscapes to be sustained they need to be preserved and taken care of. Due to time, weathering and erosion, humankind needs to tend to its settings on a regular basis in order to maintain them. Landscapes can be altered, modified or even destroyed by natural disasters. If they are abandoned or not managed, their structures will eventually be conditioned by other management practices. Natural interventions such as fields and forests, for example, can succeed and “replace” existing landscapes.

Cultural Landscapes of Great Britain and Experience

The castles of Great Britain are classic examples of cultural landscapes. During medieval times these stone masses served to house kings, noble families and also as fortresses in times of battle. The country itself is fascinating because of its history and is perfect for tourists and travelers that want to visit Britain’s ubiquitous cultural areas. London, for example, is Britain’s greatest attraction for it is the home of some of the world’s most popular sites including Big Ben, the Houses of Parliament, Westminster Abbey, Buckingham Palace, Tower Bridge, the Tower of London and the British Museum; all of which are cultural landscapes themselves for they are landmarks for British tradition and its history.
Aside from London, the country of Wales is another main interest. The Welsh are considered to be the “original Britons” that were derived from Celtic origins. “It was only after around 600 B.C.E. that the influence of the Celts was felt in the British Isles [...] Celtic civilization in Britain has been through the eyes of later Roman occupiers, and its remains are obscured by those of the Romans.” (King, 13) Like the rest of Britain, Wales is rich in history and holds several cultural elements. For instance, in the college town of Aberystwyth, which lies on the Welsh mid-west coast, one can hike to the top of Constitution Hill and witness miles of breath-taking scenery such as farmlands, hills of deep green grass, fields of grazing sheep and Cardigan Bay. The ruins of Aberystwyth Castle, built by King Edward I and liberated by the Welsh national hero, Owain Glyndwr, are only one of many castles throughout the country to be explored. “The castle here was begun in 1277, and like many other castles in Wales it was captured by Owain Glyndwr at the start of the 15th century, and wrecked by Oliver Cromwell’s forces during the Civil War.” (King, 237) A more haunting experience would be to venture out to Devil’s Bridge (Pontarfynach) that spans the Rhiedol Valley; a dangerously rapid river gorge located east of Aberystwyth.

A definite must see is the city of Cardiff; the Welsh capital and youngest capital in the world. By the end of the 19th century, Cardiff was the grimy nerve center for the largest coal-exporting region in the world. Both world wars and the Great Depression brought the coal industry to an end and Cardiff nearly became a backwater. However, in 1955 the city was designated the capital of Wales and in the 1980s was able to get a grip on itself once again. The town redeveloped like mad and promoted itself as “Europe’s fastest growing city” (King, 129). Cardiff Castle is a fascinating work of art and a most enchanting cultural landscape that lies in the heart of the Welsh capital.

The History of Cardiff Castle and Timelines

The city of Cardiff was first established by the Romans in the latter half of the 1st century C.E. during the rule of Emperor Nero. The site of Cardiff Castle was originally a Roman fort built on the mouth of the River Taff that served as a successful trading post for about four hundred years. “There were, in fact, four different forts of varying sizes until the present square 8 acre site was established in the 4th century.” (Cardiff Castle, 3) The fort was defended by walls about 10 feet thick and faced with square blocks made of blue Lias limestone. The cores of these walls were packed with river stones and boulders that were set in solid cement. Inside these protective walls were wooden buildings that housed the Roman community. In more recent years, during archeological digs, glass and pottery were uncovered that gave a hint of the type of lives the Romans had there. They abandoned the site in the fifth century and the area remained unoccupied until about 1081 after the arrival of the Normans.

Robert Fitzhamon, the first Norman Lord of Glamorgan, saw the strategic value of the site and built a wooden keep on top of a motte or artificial hill. By this time, the remains of the Roman walls disappeared from view beneath the earth banks until they were revealed during excavations in 1889. “The Castle’s known history was thereby pushed back nearly a thousand years.” (Cardiff Castle, 3) In 1140, Robert the Consul, son of King Henry I and second Lord of Glamorgan, built the present stone version of the keep where his uncle, Robert Curthose, was held prisoner. Curthose was the second Duke of Normandy and elder brother of Henry I who tried to take the crown of England by force. Therefore, Henry invaded Normandy, captured Curthose and imprisoned him in the keep where he remained until his death in 1134.
In 1216, the lordship of Cardiff Castle passed to Robert the Consul’s great grandson, Gilbert De Clare. The De Clares reinforced the castle and built the Black Tower to the south next to the main entrance. In 1306, Gilbert’s great granddaughter, Elizabeth, married Hugh Despenser; the Despenser family possessed lordship of Cardiff Castle until 1411. The castle was succeeded by another noble family known as the Beauchamps when the heiress to the castle, Isabel Despenser, married Richard Beauchamp, Lord of Abergavenny. He died in 1422 and Isabel was remarried to Richard’s kinsman of the same name one year later. This Richard was the Earl of Warwick and during the 1420s, he built the lodgings or “apartments” west of the keep that became the new household. As for the keep, it remained fortified and could always be reoccupied in times of attack. Richard and Isabel both died in 1439 and when their son, Henry, died in 1445, the male line of the Warwick Beauchamps was no more.

Richard Beauchamp’s inheritance passed to his sister, Ann, who was married to Richard Neville, the Earl of Warwick. Through this marriage he became Lord of Cardiff and after his death in 1471, his eldest daughter, Isabel, was bequeathed the lordship of Cardiff. Isabel married George, Duke of Clarence and younger brother of King Edward IV who took the lordship of Cardiff by right of his wife in 1469. Isabel died in 1476 and Edward IV had Clarence killed in 1478 in the Tower of London; he was drowned in a butt of malmsey wine for suspicion that he was attempting to seize the crown. Neville’s youngest daughter, Ann, married Richard, Duke of Gloucester and another brother to Edward IV, who succeeded the lordship of Cardiff after Clarence was killed. Richard usurped the throne in 1483 and became King Richard III after he apparently murdered Edward IV’s children, the throne’s rightful heirs, in the Tower of London.

Henry Tudor, head of the Lancaster House landed at Milford Haven in 1485 and marched to Bosworth Field where he defeated and killed Richard III. Ann Neville had died five months earlier so the lordship of Cardiff was now in the hands of the Tudors. Henry (now King Henry VII) gave the Lordship to his cousin, Jasper Tudor, in 1486. When Jasper died in 1495 the Lordship of Cardiff was reverted to the king. The castle remained in royalist hands under Henry VII, Henry VIII and then on to Edward VI in 1550 who granted the Lordship to William Herbert.

William Herbert was in the service of Charles Somerset, a supporter of Henry Tudor. Therefore, Herbert gained preferment in the court of King Henry VIII and his position was enhanced when Henry married his sister-in-law, Catherine Parr. Because of this, Herbert acquired much property in South Wales. Furthermore, when Henry VIII died in 1547, Herbert became one of Edward VI’s Governors and was created Baron Herbert of Cardiff and Earl of Pembroke in 1551. The Herbarts eventually transformed Cardiff Castle into a luxurious home but in 1642 during the Civil War, Philip Herbert, the fourth Earl of Pembroke sided with Parliament against King Charles I. Charles sent the Marquess of Hertford who seized the castle and it remained under a royalist garrison until 1645. Cardiff Castle suffered much damage during the war and in 1652, two years after the death of Phillip, work for the necessary repairs began under his son of the same name. The fifth Earl was succeeded in the lordship after his death in 1669 by his three sons: “William the 6th earl, who died in 1674, Philip the 7th earl, a homicidal dypsomaniac who died in 1683 […] and Thomas, the 8th earl, who died in 1773.” (Cardiff Castle Web) In 1704, Charlotte Herbert, daughter and heiress of Philip, the seventh Earl of Pembroke, married Thomas Viscount Windsor who acquired the lordship and held it until 1766. Cardiff Castle was conveyed through his granddaughter, Charlotte Jane, and to her husband, John Stuart, the Marquess of Bute.
The Butes, “Capability” Brown and Modernization of Cardiff Castle

John Stuart was from the Isle of Bute in Scotland and heir of the Earl of Bute, King George III’s prime minister. In 1766, he was made Baron of Cardiff and intended the castle to be a residence for his son. Therefore, he began a program of demolition and remodeling for the castle, which was in need of modernization and had been without a resident lord in nearly two centuries.

The 18th century was known as The Age of the Enlightenment because of changes in ideas. In terms of cultural landscapes, the philosophies, essentially French, had expression with an ordered rectangular system that was superimposed on existing yet unsystematic landscapes. However in Great Britain, a more free form of landscape was favored. This was exemplified by Lancelot “Capability” Brown (1716-1783) who believed in “simple artifices to obtain natural effects.” (Magnusson, 214) Lord Monstuart hired Brown and his son-in-law, an architect named Henry Holland, to recreate Cardiff Castle. Despite that he felt constrained by the Roman walls to express his free landscape ideals, Brown cleared the castle ward of ancient remains such as the lodgings of the Norman Knights throughout the 1770s and 1780s. He also stripped the keep of its ivy and cut down the trees that grew on the ancient motte. He then filled in the moat around the keep leaving it to look like “a deserted pigeon house on top of a truncated sugar loaf!” (Cardiff Castle, 5) As for Holland, he remodeled the interior of the house with altered and additional accommodation onto the west wing. He also rebuilt the north wing and added a corresponding wing to the south. Unfortunately, the Marquess’ son never occupied the house because he died at the age of 26 in 1794. It wasn’t until 1814, the year the first Marquess died, when his grandson, John, became the second Marquess of Bute and the work on the castle had been completed.

The second Marquess, known as “The Founder of Modern Cardiff,” (Cardiff Castle Web) was responsible for starting the coal industry in South Wales that generated enormous wealth for the Butes during the industrial revolution. “The 2nd Marquess of Bute was an extraordinary man. Unlike his father and grandfather, he exploited the economic potential of the Glamorgan estates. In 1839 he opened the Bute West Dock in Cardiff, heralding a period of great industrial expansion and prosperity for South Wales.” (Cardiff Castle, 7) The Bute wealth produced by the industrial revolution set the next stage of development in Cardiff Castle. During the 1820s, restoration of the castle continued and the second Marquess occupied the house until his death in 1848. He left his widow, Sophia and their six-month old son, John Patrick-Crichton Stuart. He would become the third Marquess of Bute and is responsible for the Victorian transformation of Cardiff Castle.

The young Bute was educated in Harrow School and Oxford University. He was known for his fascination of art, history and archeology and in 1865 the 18-year-old Bute began to remodel Cardiff Castle. He met the famous Gothic Revival architect, William Burges, and hired him to restore the castle. Burges was educated at King’s College, London and made prize-winning designs for Lille Cathedral and Crimea Memorial Church in Constantinople in 1855 and 1856 respectively. He was strongly influenced by the Arts and Crafts Movement (1834-1836) and was also known as a pre-Raphaelite architect. Bute was a lover of French style Neo-Gothic Revivalism, not only architecturally, but also in lavish internal decoration. Because of the flourishing coal industry, he was one of the wealthiest men in Europe and when combined with the genius of Burges, one of the most astonishing multi-structures in Victorian Britain was created.

In March of 1869, Burges and his crew began the building of the Clock Tower that was completed in 1875. In 1873, they re-excavated the moat and a new flight of stone steps was
added to the keep to allow for easier access. In terms of the castle, Burges’ intention was to have it enlarged but Bute insisted that additional rooms be built in towers. The Tank and Guest Towers were built and the existing Herbert, Octagon and Bute Towers were heightened; the ceilings of the rooms were built with Gothic arches.

The Smoking Rooms

The Winter Smoking Room was completed by Burges in 1872 within the Clock Tower. Above the Winter Smoking Room, in the very top of the tower, is the Summer Smoking Room. “Smoking rooms were something of a Victorian invention, a place where the gentlemen of the household could retire to smoke cigars without offending the ladies.” (Cardiff Castle, 11).

The decorative theme for the Winter Smoking Room is “time” which is, of course, suitable for the Clock Tower. The vault of the ceiling is painted with the signs of the zodiac and on the four walls are paintings of the labors for each of the four seasons. The Norse Gods, after whom the Saxons named the days of the week, are depicted in the room’s six stained glass windows: Sun’s day for Sunday; Moon’s day for Monday; Tiw’s day for Tuesday; Wotan’s (Odin’s) day for Wednesday; Thor’s day for Thursday; Freya’s day (sometimes known to be Frecka - Odin’s wife) for Friday; and Saturn’s day for Saturday. (Barbarian’s Norse God Page)

In each of the four corners of the room are the “times of the day” corbels; in one corner noon is represented by the Sun God holding up the sun and in the opposite the Moon Goddess represents dusk and night. The other corners represent morning, or dawn, and afternoon. The chimneypiece, which is the centerpiece of the room, has “Love” or “Amor” dominating on the hood. In the frieze below are carvings of medieval lovers that hunt, skate and sit beside a winter fire.

One of Bute’s favorites was the Summer Smoking Room that was intended for summer entertaining and is described as “one of the most extraordinary rooms in Britain.” (Cardiff Castle, 13) The floor tiles illustrate the earth at the center of the cosmos and on the walls are the legends of the zodiac. The eight winds of classical antiquity such as Septentrio and Aquilo - the winds of the north - are represented by life sized carvings of twinned figures on alabaster columns in the four corners of the room. On the chimneypiece is Cupid with lovebirds perched on his wrists and above is a Latin motto, “aestate viresco,” which means, “in summer my love grows green.” (Cardiff Castle, 13) Below is a carved frieze that includes scenes of courtship and matrimony. The dome ceiling of the room is like an astrologist’s dream because of the paintings of the stars and constellations with the four elements: earth, air, fire and water. Finally, a magnificent chandelier of the Sun God standing on his chariot wheel hangs down from the center of the room and is the main attraction here.

The Bachelor Bedroom

In 1872, the third Marquess married Gwendolen FitzAlan Howard to whom he dedicated the Bachelor Bedroom. The room’s decorative theme is “mineral wealth” and represents Bute’s massive income from the coal industry in South Wales. The Lord Crichton-Stuart Arms appear on the chimneypiece and contain specimens of minerals found on the Bute estate. Legends from classical literature about the pursuit of precious stones and metals are illustrated on the wall decoration. Sapphire, emerald, ruby and topaz are represented in the stained glass windows while diamonds and pearls appear in windows of the adjoining bathroom. A marble bath with metal insets of fish and other sea creatures was installed by Burges. Lord Bute brought this creation from Rome and when water was in the bath the fish appeared to “swim.”
The Nursery
In the Guest Tower is the Nursery which is, without a doubt, a child’s paradise. It is another of Burges’ creations that was used to accommodate visitors and occupied by the Lord and Lady Bute’s four children: Lady Margaret, Lord Dumfries, Lord Ninian and Lord Colum. Most of the time they spent here was usually in lessons with their governess and two nursery maids: one French and the other Welsh - they were allowed to speak to the children only in their language. In tiles above the doors is a chain of famous children’s authors and all around the Nursery on the upper walls is a tiled frieze that contains a string of characters from fables and fairytales. These include Aladdin, Ali Baba, Jack and the Beanstalk, Robinson Crusoe, Sleeping Beauty and many others along with the Invisible Prince in the northeast corner of the room. On the chimneypiece is the figure Fame from Geoffrey Chaucer’s poem, The House of Fame, holding two trumpets: one representing “ill fame” and the other “great renown.” A later addition is the electric lanterns that hold themes of popular nursery rhymes including Hey Diddle Diddle, the Cat and the Fiddle and Mary, Mary, Quite Contrary.

The Banqueting Hall
The largest room in the castle is The Banqueting Hall, which is the focal point of Lord Bute and Burges’ restoration project that began in 1872 and was completed in 1890. Originally there were seven rooms in this space and Burges tore them out to create the enormous hall. Even though it’s a 15th century room, the decoration is entirely Victorian. Burges transformed this room with a theme of the Middle Ages because of Bute’s admiration for the medieval history of the castle. The stone chimneypiece represents Cardiff Castle and in the center is a carving of Robert the Consul dressed in armor riding a horse into battle. Below in the lower left hand corner is Robert Curthose, second Duke of Normandy, peering out of his dungeon cell in the castle keep. Stained glass windows that decorate the roof show the Glamorgan Ancestors that were successive lords of the castle; they also depict Scottish shields representing Bute’s ancestry. Services of family Christenings and household prayers were held here and a large number of people could be accommodated. Choirs and harpists were frequently hired to play during musical evenings and the Butes were very keen on Welsh singing. Over time many royalty were entertained in the Banqueting Hall including King Edward VII, Queen Alexandria, King Edward VIII, King George V, Queen Elizabeth II, Prince Charles and the late Princess Diana of Wales.

The Chaucer Room
The Chaucer Room is located at the top of the 15th century Octagon Tower and was designed as the sitting room for Gwendolyn, the Lady Bute. The theme for this room is the works of the 14th century author, Geoffrey Chaucer. In 1877, Burges added a fleche, or steeple, to the old tower and built the interior that rises 50 feet into the clerestory, holds some of the most astonishing stained glass in the castle. Illustrations of The Canterbury Tales, Chaucer’s most famous work, are portrayed on the glass and the walls are painted with illustrations of other Chaucerian stories. On a plinth above the chimneypiece is a statue of Chaucer and behind it is a wall inscribed with several letter “Gs” - the letter G being the initial for Gwendolyn. The alphabet is displayed on ceramic tiles in the hearth of the fireplace that represent “the tools of Chaucer’s trade” (Cardiff Castle 20) and tiles on the floor form a ceramic labyrinth.
Bute’s Bedroom
A biblical theme was chosen for Lord Bute’s Bedroom located in the north wing that Henry Holland had built. It was re-named the Bute Tower after Burges extended the wing and added two stories in 1873. The interior is dominated by a gilded bronze statue of St. John the Evangelist. It stands on the chimneypiece glittering with silver, emeralds, enamels and rubies while the seven churches of Asia, referred to by St. John, are depicted in the stained glass windows. On the ceiling of this magnificent room are 189 bevelled glass mirrors that are designed to reflect Bute’s first name (John) in Greek in both true and mirror image. Furthermore, there is an adjoining bathroom that is paneled in walnut and inset with about 60 varieties of marble with the name of each sample inscribed onto it in gold.

The Roof Garden
On top of the Bute Tower is the Roof Garden, which was Bute’s favorite retreat in the castle that dates from 1876. The design for the Roof Garden was probably inspired by his visits to the Roman ruins of Pompeii. The theme was also biblical and the inscriptions were in Hebrew, which was the language Bute was learning at the time. Altogether the Roof Garden was a courtyard originally open to the sky and surrounded by bronze columns. Burges designed a fountain in the center of the room that was decorated with bronze beavers that Bute had a passion for. Bute loved animals of all kinds and had them included in all decorations throughout the castle and on the famous Animal Wall along Castle Street.

The Library
The third Marquess’ intellectual tastes and fascination of history is reflected in the Library, which holds the theme of literature and learning. Ancient alphabets are displayed on the carved chimneypiece and the names of worthies in literature are included on the wall decoration. Three central bookcases designed by Burges hold Bute’s rare collection of religious books and have marquetry panels depicting the three most famous fifth century Greek dramatists: Sophocles, Aeschylus and Euripides. The bookcases are further decorated with insects, animals and birds that were inlaid by Bute’s craftsmen.

The Chapel
The dressing room where the second Marquess died in 1848 became The Chapel. Lord Bute converted to Roman Catholicism in 1869 and asked Burges to transform the room with a theme of resurrection. The ceiling is painted with angels and the floor has a Roman style of inlaid marble tesserae. On the altar, angels flank the marble figure of Christ while the tomb is guarded by bronze Roman soldiers. A bronze and silver chapel door is cast with a panel of the Virgin Mary while stone carvings of the tree of life in full leaf set on either side of the entrance. An axe is “embedded” in the one on the left and represents the death of the second Marquess.

The Arab Room
The last room designed before William Burges’ death in 1881 was the Arab Room. It was inspired by Islamic architecture and used as an occasional sitting room. The tower was raised to create the fascinating ceiling, which is the room’s primary feature. It is in fact a replica of a Sicilian church ceiling made of wood and decorated with gold leaf. Burges loved birds and on each of the four walls are two parrots that peer down from the arcading. The decoration of the room is Turkish and the wooden window screens are designed so that one can see out without
being seen. The flooring is made of Italian marble and the chimneypiece is made of white marble inlaid with semi-precious stones. In the walls are small boxwood and ebony cupboards that held Bute’s collection of porcelain figurines. Many guests including King Edward VII were entertained to coffee in this room after dining in the Banqueting Hall.

**Twentieth Century Renovations and Cardiff Castle Today**

After the death of Burges, some interiors of the castle including the Arab Room were left unfinished. He left his design plans along with an architectural model with his former associate, William Frame, who finished the schemes including the Animal Wall and restored the north gate of the castle. Lord Bute died at the age of 53 in 1900 and was succeeded by his son, John, the fourth Marquess of Bute. He wasn’t as wealthy as his father but shared his interest in building and architecture. After the Roman walls were revealed in 1889, the third Marquess wanted them rebuilt on their original foundations and used red sandstone to outline the Roman remains. The fourth Marquess finished his father’s work, which altogether took thirty-five years and was completed between 1922 and 1925. This also included the building of the Barbican Tower and additional guest accommodation. The fourth Marquess died in April of 1947 and that same year his son, the fifth Marquess, presented the castle to the people of Cardiff and is the only castle in Britain owned by a city. It remains a tourist attraction today and is just as immaculate as it was since the renovations of Bute and Burges that began over 150 years ago.

Today, the Black and Barbican Towers hold the exhibition galleries for the Welch Regiment Museum that commemorate the services of the infantry of South Wales (1719-1969), the Glamorgan Militia and auxiliary land forces of South Wales (1757-1969). “Here is portrayed the long service story of this large regimental family: the acquisition and defence of the British Empire and from same, the two great World Wars of the 20th century and the cold war confrontations that followed.” (Cardiff Castle, 27) The Museum was moved to Cardiff Castle in 1977 from its original site at Maindy Barracks Cardiff in the regimental depot. It was officially opened to the public by Prince Charles in May of 1978.

Cardiff Castle is a cultural landscape that shines a bright reflection not only on the heritage of the British Isles, but also a large portion of the European continent. The setting holds multi-cultural elements from a variety of European themes that establish this castle as the fantasy palace of art, history, imagination and splendor that it is today.

**Bibliography**

<www.wizardrealm.com/norse/gods.html>

<http://www.cardiffcastle.com>

County Council of the City and County of Cardiff. Cardiff Castle. Wales: 2001


*Dedicated to the memory of my friend, Dr. David Wigston*
The Pagan Influences on Christian Art in Ireland

Caitlin Hutchinson

Faculty Advisor: Shelley Perlove
Department of Art History
University of Michigan – Dearborn

The spread of Christianity in its first centuries did not immediately reach Ireland due to the island’s remoteness and its pagan culture. This culture had been in place for centuries, long after the Celtic presence on the continent was reduced by the invading Romans in the first centuries after Christ. By the fifth century, however, Christian missionaries gained a foothold in Ireland, with the result that over time, Christian and early pagan/Celtic traditions became fused. This fostered the creation of a unique Christian culture that reached its fullest development during the Medieval Age. The evolution of this culture as it presented itself in Irish art and the investigation of how the Celts adopted the new beliefs with modifications are the subjects of this paper.

“Celtic” was a language once spoken in Europe and became the name of the people who spoke it and shared common customs. Celts flourished in Continental Europe before they spread to the British Isles and Ireland. The centuries of Celtic dominance on the European continent ended when Rome conquered and assumed control of the area near the turn of the millennium. Roman historians viewed the early people of Ireland, the area classically known as Hibernia, as barbarians for they had “no cities and founded no empires.” However, this observation does not mean that the early Irish peoples did not have a vibrant society or complex belief system. They were cattlemen and farmers who lived in small villages. They were also fierce warriors, who made battle a large part of their culture.

Since the majority of early Irish lived an agrarian existence, their livelihoods depended on climate and seasonal changes. They developed a theosophy that centered on the weather and the influence of heavenly bodies, both of which made their agrarian life possible. Nature was viewed as “a manifestation of divinity not as a ‘fallen’ creation...” which contrasts with the Roman Christian view that emphasized the separation of heaven from earth.

The early Irish views of life and death are seen in their creation, and later in the Celtic appropriation, of the burial chamber of Newgrange alongside the Boyne River in County Meath. The site is an excellent representation of a passage tomb structure, which honored the dead and prepared them for an afterlife. It was built approximately 2500 B.C.E., but the structural integrity has remained intact and the corbelled roof covered by a tumulus has been consistently waterproof for the past four millennia. It is 85 meters (250 feet) in diameter, 13.5 meters (40 feet) in height, and covers about one acre of land.

The great tumulus of Newgrange contains curious characteristics that suggest a dependence upon the cosmos in the beliefs and rituals of these early agrarian inhabitants of Ireland. Newgrange was arranged to enable a solar ceremony to occur on the winter solstice.

Figure 1: Newgrange, Ireland, Entrance and Roof Box,
Image by Caitlin Hutchinson

Meeting of Minds 2010
dawn, the sunlight enters through a roof box above the entrance of the tomb (Figure 1) and travels down a 62 foot passage to illuminate the chamber as well as the carved solar images (spirals, zigzags, lozenges (<>), and swastikas) at the end of the passage. One image described as “three spirals combined to form a triskele” (Figure 2) carved here and again on the entrance stone, stands out above the rest and is a design unique to Ireland. This and the other symbols show the significance of the sun in the lives of this agrarian people. As the Celtic tribes moved into Ireland, they adopted Newgrange as their own and gave it a crucial role in their own mythology and religion, such as in the legends of the Tuatha dé Danaan and Cú Chulainn. The adoption of ideas not their own became a characteristic of the Celtic people and would be repeated when the Christians came in contact with them.

Another important feature of Celtic Pagan art which evolved from the early symbols, are interlace, plaitwork, key patterns, spirals, as well as zoomorphic and plant designs; these are found on monuments throughout Ireland. The designs resemble natural forms found in Ireland, such as vines and other plant life. The painstakingly beautiful details of Celtic designs were not created to copy nature exactly, but the intricate geometric figures were employed to decorate their metalwork and carvings. Plaitwork imitated common weaving and its importance revolved around the idea that the spirit lives on after death.

The contemplation of life and death is found in every culture. How a culture regards the afterlife affects how they live their life on earth. The idea of a glorious afterlife did much to inspire Celtic warriors to be fierce in battle. They did not fear death and their burial sites were revered locations for rituals and religious festivals. Celtic folk tales speak of immortals who were aided by spells or magic springs that allowed them to be given new life after death.

An important example of warrior mythology is the two-faced stone sculpture from Boa Island in County Fermanagh (Figure 3). The statue stands 73cm (29 in) high, 45cm (18 in) wide on its broadest sides and 30cm (12in) on its narrower sides. The designs are carved in relief and the sculpture is essentially two dimensional. The two heads follow a Janus-form and are nearly identical with large, schematic, triangular shaped heads whose chins end in a point. The heads are the largest and most detailed areas of the statue and serve as the focal point. Their lentoid eyes are large in comparison to the other facial features. The figures do not have necks, but their heads rest directly on their shoulders with two thin arms carved across each of the torsos.

One of the most important beliefs within Celtic pagan culture revolved around the veneration of the human head. It was the most common Celtic pagan religious symbol denoting divinity or otherworldly powers. The Celtic pagans believed that the soul resided in the head and, even when severed, it still contained life and power. The person who possessed the severed head of an enemy would benefit from its power. Archeologist Anne Ross wrote “Heads of prized enemies were taken, impaled on spears or fastened to saddles of the horses and born home in triumph.... thereafter impaled on stakes about the houses and fortresses of the Celtic chiefs and
placed in places of worship."\cite{17}

Over time, sculptured heads could be found outside homes or important structures and they retained the same significance and veneration as severed heads. The Janus-head type is important, not only because more heads means more power, but also because it upholds a traditional pagan belief of honoring the dead and looking into the future, which is celebrated during the festival of Samhain on November 1.

Celtic art, which embraced a benevolent polytheism and a warrior ideal, was in strong contrast to the beliefs presented in early Christian art. When Christian missionaries first reached Ireland, they preached a dualistic faith based on the conflict between good and evil. Salvation and deliverance from evil could only be achieved through the acceptance of Jesus Christ, a martyred god, whose willingness to suffer for all men placed him outside the warrior ideal. Those who became adherents of this faith in the early centuries of the current era secretly worshipped in house churches and interred their dead in abandoned salt caves outside the city of Rome, where Christian art first became established.

The earliest Christian art used symbols rather than realistic portrayal to present the message of Jesus and to teach ideas and stories that only followers could discern. The idea behind the work was more important than the artistry involved in its making. The art of the catacombs centered on the miraculous power of Christ, his command over nature, and his promise to save those who believed in him. The common themes of the artwork consisted of Old Testament stories that emphasized divine intervention in the deliverance of the faithful, which offered typological parallels to the life, death, and resurrection of Jesus.\cite{18}

One such example of Christian art, found in the Catacomb of San Callisto, refers to the miracle of the Multiplication of Loaves and Fish (Figure 4). After a sermon, Christ multiplied a small meal consisting of bread loaves and fish, which sustained the crowd of five thousand. The idea that there should be someone to take care of and feed them was a powerful message given to people who often went without food. Jesus took care of physical as well as spiritual hunger. He gave hope to all those who believed that there was a better life and that it could be obtained through him.

As the Christian faith grew in numbers, this religion became a powerful force in the empire. In 313 C.E., the Emperor Constantine recognized Christianity as a legitimate religion with the issuance of the Edict of Milan. Sixty-seven years later, the Emperor Theodosius declared Christianity the official religion of the Roman Empire and accepted the Nicene Creed as its legal doctrine. Christian art now contained powerful images of the New Testament and worship took place in converted Roman basilicas. No longer was the Christian mystery presented in crude paintings hidden in catacombs deep beneath the earth. With state sponsorship, art was made from the finest materials, rendered by professional artists, who placed it in the most visible and venerated areas of the church.

The most emotionally difficult portrayal for early Christian artists was the crucifixion. This punishment was reserved for the worst criminals in the empire and presented grave problems in sacred presentation. Although Christ appeared only rarely on the cross before

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{Figure5.png}
\caption{Labarum Cross}
\end{figure}

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{Figure4.png}
\caption{Loaves and Fish, Catacombs of San Callisto, Italy, Image copyright: Photo Pontifical Commission for Sacred Archaeology}
\end{figure}
the fourth century, eventually Christian artists chose to make the cross a symbol of victory over death. The cross became a symbol of sacrifice as well as one “of life eternal, of redemption and resurrection through faith.” Several variations of the Christian cross, such as the Labarum cross (Figure 5) and later the Latin cross came about when the Christianity became dominant.

A significant medium for the transmission of Christianity was manuscript illumination. Early Christian illuminations were taken from the Bible, but not of its entirety, as only sections, such as the Pentateuch, Psalms, and the New Testament, were illustrated. The images portrayed were subjects chosen to highlight important passages, crucial to Christian doctrine and thought. Illumination played a major role in the missionary efforts of Ireland and provides us with some of the best examples of the fusion of Irish and Christian art.

One such example of manuscript illumination from the continent is the depiction of the Pentecost taken from the Rabbula Gospels (Figure 6), written in 586 C.E. The Apostles faced the dilemma of how to fulfill the teachings of Jesus with their leader no longer physically present. Ten days after Christ ascended to Heaven, while Mary, the Apostles, and other faithful were gathered to feast, a mighty wind rushed through the home and tongues of fire were placed above their heads. It was the Holy Spirit descending upon them and commanding them to preach the word of God. The disciples discovered that the Holy Spirit had not only given them the power to speak in different tongues in order to reach out to all the people in the world, but also the courage to carry out Christ’s message to the unknowing.

Sometime during the fourth century, it was believed that Christianity was introduced to Ireland by Roman missionaries who came from England. Pope Celestine officially sent Palladius to convert the people in 421 C.E. However, the most effective missionary who came to Ireland was Saint Patrick, who converted large numbers of Celts. By 438 C.E. Christianity had so many adherents that the high king of Ireland, Laoghaire, organized a committee to decide the future of the faith in Ireland. The laws became known as the Seanchus Mor and held a mixture of Irish and Christian beliefs. The Celts, in general, accepted the beliefs, but would not let go of many of their pagan traditions. Irish paganism granted tolerance to Christianity because the missionaries compromised in order for the Celts to convert. This compromise is demonstrated in their art.

The first example of Irish Christian art that displays this fusion is an Irish High Cross, which is a standing stone, but the entire slab is carved into a cruciform shape. This particular cross is dated between the seventh and ninth centuries, found in the old abbey in the village of Moone in County Kildare. It stands seventeen and a half feet high, and is made of granite (Figure 7). The cross has a pyramidal base from which rises a rectangular shaft that is intersected near the top by a shorter rectangular shaft and connected by four arches, forming a circle. The circle connecting the arms of the cross is a significant feature of the majority of Irish high crosses derives from a pagan Celtic cosmic symbol representing the sun wheel, like those depicted at Newgrange. This image was easily fused with Christian symbols to represent the heavens as well as life without end. One of the
faces of the cross contains an image of Christ, embraced by the circle, inferring that His followers will receive eternal life.

The four sides of the cross are covered with carved images placed tightly together. Displayed on the east side are the Twelve Apostles below an image of the crucifixion (Figure 8). The twelve apostles, as well as the image of Christ and the two men depicted at his sides, are reminiscent of the janus-head statue of Boa Island described earlier. The large triangular heads with lentoid eyes are the dominant body part on these schematic figures, the majority of which lack arms. Along the shaft on all sides of the cross are images of animalia, as well as the familiar Celtic symbols of spirals and lozenges along with intertwining serpents in the familiar interlace pattern.25

A theme found consistently in the images of the Moone Cross, as well as other Irish High Crosses, is divine intervention and miracles. The West side of the base contains the Old Testament images of Daniel and the lions, Abraham sacrificing Isaac, and Adam and Eve, which are all examples of God’s divine intervention. The North and South faces of the cross contain images of the Miracle of the Fish and Loaves, the Flight into Egypt, and the Three Hebrews in the Fiery Furnace on its base, all emphasizing the role of the miraculous.

Depicted on the cross are two scenes portraying Saint Anthony (Figure 9), who was an important figure to the Irish in the early medieval period because he was a hermit who lived alone and devoted his life to Christ.26 Monastic life was a major factor in the development of Christianity in Ireland, principally because of the art and knowledge these communities fostered. It was in the seclusion of these monasteries of Ireland during the seventh century that the illumination of manuscripts reached full expression. This occurred at the same time that the art and culture of the rest of Europe fell into decline due to the Germanic invasions. The isolation of Ireland allowed the land to remain untouched by the unrest and disorder of the continent. Irish monks preserved knowledge from the continent in illuminated manuscripts.27

The style of the manuscripts created in Ireland was unique due to the images that derived from pagan Celtic art. The oldest book of this kind that originated in Ireland is the Book of Durrow dated from the seventh century. It is evangelical in content and is written in Latin in insular script. It contains 248 folios depicted on vellum measured at 247 by 228 mm.28 Each of the four books of the gospels is preceded by a depiction of the author and a carpet page (except for the portrait of Matthew which is now misplaced).29 The Folio 3v from the Book of Durrow is an example of an Irish carpet page that exhibits Celtic decoration and Christian text (Figure 10). The dominant images depicted on this particular page are the triple spirals or triskeles. This
solar symbol, which also conveys the Irish belief in the power of three, was transferred into Irish Christian art, where it represented the Holy Trinity. The circle and the twining interlace depicted on the High Cross has the same meaning within the Book of Durrow as it does on the monument. The human images (Figure 11) of Durrow display the fusion of Christian and Celtic art with their schematic frontal faces and bodies with little expression or personal characteristics.

Another illuminated manuscript, known as the Book of Kells, is one of Ireland’s most treasured relics. On the 339 folios (330 by 250 mm) of calfskin is written the four gospels in Latin in the insular majuscule style. With its red, black, blue, green, purple, and gold pigments used to create bold and dynamic images, the gospel was described as “the product of cold-blooded hallucination.” An illumination taken from the Book of Kells, is the Monogram page (located on folio 34R) (Figure 12), which has no precedent in classical art. The Greek letters X (Chi), P (Rho), and I (Iota) dominate the illumination, for together they are the first three letters of the Greek spelling of Christ, the first word written in St. Matthew’s gospel. The X is placed at the curving section of the P, similar to the Labarum form of the cross. Placed within and around the letters, numerous Celtic symbols appear in the form of triskelions and swastikas, designs, and interlace, which decorate and give further meaning to the illumination. Another Celtic feature promoting warrior culture emerges in the disembodied heads of Christ and angels, which have blond hair and almond shaped eyes.

With manuscript illumination, the fusion of Irish and Christian art reached its fullest expression. Images featured in illuminated manuscripts created in the isolated monasteries of Ireland are perfect examples of how the word of Christ, illuminated with Celtic forms, transformed pagan symbols into Christian images. These images, rendered at the same time as the Irish High Crosses, defined Christianity in Ireland and utilized the same figures and miraculous stories found in early Christian art, but with the geometric forms and symbols of Celtic art.

Christianity was able to advance quickly in Ireland, not only because of the power of Christ’s message, but also because of the use of art to educate the people. The policies of the Christian leadership that permitted the Irish to retain many facets of their pagan culture was also a contributing factor. Christians connected Irish mythology with Christian scripture; the heroes of old worked with the Christian saints to bring about early Irish Christianity. Over time, the symbols featured in their art lost their original meaning, as did many of the pagan traditions, and came to serve the Christian mission in Ireland.

Notes
3. Ibid. 14.
4. Jones and Pennick 2.
8. O’Riordan 54.
9. Ibid. 60.
12. Bryce 60.
16. Ibid. 61.
17. Ibid. 64.
22. Ibid. 104.
25. Ibid.
26. Ibid.
29. Ibid.
Bibliography


Memory and Metaphor on Roman Funerary Monuments

Jessica Hull

Faculty Advisor: Melanie Grunow Sobocinski
Department of Art History
University of Michigan-Dearborn

Modern understanding of Roman funerary practices is limited; one significant source for interpretation is the funerary monuments. Such monuments range in size, cost, and dignity. An imperial tomb, such as the late first century B.C.E Mausoleum of Augustus, is at the highest rung of the ladder; every aspect of the tomb conveys the richness of the Empire which Augustus worked to establish. In contrast to the few enormous burial monuments each housing several emperors of Rome, mythological sarcophagi were very common in the second century C.E. and beyond. These tomb types, both used as vehicles for remembrance, were intended to have spectators commit to memory the deceased including their virtues and wealth; the monuments differ in the way in which they present allegories for the deceased.

Probably the most important element in the design, location and visual appearance was the role that memory played. Roman memory was enhanced with visual narratives and Romans were trained to locate ideas in space and associate them with iconography (Guven 32). This concept is easily applied to funerary monuments. Mythological sarcophagi depended on the popular repertoire of myths. By using popular myths, such as the Labors of Hercules, they “…work upon the mind, excite thought with their inherent drama, and thus implant themselves in the repository called memory” (Koortbojian 116). At Augustus’ Mausoleum visual clues appear in the form of a colossal statue atop the mausoleum. While the statue’s form is highly debated, the “inherent drama” in crowning the mausoleum with a colossal statue engaged the viewer, forcing them to look towards the heaven and thus creating a metaphor of deification (Rehak 43).

This imposing sight would not be the only visual impact on the viewer. The location of the mausoleum undoubtedly impressed travelers entering and leaving Rome through its Northern boundary (Rehak 36). By choosing to place the mausoleum where the Via Flaminia and the Tiber River came closest to each other, it was assured to be travelers’ first sight of the city as they entered and their last as they left. Placement of sarcophagi played an equally important role when trying to engage viewers. Like the mausoleum, sarcophagi were placed within burial chambers along roadsides, which potentially would have increased the number of spectators. When placed in burial chambers, the sarcophagus would be placed against a wall or in a niche, leaving the undecorated back inaccessible to viewers. (Toynbee 271). The sculptural program was meant to be admired and contemplated (Toynbee 275). The last influence on memory is the tomb’s design which is most applicable to Augustus’ Mausoleum. Clearly meant to impress the viewers was the size of the Mausoleum; its diameter reached close to 80 meters while it probably reached 40 meters high (Rehak 38). The staggering size would reference the concept of Roman memory being aided by locating ideas in space. However, in this case, it was even more important to locate the massive structure in space as well and realize the power of the Imperial family to marshal the manpower and resources necessary to build it (Rehak 53).

Recounting the achievements of the deceased was another way to create a lasting memory. However, the tactics through which sarcophagi and the mausoleum achieve this goal diverge. The ancient author Polybius records that those who gathered to mourn the deceased
were retold a version of their achievements (Koortbojian 123). This retelling would have “…recalled to their minds and brought before their eyes…” a memory of the deceased (Koortbojian 123). For most, accomplishments were recounted for mourners only at the funeral or on funerary inscriptions; Augustus however, was able to document his virtues and achievements at length with his Res Gestae Divi Augusti, which translates as the Achievements of the Divine Augustus. The Res Gestae was the autobiographical account of Augustus’ deeds inscribed in bronze and meant to be placed near the entrance to the mausoleum; copies were distributed throughout the empire. By recording his Res Gestae, he took a fleeting funerary ritual and made it permanent and very public. The tenor of the inscription was meant to appeal to the Roman people, to whom he wished to appear benevolent (Goodman 128). However, the Res Gestae can easily be read as a document manipulating Augustus’ acts and reputation through perhaps unscrupulous spin. For example, in his pious pose he states that after he earned the title of “Augustus” he “…possessed no more official power than others who were my colleagues in the several magistracies” (Brunt 37). This simple statement is meant to show his respect for the division of power in Rome, but it is only a half-truth (Brunt 79). At that time, his colleagues “…were not his equals even in legal power, when we take into account both the vast provinces he governed and…the tribunician power that he also possessed…” (Brunt 79). While the Res Gestae follows Roman funerary practices of recounting virtues and achievements, Augustus does not present an altruistic history and thus “…the distinction between history and personal achievement was obliterated, resulting in a fusion of public and private memory with the kind of reading that Augustus wished to engineer” (Guven 32).

Among the greatest differences between the mausoleum and Roman sarcophagi is the ability to extend metaphors about the deceased. Sarcophagi can extend a limited amount of metaphors while the mausoleum, clearly used as a propagandist monument, allows its function to provide additional context to convey the legitimacy of his ruling and military victory. The mythological cycle on sarcophagi provide allegory by associating the individual with ancient myth. As a result, this would elevate “…the lives of those who were recalled to the status of myth” (Koortbojian 124). Augustus, while seeking to elevate himself extends the concept much further in order to prove his legitimacy as the new ruler. Construction began before he gained sole power, quite likely in order to demonstrate his loyalty to Rome for propagandist motives (Zanker 100). His loyalty was meant to elevate himself above his rival, Marc Antony. While most funerary monuments are meant to elevate the individual, the motives were entirely different; Augustus intended to prove himself to the Roman people while sarcophagi were used to associate the individual with myths depicting heroic actions and acts of piety.

Augustus tried to prove that his lineage was steeped in Italic history. This heritage is easily seen in the structure of the tomb as it reflects Etruscan tumuli. One scholar argues that it meant “…to evoke tumuli of the princes of Troy” (Claridge 183). This connection is also supported as Augustus attempted to create a new mythology, turning first to the myth of Aeneas, a Trojan survivor of the war who later settled in Italy. The myth was retold in the Aeneid, an epic poem commissioned by Augustus which included “…the wanderings of Aeneas with a new meaning, in which not only the future rule of the Julian house, but the whole history of Rome was portrayed as one of predestined triumph and salvation” (Zanker 193). This poetic patronage shows Augustus manipulating a well established myth, in the memories of the Roman people to legitimize his rule.

Placement of his tomb in the Campus Martius also roots Augustus to early Roman history. Burial at the Campus Martius was previously reserved for Rome’s summi viri, the
topmost men (Davies 139). Among the summi viri was Romulus, the founder of Rome. In this way, Augustus claimed further legitimacy by placing his tomb among the historical figures of Rome. When looking at the historical connotations of sarcophagi, on the other hand, most do not have such a deep seated history intending to connect the deceased to a legacy of myths, nor do their styles or from quote historically significant precedents.

Another metaphor the Mausoleum extends is victory. Previously discussed was the placement of the tomb; the visibility in the cityscape and the grandiose size was meant to commit the monument to memory. The placement in the Campus Martius also suggests that the function of the Mausoleum doubled as a victory monument. A preceding building program at the Campus Martius was Pompey’s triumphal complex; Augustus followed this example by placing another triumphal monument in the Campus Martius (Davies 67). The use of Egyptianizing motifs, specifically the obelisks that flank the entrance to the mausoleum follow the tradition of displaying works of art as “emblems of triumph” (Davies 63). Augustus was successful in annexing Egypt after his defeat of Antony at Actium. Therefore, when the Egyptian motifs are seen at the mausoleum, it recalls Augustus’ triumph.

Roman tombs provide rich examination of the mores of the individual and common funerary practices. Tombs must have appealed to the class system of Rome allowing the Imperial family to show off their divinity and wealth while the lower classes could still effectively display their own wealth with more modest tombs. What we can glean from funerary monuments is the desire of the Romans to elevate themselves to more pious individuals and hopefully reach immortality through memory.

Works Cited


Psychological Continuity, the Circularity Objection, and Quasi-Memories

Michael R. Pauldine

Faculty Advisor: L. Nathan Oaklander
Department of Philosophy
University of Michigan-Flint

Abstract

This essay addresses the psychological continuity solution to the problem of what accounts for one’s identity over time, also known as diachronic identity. More specifically, inherent within this solution is that psychological continuity presupposes one’s identity and is, thus, based on circular reasoning. Derek Parfit (1971) provides a notion that, he argues, avoids this circular reasoning in defense of psychological continuity known as quasi-memories. However, Marya Schechtman (1990) believes to illustrate that Parfit’s quasi-memories rely on an elementary and implausible view of human experience and, therefore, does not avoid the circularity objection. Lastly, Steve Matthews (1998) offers a response to Schechtman’s argument against Parfit via a thought experiment.

There are a number of perplexing questions in the broad field of metaphysics. These include, for instance, inquiry in the areas of space and time, free will, religion, the nature of the mind, and personal identity. This paper will focus on the latter. Within personal identity there are two main areas of interest; that is, the question of what accounts for one’s identity at a moment, which is known as synchronic identity, and what accounts for one’s identity over time, or diachronic identity. Again, this paper will be concerned with the latter. The most widely accepted and discussed theory of what accounts for one’s identity over time is known as psychological, or memory, continuity. This view suggests that what accounts for one’s diachronic identity is their psychological states such as memories, intentions, beliefs, values, ambitions, character traits, and the like. However, a commonly recognized and well-known criticism of this view is that, in its argument, psychological continuity presupposes personal identity itself and thus, is guilty of circular reasoning. More specifically, for one to have the memory, for example, of an experience this already assumes that it was they whom had the experience; or, in other words, we are only able to remember our own experiences. Derek Parfit (1971) in “Personal Identity” suggests a concept that he calls quasi-memories, or simply q-memories, that, he argues, avoids the circularity objection. However, Marya Schechtman (1990) in “Personhood and Personal Identity” puts forth a convincing argument against Parfit’s q-memories, and all other q-psychological states, which, she asserts, “relies implicitly on a highly implausible view of human experience” (p. 72). Lastly, Steve Matthews (1998) offers a response to Schechtman’s argument against Parfit in his article “Personal Identity, Multiple Personality

Disorder, and Moral Personhood\textsuperscript{3}” via a thought experiment. The current paper aims to describe these opposing and complementary positions regarding \(q\)-psychological states and the circularity objection of psychological continuity.

In order to avoid the circularity objection of psychological continuity, as described above, Parfit introduces the concept of \(q\)-memory. This notion is beneficial insofar as it evades the logical truth that we can only remember our own experiences; or, put another way, \(q\)-memory does not presuppose one’s identity in its definition and, therefore, sidesteps the circularity objection. Specifically, Parfit (1971) defines the concept as, “I am \(q\)-remembering an experience if (1) I have a belief about a past experience which seems in itself like a memory belief, (2) someone did have such an experience, and (3) my belief is dependent upon this experience in the same way (whatever that is) in which a memory of an experience is dependent upon it” (p. 176).

It is clear that with this definition of \(q\)-memory, and similarly with other \(q\)-psychological states, such a concept does not necessarily presuppose identity because one can now imagine that an individual could \(q\)-remember someone else’s experiences. Parfit suggests that currently people automatically assume that their memories are their own because they do not in fact have \(q\)-memories of others’ experiences. However, with the introduction of such a possibility as \(q\)-memories, Parfit (1971) describes that “I should cease to assume that my apparent memories must be about my own experiences. I should come to assess an apparent memory by asking two questions: (1) Does it tell me about a past experience? [and] (2) If so, whose?” (p. 176).

Therefore, with this possibility, apparent memories would come to such a person as the more encompassing concept of \(q\)-memories. For instance, consider an apparent memory that comes as a belief about my past: “I brushed my teeth today.” Whereas if I knew I could \(q\)-remember other people’s experiences, such a memory would have to come to me as: “Someone—probably I—brushed their teeth today.” With the notion of \(q\)-memories, the psychological continuity view of personal identity does not, by definition, presuppose identity and, hence, successfully avoids the circularity objection.

After defining the terms and discussing the circularity objection, Schechtman covers, in detail, Parfit’s response to the objection followed by her intriguing criticism of Parfit’s \(q\)-memory notion. Schechtman (1990) holds that “the issue of nondelusionality [is] far more complex than identity theorists recognize. I shall argue that simply deleting the ‘nametag’ from a memory is not sufficient to make it nondelusional, and that in order to make an apparent memory truly nondelusional one will have to either presuppose the identity of the rememberer with the person who had the experience, or else remove so much of the content of the memory that it is no longer plausible to say that what is relevant to personal identity in genuine memory is preserved in quasi memory” (p. 79). Schechtman begins her argument with a passage from a novel, which describes a man, named Casey, and his family’s outing to dinner and a movie.

Although it is beyond the scope of this paper to reproduce the scenario completely, here is a representative portion of Casey’s recollection of the experience:

I recall going to the movie \textit{Small Change} a few weeks ago…After dinner nearby at Clark’s, my two young children, my wife, and I had walked briskly over to the Lincoln Theater. There ensued a wait that seemed much longer than the ten or fifteen minutes it actually was. The children were especially restive and had difficulty staying in the line that had formed—Erin attempted some gymnastic

tricks on the guardrail by the entrance, Eric looking at the posted list of coming attractions... The film was in French, with English subtitles. I have only a vague recollection of the spoken words; in fact I cannot remember any single word or phrase, though I certainly remember the characters as speaking. The same indefiniteness applies to the subtitles, at which I furtively glanced when unable to follow the French. Of the music in the film I have no memory at all—indeed, not only of what it was but whether there was any music at all... (Schechtman, 1990, p. 80).

Schechtman believes the preceding story shows that Casey’s memories are of a notably complex nature due to the number of personal associations, such as his relationship with his family and details about Casey’s life that are inherently involved in them.

Schechtman argues that imagining someone other than Casey q-remembering this family outing results in an implausible view regarding the inner lives of people. This is due to the amount of personal detail, reference to other parts of his life, and his personality imbedded within the memory, which would seem to make it difficult for another to receive it as a coherent q-memory (Schechtman, 1990, p. 81). The memory of the outing includes, for instance, familiarity with the town in which Casey lives, details regarding his relationship with his wife and children, and his knowledge of French plays a significant role in how he recalls the movie. If we are to imagine someone else q-remembering these experiences, the physical locations would seem unfamiliar to them, the notion of having a wife and kids may seem foreign, and the difficulty in making sense of the movie if the case be that the q-rememberer does not speak French. We could also imagine that the q-rememberer happened to act in the movie or had a part in the film’s score, then it would be difficult to explain how he/she failed to recognize them self on screen or how he/she could have no knowledge of the movie’s music. In short, there would be a number of missing elements in the q-rememberer’s psyche that would make it difficult to imagine what such a q-memory would be like.

Schechtman finds that there are two possible outcomes to someone attempting to q-remember having such an experience. (For the following imagine that a man, Rob, is q-remembering Casey’s outing.) The first Schechtman (1990) describes “is that [Rob] will reproduce all of the visual content of the memory without interpreting it as Casey does. That is...[Rob] will have images of being in a strange restaurant...then a theater, with a woman and two children whom [he] does not recognize, and [he] will also have images of seeing a movie with these people. The second alternative is that [Rob] will reproduce the memory exactly as it occurs in Casey, with all the same personal elements and associations” (p.82). Neither of these possibilities, Schechtman argues, allows for q-memories to operate as Parfit intends them to. Furthermore, she claims that it is not even entirely clear if the first alternative is actually possible insofar as our memories may not be strictly visual as this suggests. To illustrate, it is plausible to imagine that Casey does not simply visually recognizes these people as his family but recognizes them nonvisually as his wife and children, which, Schechtman (1990) finds “would be impossible to reproduce neutrally in [Rob]” (p. 82). Even if this possibility did exist, this would still seem to fail because such a q-memory would not capture all that is important in personal identity as does a genuine memory connection. Thus, Schechtman concludes, if so much of Casey’s experience is absent from the q-memory then there is little support in arguing that the q-memory is qualitatively the same as Casey’s memory.
As for the second possibility, supposing that Casey’s memory is reproduced in the q-memory with all the personal associations and details, it would follow that these people are Rob’s wife and children, the town in which he lives is Rob’s town, the theater will be exactly familiar to Rob just as it is to Casey, and so forth. Schechtman finds that, given this possibility, it is difficult to make out Parfit’s claim that the memory of the experience and who had the experience is separable. Schechtman (1990) explains that “if the memory must be such that I think of it as my family and my hometown, then the mineness of the experience seems to be part of the content of the memory” (p. 83). In this case, the fact that this memory is Casey’s memory is a crucial and fundamental part of its qualitative content; and this qualitative content, Schechtman believes, cannot possibly be coherently q-remembered without substituting Casey’s complete psychology in place of Rob’s psychology (Schechtman, 1990, p. 83-84). The problem with this option is the memory would no longer be nondelusional in the q-rememberer because “giving [Rob] the full content of Casey’s memory requires the inclusion of facts about who has the memory. These facts, however, are false in relation to [Rob], so their inclusion will make [the] quasi memory delusional” (Schechtman, 1990, p. 84).

After explaining her argument, Schechtman summarizes the two possible outcomes in someone q-remembering such a complex experience as Casey’s outing. If a q-memory fails to include the original individual’s personal associations and details (i.e. the memory is solely of a sensory nature) the q-memory will be absent of so much of its original content that it cannot be regarded as qualitatively the same apparent memory; and, therefore, removes any relevance such a q-memory could have for personal identity. On the other hand, if the entire content of the apparent memory is reproduced with the q-memory (i.e. with all the personal associations and details from the original experience) the inclusion of these facts will result in the q-memory being delusional. In this case, Schechtman claims, it would be impossible for the q-rememberer to separate the content of the experience from whom it was that had the experience. The remainder of her essay consists of Schechtman explaining how the criticism she raises against q-memories is just as problematic with other q-psychological states (e.g., q-intentions, q-beliefs, q-desires, etc.).

Steven Matthews (1998), however, believes to show Schechtman’s criticisms faulty insofar as they disregard the theoretical importance of differentiating between the qualitative content of a q-memory and the ownership of a q-remembered experience (p. 76). He argues that this is so by first introducing the Inseparability Thesis (IT), which he defines as the proposition that “memories, and other psychological states relevant to personal identity, establish the identity of a person in virtue of the qualities of the person revealed in the content of those states” (Matthews, 1998, p. 77). The significance of IT in respect to Schechtman’s argument is, as Matthews claims, it includes in its definition that apparent memories contain allusion to the person whom originally had the experience in order for such a psychological state to be relevant to personal identity. This inclusion, Matthews continues, emerges from Schechtman’s dilemma; that is, the ultimate outcome of q-memories is either of an incomprehensible or delusional nature. Matthews argues that this is not necessarily the case and, thus, Schechtman’s argument is unsound. He believes to show this via a thought experiment:

So, consider a science fiction example in which two planets match one another perfectly in all intrinsic respects. Suppose the histories of these planets, which we may call “Earth 1” and “Earth 2”, are exactly alike, until the following event occurs: on Earth 1 you are going about your
business as normal, as is your double on the twin planet, when suddenly you are kidnapped and taken to Earth 2... They bring you and your twin together for surgery. They extract qualitatively identical memory traces [regarding a recent holiday] from each of you and swap them over, implanting your memory traces into your double and vice versa... You are asked to recall your holiday experiences, which you do with perfect ease, as does your double. You are then told... what you in fact seem to remember is the holiday had by your double. You then check your apparent memory against [his, which] it turns out, is no different from yours (Matthews, 1998, p. 76).

In the following example, Matthews finds, there would not be anything in either individual’s memory to give him the ability to distinguish between the two. Furthermore, he argues that this case does not illustrate incoherence or delusion on the part of the $q$-rememberer, which is required if Schechtman’s argument holds. The final implication of the above story is that there would be clear separation of qualitative content of the $q$-memory with that of whose experience it originally represents. Therefore, Matthews concludes, the IT is erroneous, as the example shows, and Schechtman’s argument, regarding the two possible outcomes of $q$-memories, is unsound. Thus, $q$-memories, as well as the other $q$-psychological states, resist the circularity objection of psychological continuity as suggested by Parfit.

This paper discussed the relevance of Derek Parfit’s $q$-psychological states in respect to the circularity objection of the psychological continuity theory of personal identity. Also reviewed was Marya Schechtman’s criticism of these quasi states and a response by Steve Matthews in defense of Parfit’s notion. Certainly this debate over personal identity is far from being resolved, similarly with other issues regarding personal identity (e.g., synchronic identity) and matters in the further fields of metaphysics. This is surely one of the primary reasons this branch of philosophy continues to draw, so many years later, new inquiry and interest.
How We Put It: An Analysis of Wittgenstein’s “Language Games” and Their Relation to Skepticism

Aaron Usher
Faculty Advisor: Maureen Linker
Department of Philosophy
University of Michigan-Dearborn

The discipline of philosophy is well known for, among other things, asking so called “big questions”. Queries such as “What is Love?”, “What is The Good?”, and “What is Justice?” seem to emanate naturally from philosophy. For much of its history, philosophers have sought true, objective answers to these questions, however difficult they may be to find. In Cause and Effect: Intuitive Awareness, Ludwig Wittgenstein makes important commentary on these kinds of questions, giving particular attention to “What is Causation?”. His primary concern seems to be that philosophers before him were always trying to “know” what causes what when this is not how we really deal with what we call “Causation” (452). Wittgenstein claims “We react to the cause.” rather than knowing, objectively, what it means for one thing to cause another (ibid). He uses the term “cause-effect Language Game” (along with other kinds of Language Games) to refer to this apparently intuitive way human beings apply rules to the way they express common language (Glock, 193). The skeptical implications of these rules, Wittgenstein says, are quite significant: We may say we “know” P simply due to the rules of the game; it does not follow that we truly “know” P. Rather than dive head first into the pure skepticism that seems to result from this conclusion, an avenue that David Hume before him saw as inevitable, Wittgenstein rejects dependency on objectivity and says “the game doesn’t start with doubting.” (“Cause and Effect”, 454). He suggests that the only way we can “know” such things as causation, in any sense, is through some kind of intuition. I believe that Wittgenstein is correct in asserting that his “language-games” serve as a natural way for people to overcome skeptical doubt concerning causation and other abstract ideas.

Centuries before Wittgenstein, The Scottish philosopher David Hume sought to divide the many claims of truth into different categories. In An Enquiry Concerning Human Understanding, he argued that all relevant statements of truth are based either on ideas or impressions (physical sensations), with the latter being derived from the former (167). These two kinds of perceptions are then related to “Relations of Ideas” and “Matters of Fact”, respectively (ibid, 170). The former are simply combinations and translations of ideas; they are the pure product of mental activity and need have no “dependence on what is anywhere existent” (ibid). Matters of Fact, however, are statements that require real and direct experience with the external world. Because they are not logically based, Hume says that “the contrary of every matter of fact is still possible” (ibid). What we perceive may easily be perceived differently later.

A large problem that Hume hopes to address is that of expressions which are “employed without any meaning of idea” (ibid, 169). These “meaningless utterances” represent any statements that are not firmly grounded in experience (this can still include ideas and relations of ideas) (Soccio, 306). Hume examined many types of ideas which he later found to be meaningless, but paid particularly great attention to causation. He admitted that we develop an idea of cause and effect from experience (Hume, 171), but later points out that we have no explicit evidence of what we commonly call “Causation” (ibid, 181). Out of habit, we seem
inclined to assume such a thing for practical purposes, but we have no experience of it (ibid, 177); the idea of cause and effect is meaningless.

While Hume did not spend much time discussing the relation between “meaningless utterances” and skepticism, he certainly got the discussion started. It is this philosophic torch that Wittgenstein takes up in his work *Cause and Effect: Intuitive Awareness*. Here, Wittgenstein speaks of the role intuition plays in gaining knowledge. Wittgenstein points out that we, by intuition, recognize specific, often personal experiences as having some distinct cause (“Cause and Effect”, 452). This is not done experimentally. Rather, Wittgenstein says, we seem to directly experience the cause of a given effect (ibid). Even in cases where there is a lack of empirical evidence to support a certain cause, we have “a powerful urge…to see everything in terms of cause and effect” (ibid, 453). Hume would largely agree with this conception of human behavior; he calls our idea of necessary connection a “customary transition of the imagination (this being his best explanation) (Hume, 181).

Wittgenstein, unsatisfied with such a limited explanation, turns to a term of his own invention: The Language Game. Wittgenstein originally used the idea of a “Game” analogy as a way of explaining mathematical axioms. Axioms work for math like the rules of a game work for said game; they are the base, the entire support system that allows it to function (Glock, 193). Eventually, Wittgenstein made the connection to language, with what we call “grammar” acting as the “rules” of the “Language Game” (ibid). Language Games, however, are not, generally, played consciously (i.e. for our amusement) but rather are interwoven into what Wittgenstein calls our “form of life” (ibid, 197). While Hume considered certain types of sayings “meaningless”, Wittgenstein says that no consciously spoken statement deserves this title. Seemingly pointless sayings may, in fact, be subtleties of our personal backgrounds (ibid, 124).

Wittgenstein says that we can talk about cause and effect so freely because it is embedded in the “the Game”. Wittgenstein grants to Hume that necessary connection is not the tool we work with from day to day. Hume’s mistake, however, in his staunchly externalist view. Of course we should doubt cause and effect, if cause and effect it supposed to be a property that exists separate from us. This is the wrong approach, explains Wittgenstein, because Causation is a part of “the Game” and “the basic form of the game can’t include doubt” (“Cause and Effect”, 453). By this he means that the way we speak naturally does not begin by doubting the truth of what we say; In fact, we start with the unspoken assumption that our propositions are, in fact, true. Doubting, if it be done at all, comes after the fact, not before (ibid, 454).

Yet this may not be enough to some philosophers. It may seem too personal, too human. It may even be fair to critique Wittgenstein for not really making much headway on the problem Hume dug up. Does giving Hume’s vague “feeling” of causation a home (i.e. a Language Game) really explain it better, or does it simply state, in more words, that we can’t know certain facts of life? Rather than defeating skepticism, Wittgenstein’s approach seems to just curb it. Such assertions give rise to a few worthy counter-examples.

One such example concerns how we communicate physiological states. Pain and injury (something Wittgenstein himself talked about in detail) are, quite unfortunately in some cases, very common and seemingly collective examples of human experience. If I stub my tow and then exclaim to a friend “That hurts!”, that friend generally has no confusion about the meaning of my words. If I further explain the source of my pain to this friend (perhaps they didn’t witness the misstep personally), this chain of events will not cause any confusion to them either. Yet how can my friend do all this? They did experience this particular stubbing or the pain that appears to be its direct effect. Hume’s response would be simple: they can’t know. At best, Hume would
argue, the friend could assume that previous experience of pain they had was remotely similar to mine. Wittgenstein might instead relate such an understanding of another’s experience to his Language Game and further to his concept of Form of Life. It is evident by the freedoms we take when speaking of pain in general, he might say, that everyone (or at least everyone who has experienced it) has a sufficient concept of it. Still, in all this talk of practical language, Wittgenstein seems to evade the key issue: can we have knowledge of what pain, in general, is?

Another issue arises with interpersonal conflicts and deals similarly with collectively understood ideas. I, for one, can’t count all the times I’ve argued with my younger brother about any number of issues. The disagreements typically start over a rational matter. In cases where my brother is either being lazy about his thinking or is, despite his best efforts, wrong (i.e. logically inconsistent), I end up debunking the assertion he made. However, as he sees the discussion heading in this direction, he will often claim I have unfairly jumped to a conclusion. This critique seems, from my point of view at least, to be an act of desperation driven by frustration or anger over being wrong. The problem, from a Language Game perspective, occurs when I try to point out his emotional error. He claims that I don’t truly know this is what he is doing and proceeds to act as though he is calm and level headed. In other words, if our everyday language can be seen as a game, than my brother seems to “cheat” to avoid appearing mistaken. Even if I am right about my claims that he is faking his emotional state, he still raises a fair question: How can I really know another person’s emotions and, in regard to my practical problem, how can I overcome such gaps in knowledge for the sake of better communication with my brother?

I third problem, one common to the field of developmental psychology, is how and when infants come to understand causality. A pioneer in such studies was famed Swiss psychologist Jean Piaget. Piaget, an advocate of constructivism, believed that infants developed their knowledge of the world, including causation, by exploring their world and constructing various schemes over various stages of development (Sigelman, 187-188). Infants do have a built in capacity for general knowledge, Piaget says, but they must be active explorers if they wish to gain practical knowledge. Piaget’s most recognized experiments were on the subject of object permanence, a person’s awareness that objects remain even when they aren’t perceived. He noticed that younger infants ran into what he called the A-not-B error (Hespos, ¶ 3). In this example, an infant, who had been conditioned to look for a toy in spot “A”, continued to search in vain for the toy in that same spot, despite witnessing its move to spot “B”. Until a certain age (though the age Piaget calculated has since been judged as to high), infants seemed incapable of assessing what was, to adults, a simple matter of causation. This is problematic for Wittgenstein because his assertion that the idea of cause and effect is imbedded in language seems to imply an innate understanding of such principles (and that human language is a natural result of such understanding). How can such an intuitive approach to skepticism as Wittgenstein’s be squared with evidence that environmental factors are crucial?

These points, I believe, are all worthy of our attention when considering Wittgenstein. However, I believe they are all at least partially flawed in that they fail to appreciate his relatively novel approach to the problem of skepticism. From studying the classic we are perhaps most familiar with Descartes attempt to defeat skepticism. Descartes sought, and with the Cogito seems to have found, at least one truth that was epistemically unshakeable. This one truth, Descartes hoped, would be like an invincible wall, which would be, if anything, strengthened by attacks of doubt (Descartes, 118).

Wittgenstein takes an entirely different approach to knowledge in general. While Descartes came from a time when questioning and doubting was the starting point, for
Wittgenstein doubt comes after the fact. He says that starting off doubting things is like declaring a winner and a loser at the beginning of a game; it is self-defeating ("Cause and Effect", 455). Instead of doubting, Wittgenstein asks us to look point blank at our claims of knowledge. For Wittgenstein, knowledge requires context (Morawetz, 79). People don’t “just say” things, but rather attempt to convey some reason or cause for what they claim to know. But this does not mean we commit some kind of grammatical “crime” when we say “I know p” without absolute certainty of. He tells to be less concerned with the accuracy of the words “I know” and more concerned with “what might be a fitting use for them.” (“Cause and Effect”, 457); this, in other words, is how we play the Game.

We can use Wittgenstein’s alternative approach to knowing to re-examine the stubbed toe example. As previously stated, the issue seems to be whether or not Wittgenstein’s use of language can account for knowledge of pain in general (that is, as it is experienced by all who experience it). To address this issue, he first tries to imagine the opposite scenario, that is, in this case, that the pain from my toe being stubbed is truly something that only I experience and know. The problem with this is that we don’t have a corresponding separate word for such a thing (Kemerling, ¶ 13); even to say “my pain” is to include the general term. This argument, known as the Private Language argument, asserts that language never occurs in a vacuum. Because I am not the only one who can fairly employ the word “pain”, Wittgenstein says, there must be a proper “criteria” for evaluating its reality (ibid ¶ 14). In our example, the criteria are essentially my screams and likely an accompanied grasping of the offended toe; it is the immediate physiological reaction. Notice the difference between Wittgenstein’s approach and that of a standard empiricist: Wittgenstein first recognizes that we all use the word “pain” and then searches for criteria, not the other way around.

What about my issue with my brother? The issue here, like the initial critique, is similar to the stubbed toe argument. They both deal with sympathy, but two different kinds: the tow argument deals with a physiological feeling, while the brother example deals with an emotional feeling. Still, the method is similar because both are matters of criteria. Establishing criteria is more complex in this case, however, because there is another dimension added by our having a conversation. While my friend in the toe argument has no reason to deny my obvious criteria for pain, my brother, in what seems to be an attempt to save face, does. For tackling more complex problems like this one, it might be useful to address a distinction Wittgenstein makes between kinds of knowledge claims. He says there is there a significant difference between me saying “He knows p” and this “He” saying “I know p” (Morawetz, 82). In terms of my example, if I say about my brother “he knows he’s having an irrational reaction to his own frustration”, this is distinct from his statement “I know I’m having an irrational reaction to my own frustration.”, or the opposite in this case. When I say my piece the only required criteria is an account of his irrational verbal reaction. But for my brother to affirm, or in this case deny, what I say he must take into account what triggers these reactions. While I am only epistemologically responsible for giving an accurate account of the substance of his actions; he must give a reason for them if he wishes to continue rational discourse. Both of, then, might benefit from examining the motivations behind our arguments, whether conscious or subconscious.

Finally, we return to the issue of infant perception of causality. More recent developmental research (Piaget’s died in 1980) may shed some light in defense of Wittgenstein. One common critique of Piaget’s work is that it downplayed the influence of society and culture (Sigelman, 209). In light of this, psychologist Susan Hespos sought to test cross-cultural causal awareness in infants, specifically in infants from English and Korean-speaking homes (¶ 9).
significant difference for Hespos is how speakers of each language refer to the joining of two objects: Americans speak in terms of dominance (i.e. “A is on B”), while Koreans talk about the quality of the connection (i.e. “A is held loosely/tightly by B”) (ibid). In her experiment, a group of English-only American infants viewed a cylinder as it was inserted into another wide cylinder (loose fit) and another thin cylinder (tight fit). In a significant majority of the trials, infants paid more attention to one process than the other, showing that these distinctions are not simply enforced by teaching, but are innate to some extent (ibid, ¶ 11). Still, Hespos admits, it’s not simply nature or nurture, but nature and nurture. Other research she finds indicates that both combine to influence how we understand causality, as well as how we talk about it (ibid, ¶ 15). For Wittgenstein, this means that language has both intuitive components (which give us basic understanding of the external world) and taught ones (grammar, the “rules” of the Game, that shape it further). I think Wittgenstein would concede that this gives a broader and more accurate explanation for why we talk and act the way we do.

Those new to Wittgenstein’s theories may find it difficult to take in at first. This is no surprise, considering the historic background of Western thought. We live in an era ripe with scientific skepticism, a likely descendent of earlier skeptical and empirical philosophies. We are taught, both inside and outside of our school system to question everything, because this will lead us to greater clarity. So it may offend our internalized teachings to here a philosopher tell us that “the game doesn’t start with doubting”. It may be harder still to grasp the idea that knowledge is imbedded in language, something humans construct, or that it is always context specific. Wittgenstein, if he were still here to work us through these qualms, might suggest internal reflection. Instead of starting with skeptical queries, perhaps we should start with what is apparent and go from there. After all, don’t we already do this naturally, whether we are aware of it or not?

Works Cited

Evaluating Freedom

Kathleen Pullen
Faculty Advisor: Maureen Linker
Department of Philosophy
University of Michigan-Dearborn

Freedom is described philosophically as the power to exercise choice and make decisions without constraint from within or without. It is these values that are held at the core of every individual’s conscious thought-making process. By garnering an understanding of his or her freedom as it relates to the life one choices to live, then that individual is better equipped to handle decisions, big or small, as they come into play throughout the course of their life. In this presentation, I will focus on the question of “evaluating that freedom” from the perspectives of Jean-Paul Sartre and Maurice Merleau Ponty. While both of these philosophers hail from a 20th century French tradition, there are striking similarities and differences in their views on Freedom and the work they have produced to its’ effect.

To begin with is the analysis of Sartre’s view on human freedom. For Sartre, the fundamental choice is the self. Ultimately, the self is free, because it has already been made in accordance with the fundamental project. “Freedom is nothing but the existence of our will or of our passions in so far as this existence is the nilification of facticity; that is, the existence of a being which is its being in the mode having to be it” (Sartre 314). By viewing freedom (i.e. the fundamental project) as nothing but the state of the will’s existence, we come to view that Sartre sees that we are burdened to it, yet free from it in the same respect. We are tied to it as a burden, because every choice we make is essentially our choice. He goes into this further by using the example of a person going to war (Sartre 321). He states, “Thus, there are no accidents in life. If I am mobilized in a war, this war is my war; it is in my image and I deserve it” (Sartre 321). Since I am present in the war at the time, it is essentially my responsibility to own it. I could have taken a different path to get out of going - desertion, suicide etc. Yet, I made the conscious choice to go, therefore I must own my choice and deal with its’ consequences. In the same respect, I am free from the state of my will, because I have made certain life choices knowing that there would be consequences to them, although I did not know what those consequences would be. I was still free to choose something else, but I choose X instead of Y (i.e. war instead of desertion or suicide).

To see Sartre’s view of the fundamental choice, we are going to further it in reference to the idea that human beings are always free, yet this freedom is a great burden on the for-it-self. To best view these notions, let us look at the following passage from Being and Nothingness, “Therefore it is necessary that the for-itself in its project must choose being the one whom the world is revealed as magical or rational; that is, the for-itself must as a free project of itself give to itself magical or rational existence. Therefore the for-itself appears as a free foundation of its emotions as of its violations. My fear is free and manifests my freedom; I have put all my freedom unto my fear, and I have chosen myself as fearful in this or that circumstance” (Sartre 316).

It is from here, that we are able to see that Sartre views the fundamental choice as an existence that human beings are revealed through the for-itself. By obtaining this revelation of the fundamental project, we understand that it is a great burden that we carry because I choose to
be fearful in a certain situation, whereas in a different situation I may choose to be courageous. However, regardless of my reaction to the situation in which I find myself I am always free to choose the reaction. For example, if I am camping in the woods, and a bear has wandered into my campsite, I can choose to be fearful of the bear and not act in regards to its presence, or I can choose to view the bear as a fellow being (i.e. my being courageous in the aspect of “facing the bear”) and respect its space. Whichever act or emotion I choose to have, Sartre says that I am free, because ultimately it is up to me to decide what to do, or not to do.

While Merleau-Ponty agrees with Sartre on many of his views regarding the fundamental project, the main objection that we will be reviewing is Sartre stating that the fundamental choice is the self. Merleau-Ponty objects to Sartre by offering the following question, “If the fundamental project is the self, then who or what is making the choice for freedom (i.e. the fundamental project)?” Merleau-Ponty responds to his own question by saying that it is a contradiction because someone or something has to initiate the fundamental choice, and Sartre has failed to do that. “Moreover, even if existence as a human being were imposed upon me, the manner alone being left to my choice, and considering this choice itself, and ignoring the small number of forms it might take, it would still be a free choice. If it is said that my temperament inclines me particularly to either sadism or masochism, it is till merely a manner of speaking, for my temperament exists only for the second order knowledge that I gain about myself when I see myself as others see me, and in so far as I recognize it, confer value upon it, and that sense choose it” (Merleau-Ponty 325).

In this context, we can see Merleau-Ponty’s criticisms by using his examples regarding human existence and temperament. By stating that if human existence were a free choice regardless of outside forces, Merleau-Ponty sees that if I (the self) am simply the fundamental choice, then I am still not capable of making the choice to bring myself into existence, because there is nothing (i.e. no someone or something) to choose the fundamental choice. Within the example of temperament, Merleau-Ponty states that if he is known to be either sadist or masochist, it is simply an existence of knowledge gained about himself while others view him as such. Only when he recognizes it (places a value on it), can he then choose it. Thus, we see that through a hidden approach (i.e. human existence and temperament examples) Merleau-Ponty sees that without someone or something to make the fundamental choice it is not possible for the fundamental choice to be the self – someone or something must make the fundamental choice before the self can come in.

It is in my aspect of logical reasoning that I judge Merleau-Ponty’s analysis and objection to Sartre’s idea of the fundamental project succeeds in its critique. This being because it does not make sense that someone can judge the fundamental project as being the self when there is no one or nothing to make the initial choice. To further my agreement with Merleau-Ponty’s critique let us look at the following example. Imagine that I have just stolen property from someone (let us call him Jim). I have taken something of Jim’s without his knowledge or permission, but when Jim confronts me, I claim that my fundamental choice, which is the self, made the decision to steal from him. Therefore, since the fundamental choice is the self I had no control over what was occurring. Yet, this scenario makes little to no sense at all. Yes, I stole something from Jim, but I cannot claim that it was the fundamental choice, which is the self that stole something from him, because that is a contradiction in and of itself. The fundamental choice is the self, but then who really made the choice? In a way, no one made it. This being, because there has to be someone or something there to make the fundamental choice in accordance with the self. If there is no one or nothing there to make the choice, then the self is
not to blame for my stealing Jims’ property since the self is simply the fundamental choice, and there is no one or nothing before it since it is the only choice; it is nothing more, nothing less; it is present after the fundamental choice (i.e. the self) has been made.

Throughout Merleau-Ponty’s contradiction of Sartre’s fundamental choice, I also saw more clearly his view in terms of goals. He sees that the choices that it is our choices that confer with our future. Thus, the fundamental choice cannot be the self because not only has no one or nothing gone before it, but also there was not anyone or anything there to make a concurring choice for it. For Merleau-Ponty, what one is at present makes who one will become in the future in accordance with the past. For example, if I choose to dedicate myself to intellectual pursuits my whole life, it does not hold that tomorrow I will wake up and become a disc jockey. This is because my past choices have not dictated that it is likely that a change such as this will take place. Merleau-Ponty points out that it is possible that something like this could happen, but due to my past, it is not likely that I will choose such a path. By understanding that my past leads me toward my future, I am more inclined to reason my present situation, come to terms with it, and either change it or keep it; all in accordance with my past actions and future goals.

By viewing, analyzing, and understanding two different philosopher’s viewpoints on human beings in relation to the fundamental project, I believe that it makes the notion of freedom become clearer. Without comprehending my fundamental project, I will never be able to truly appreciate everything that it has given me, what it means, and what it stands for on its’ own. It is the very notion of fundamental project that drives to the very heart of human beings the willingness to stand up for beliefs, fight oppression, and live with choices – past, present, and future. However, dim my appreciation for the citizenship of the United States that I hold may be, my appreciation for the freedom that it has given is that much more distinct.

_You can only protect your liberties in this world by protecting the other man's freedom. You can only be free if I am free._

**Clarence Darrow**

Works Cited


The characteristics of modern day machismo and masculinity are part of Mexican history and the result of various cultural transformations. In the United States the term “maschio” connotes a stereotype of a Mexican who uses his muscle power to affirm his superiority over others, including women. Through the prism of three Mexican texts, Juan Rulfo’s canonical novel Pedro Páramo and the more recent short stories “Juramento” and “Navajas” by Antonio Eduardo Parra, I will demonstrate how macho attitudes are in fact used to mask inferiority, to project feelings of guilt and shame, and to tune out a man’s insatiable desires.

It has been argued that the origin of Mexican machismo stems from the Spanish conquest when Europeans invaded Mexican lands and terrorized its original inhabitants. This subjugation in turn created a devaluation of Mexican manliness via a loss of independence and identity. In The Labyrinth of Solitude, author Alfredo Mirandé examines an essay by Octavio Paz writing that “Paz attributed the Mexican’s deep-seated feelings of inferiority to the spiritual rape and conquest of Mexico - a defeat that was so devastating that it proved to be not only a military conquest, but a spiritual and moral downfall as well” (35). Its further transformation in the 19th century involved the development of certain political arrangements where strong-armed leaders would arrive to take control over territories and their inhabitants through sheer muscle power and a particular business acumen that placed them above less courageous individuals. They epitomized machismo in their brutal usurpation of entire territories and in apparent toughness that would not allow them to open up to anyone at the risk of losing their status.

Mexican masculinity takes root in the negation of true emotions and sentiments. For this reason, a common attribute of machismo is to close oneself up emotionally and remain stoic. A Mexican man does not have the option of expressing his feelings because the act of opening oneself up to others is a demonstration of weakness and this vulnerable action is only acceptable for women. Octavio Paz’s essay “Máscaras mexicanas” illustrates what is culturally acceptable for a man and depicts the type of individual who does not follow the gender-determined behavioral patterns. He writes, “Opening oneself up depicts weakness and betrayal… a man who “cracks” is not reliable, he is a traitor or someone of questionable fidelity” (1). The essay also interprets how men use symbolic masks and walls in order to conceal their vulnerabilities, worries, and fears. The act of metaphorically putting on masks and constructing walls are methods used to ignore true feelings that would otherwise classify tough men as weak and emotional women. Men accustomed to traditional masculinity use other means to express their frustrations without opening themselves up emotionally.

The common representation of the macho depicts an aggressive man who is inclined to use power and violence to accomplish his goal. In the words of Samuel Ramos, “One must presuppose the existence of an inferiority complex in those who take vital interest in all things and situations that signify power” (36). Another collective characteristic is the persistent need to defend oneself and to be at a constant state of distrust and suspicion toward others, especially toward other men. As Mirandé argues, “the Mexican male is said always to be distrustful of
others “so that they don’t get screwed over”’’ (36). The hesitancy of the macho to let others get close to him also reiterates mistrust and fear. In any case, exerting physical power over others as well as hiding and suppressing true feelings is a defense mechanism highlighted in Pedro Páramo.

The protagonist in this book, a tough caudillo named Pedro Páramo, embodies the image of traditional Mexican masculinity as he has arrived at infinite power via pillage, murder, and corruption. He sleeps with all the women he wants to, regardless of their marital status and interest or the lack thereof, he manipulates men with threats and force, and he is emotionally impenetrable. Pedro represents “the pistol-toting bully who sates his brutal impulses by trampling on the common citizen, and who can do it with impunity because he has money or political influence” (Paredes 23). That is to say, Pedro Páramo is the proprietor of the village of Comala and feels that although he must be respected, he does not have to reciprocate that respect for anything nor anyone. When Pedro’s foreman Fulgor Sedano asks him to consider the laws of the village, Pedro answers “Which laws Fulgor? The laws in effect that surpasses any others are ours” (Rulfo 46), meaning he feels that he lives above the laws and does not need to follow them as other common citizens do. Furthermore, Pedro personifies a macho as he constantly manipulates others and uses them for his own advantage. Pedro converts Fulgor into his personal instrument and at the same time belittles the man when he refers to him as “un niño” or “un imbécil” (46) in order to reiterate his own power. Although Pedro gives important responsibilities and duties to Fulgor, he never lets him forget who holds absolute authority in all situations. This is evident when Pedro responds to one of Fulgor’s questions by saying “Do as you wish, but don’t forget who is el <don>.” (Rulfo 41). It is clear that Pedro Páramo exemplifies many attributes characteristic of machismo, when in reality his expressions of brute masculinity derive from an unfulfilled desire.

In conjunction with his overt power and tough exterior, Pedro Páramo lives with an insatiable desire originating from his childhood. As a young boy he became obsessed with a girl named Susanna who had moved away from his village as a child, leaving him unable to have her. His entire life’s mission was to find her, take control over her, and make her love him. Pedro prevailed when he found out where she was living. His only method of obtaining control of her was to have her father killed, which reiterates this inclination of the macho to use violence as a means of obtaining power. Even when Pedro finally gets to marry Susana, he is not satisfied because her deepening madness prevents them from forming a bond. In consequence, Susana’s feelings become the only thing that Pedro cannot control nor manipulate. After her death—for Susana promptly expires—Pedro’s heartbreak and frustrations can only be expressed in a way characteristic to a traditional macho. He never speaks of his sadness or shows any emotion other than a displaced anger and aggression toward his town, as he swears vengeance on Comala: “I will simply cross my arms and Comala will die of hunger” (Rulfo 124). The lack of love and happiness in his relationship with the (unattainable) love of his life appears in the text when Rulfo writes:

“He [Pedro] never loved any other woman like he did Susana. By the time she was handed over to him, she was already suffering, maybe she was insane. He loved her so much that once she died, he spent the rest of his years slumped in a chair staring at the road where they had taken her to the cemetery. He lost interest in everything, evicted his lands and burned everyone’s possessions… until his town was in ruins and resembled a wasteland” (86-87).
In other words, Pedro “invents a new self and transforms in order to conceal his vulnerability and outwardly express his manliness and “machismo”” (Coria-Sánchez 210). Pedro Páramo uses his masculine attribute of power to damage the town that he controls so that he can simultaneously reaffirm his masculinity and further suppress his deep emotional pain.

Another text that attests to the continuity of macho tradition in Mexican letters, albeit referring to much more recent history that stems from economic disadvantage vis-à-vis the United States that makes underprivileged Mexican masses insecure and aggressive is the short story “Juramento” from Parra’s Tierra de Nadie. In this story machismo is manifested in acting violently as a reaction to the “disloyal” desire of wanting to escape from Mexico and go to the U.S. The conflict begins when el Güero, a childhood friend of José Antonio returns home after having lived illegally in the United States. José welcomes him back with open arms while their other childhood friends and fellow gang members do not regard el Güero’s return in the same manner. They no longer respect el Güero after his infidelity to Mexico in deciding to sell himself to the U.S. economy. Elías, the leader of their group’s gang, assumes the macho role in the story and verbally demonstrates his masculinity when he states “He wanted to be a gabacho, and for that he betrayed his homeland” (Parra 17). When Elías suggests to the other gang members that engaging in a physical encounter with el Güero would be the best way to show their disapproval for his actions, everyone agrees. This reveals the traditional mindset that resorting to violence is the best option of displaying power. The book stresses the commonality of using physical violence to teach a lesson in describing the decision to fight as follows: “It was viewed as something easy to decide: Screw him up or don’t. There was no courage, no passion; simply the carrying out of Elías’s order” (12).

José Antonio however does not want to be involved in physically assaulting el Güero and his objection is also viewed as disloyal to his people and country by the other gang members. In order to reaffirm his position of power as the primary decision maker of the gang, Elías publicly insults José Antonio by saying “…you’ve been separating from us lately. I don’t know why. Maybe we’re becoming too tough for you. Ricardo says that you’re becoming a queer” (15). In reality, José Antonio and el Güero had made a pact years prior to cross the Rio Grande together and be free from the senseless lifestyle of their gang. Although he tries to warn el Güero about the arranged fight, the other gang members intervene too quickly and a violent battle breaks out. Elías and the other members’ intent was to teach el Güero a lesson for being a traitor and dishonoring his home country. In the end, the gang’s use of violence in the name of vengeance results in the deaths of both el Güero and José Antonio.

The duty to avenge the disloyalty of leaving the homeland of Mexico stems from feelings of inferiority of the Mexican man living near the border. In many ways, el Güero represents the type of successes that one has in escaping to find a better life. El Güero’s abdication stirs up insecurities and frustrations within the other gang members who only know how to conceal their vulnerability with violence. This story “must be read as an example of scapegoating where el Güero functions as a catalyst for the deep-rooted frustrations of others” (Pobutsky 11). Since the United States is looked upon as a land of opportunity, hope, and mobility, it is clear that the other gang members are envious of those who make it there while simultaneously feeling insecure about their own lives and futures. Elías and the other members try to restore their wounded pride and when “threatened by el Güero’s daring mobility, they turn to violence in an attempt to restore their sense of masculinity” (Pobutsky 13). It is evident that the characters in “Juramento”
use the customary physical violence to mask their own feeling of inferiority, frustration, and economic hopelessness.

Violence is also the primary representation of machismo in the story “Navajas” by Parra. The use of violence in this story, however, derives from the need to defend oneself and receive respect from others. The main character Benito assumes the position as leader of his gang and the boss of his neighborhood. His macho obligation to receive respect appears when a young man named Erick moves to Benito’s turf. Erick personifies economic success and his appearance provides evidence that he is from the United States which is an automatic affront to Benito. Parra describes Benito’s intolerance for Erick in writing “he had begun to become unbearable, the arrogant glances, the smirk of superiority which Erick used to boast his new shirts, boots, golden chains, and all of his belongings acquired in el gabacho” (53). The pride and confidence that Erick exhibits in his demeanor stirs up a hate in Benito that leaves him no choice but to put Erick in his place by publicly fighting against him. The purpose of Benito’s violence was only to instill fear in Erick and take him off his high horse, but in the end, Erick unexpectedly fights back and Benito is killed.

In “Navajas”, Benito’s demand for respect illustrates a man who is insecure in himself and wants to conceal his own weakness by resorting to violence. It is certain that the hate and anger felt by Benito derives from “vulnerability born out of inferior class status” (Pobutsky 3) and that the overtness of Erick’s wealth reinforces feelings of inferiority in relation to Benito’s economic shortcomings. Benito’s gang is composed of men “whose rituals of protection and demarcation of their turf reflect a manner in which an ethnic group maintains their identity, attached to a particular place in relation to borders and territory” (Palaversich 72). In turn, they are subjected to carry out traditional acts on outside groups or individuals. In the story, Benito is an insecure man “who tries to conceal his humiliation or the scorn directed at him by resorting to aggressive or compensatory forms” (Parades 18). The macho inclination to use violence as a means of obtaining respect is a defense mechanism. Benito and his followers have constructed a false wall for security in order to shelter intense feelings of inferiority.

Pedro Páramo and the characters in “Juramento” and “Navajas” faultlessly embody gendered behavior attributed to tough (and often underprivileged) men, popularly summed up under the sign of machismo. Through the use of power, violence, defense mechanisms, and the demand for respect, these literary works demonstrate how the common qualities of Mexican masculinity are mechanisms to ignore and suppress personal feelings and shortcomings. As argued by Américo Paredes, the traits characteristic to the macho man “are nothing but a front, false at bottom, hiding cowardice and fear covered up by exclamations, shouts, presumptuous boasts, bravado, double talk, bombast… Supermanliness that conceals an inferiority complex” (18). Likewise, the protagonists of Pedro Páramo and the stories from Tierra de Nadie, underwrite the masking qualities of traditional Mexican machismo that, deep down, hide and camouflage desperation, fear, frustration and true hopelessness.
Works Cited


Gretchen as Tragic Heroine in Goethe’s Faust, Part I

Grace Gahman

Faculty Advisor: Ingrid Rieger
Department of Modern Languages and Literature
Oakland University

One of the most interpreted plays of German literature, Johann Wolfgang von Goethe’s dramatic work Faust was published in 1808, during the literary epoch known as Romanticism. In this play, Goethe creates a modern character, Faust, who almost commits suicide, as he cannot find the answers to life he desires. A scene in Heaven precedes the Faust plot, in which Mephistopheles, the devil, persuades God to bet on human nature. God wants to prove that humans always return to him, and Mephisto says he can prove the opposite. Mephisto then seeks out Faust. Experiencing several sensual escapades, Faust, with the devil’s help, later seduces, impregnates and abandons an innocent and religious girl named Gretchen. Her mother and brother die as a result of her involvement with Faust. Gretchen is shunned by her community. She then goes insane, drowns her newborn child, and awaits her sentence in a dungeon. After discovering Gretchen’s fate, Faust tries to rescue her. Yet Gretchen turns herself over to God, accepts responsibility for her family’s demise, and refuses to escape with Faust. Faust, Part I ends with God declaring Gretchen’s salvation. Her repentance proves God’s faith in humans.

Although the play is often categorized as a romantic work that defies all classical rules, one can also think of the drama as a classical tragedy. It has distinct tragic elements in an Aristotelian sense, even though Faust has three main characters, and not just one: they are Faust, Gretchen, and Mephisto, the devil. In spite of the play’s title, some literary critics argue that Faust is not the protagonist. For example, Madame de Staehl, as Harald Weinrich points out, discusses Mephisto as “the hero of the play”. Mephisto is indeed significant for the drama’s plot, but another character is even more significant. This figure is Gretchen, who appears as the classically tragic hero in Part I of Faust.

According to Aristotle, a tragedy consists of five acts and Gretchen’s tragedy is similarly structured. The first act is called the exposition. Gretchen is introduced as morally flawless at her first appearance on her way from church. In this scene, Gretchen is confronted with a seducer for the first time. After Faust flirts with her, she briefly says: “I’m neither a lady nor am I fair, / And can go home without your care” (257, 2607 – 2608). After that, she leaves him. Though Gretchen lacks experience, she possesses intuition because she recognizes Faust’s advances as flirting. The brevity of her reply also shows she has self-reliance and independence. Leaving Faust without hesitation and resisting temptation illustrates her piety. Moreover, Mephisto says

she has nothing to confess to the priest, because she has no sins (258, 2624 – 2625). This first portrayal of Gretchen is the height of Gretchen’s purity.

The second act of a tragedy in the classical sense is called complication. In this act, the plot accelerates and in the Gretchen tragedy, the dramatic conflict arises. Because of the presence of a jewelry box, which Faust secretly gives to Gretchen, for the first time she asks herself what it means to possess precious objects. Indeed she says, “If those earrings were only mine! / One looks quite different right away” (271, 2796 – 2797). Gretchen’s downfall begins with that moment, because she thinks about her appearance and thus succumbs to vanity. The conflict emerges immediately after this incident, as Gretchen’s mother is murdered because of a sleeping potion that Faust gave to Gretchen for her and which Mephisto had procured for him. The love affair between Faust and Gretchen also develops and leads to Gretchen’s predicament as an unwed pregnant woman. According to Aristotle, a similar plot development occurs in a tragedy.

The third act of a tragedy is the climax, in which the main conflict comes to a head and the hero’s life is in danger. The murder of Gretchen’s brother and her subsequent imprisonment, after she bears a child from Faust and kills it in desperation and insanity, constitute this part of the tragedy. The retardation is the second to last act of an Aristotelian tragedy. The plot comes to a standstill and it appears as if the conflict will resolve. A similar occurrence takes place in the dungeon scene, in which Faust opens the gate of the dungeon cell and tries to lead Gretchen out, to no avail. Though it appears that Faust can save her, this does not happen. Gretchen would rather die than go back to society, where “…there is no hope any more” (417, 4544). Hence, Gretchen returns to her virtuous self and accepts the consequences of her sinful actions. The climax and the retardation demonstrate Gretchen’s tragedy.

The catastrophe or conclusion is the fifth and last act of a tragedy, according to Aristotle’s definition. Gretchen redeems herself with the words, “Judgement of God! I give / myself to you!” (421, 4605 - 4606) God finally saves Gretchen from her miserable life, because she again relies on him. While Gretchen could have escaped with Faust to faraway places, she decides to die. Furthermore, she dies not only for her own sins, but also Faust’s, in that he leaves her when she is pregnant. Unlike Gretchen, who takes complete responsibility for her actions, Faust is free to go about his life.

Other elements of a classical tragedy are also linked to Gretchen. According to Aristotle, a tragic figure should be completely virtuous, except for one character flaw. He names Achilles as an example. In Gretchen’s case, vanity causes her downfall. After seeing the jewelry box that Faust secretly placed in her room, she responds „How would this necklace look on me? / Who owns all of this? It looks so fine“, which confirms her fatal flaw (271, 2794 – 2795). Moreover, Gretchen’s vanity leads her to falling for Faust and his seductive advances, as she wants to know who gave her the precious jewelry. This flaw results lastly in Gretchen’s imprisonment.

One of the two-fold purposes of a classical tragedy, namely to entertain and to instruct, is apparent through Gretchen’s story. Because this play tells the story of a poor, young woman, who discovers happiness in a love story, it is entertaining. Aristotle finds teaching more important than entertaining. In the end, everyone in the community should live by the same moral values. Otherwise they will be punished. Gretchen has a similar situation: since she does not always behave piously, society punishes her. Aristotle might have said this about the life of Gretchen: she should have listened to her mother and given each of Faust’s presents to the church. Additionally, says Aristotle, one should accept one’s destiny, because that means to

accept one’s life. At the end of Gretchen’s story, she accepts her miserable life because she does not leave the dungeon cell. She thus returns to her initial pious and moral ways, as she repents her sins and asks God for forgiveness. He accepts Gretchen’s plea and saves her, even though society puts the entire blame of seduction, pregnancy and murder on her alone. Goethe thus goes beyond Aristotle in Faust, since he criticizes society for its bias against women: while men get away with their sexual offenses, women become social outcastes and scapegoats.

Another fundamental function of the Aristotelian tragedy is to produce fear and pity in the spectators. According to societal norms, women should not bear children before marriage, because it is considered a sin and therefore no one will help them. In spite of her observation of societal rules, Gretchen carries an illegitimate child and horrible consequences ensue. For this reason, spectators are afraid of the consequences of being outside of society. Trying to change her situation, Gretchen kills her child and is hence punished by the law. Moreover, spectators feel pity for Gretchen. This feeling arises due to her naïveté and fundamental righteousness. Before Gretchen meets Faust, she has thus far been pious, and Faust defiles her virtuous persona in giving her jewelry.

Catharsis, according to Aristotle, only occurs in a tragedy, and it occurs in the dungeon scene of Faust. Catharsis refers to the purification of emotions, which occurs after spectators experience a series of heightened emotions such as sorrow, fear, or pity while viewing the drama. Gretchen’s seduction and pregnancy instills fear and pity in the audience because they can identify with her: they could be in a comparable situation and suffer a similar fate. In her final scene, when Gretchen behaves completely self-destructive because she does not take her opportunity to be set free, spectators feel sorrow for Gretchen. They are disheartened to see Gretchen in such a dejected state. However, Gretchen chooses not to lead a dishonest life with Faust. In this way, spectators have pity for Gretchen, since although she finally follows a moral path, it leads to her death. Seeing the consequences of Gretchen’s actions, spectators further feel pity toward her. These multiple intense feelings culminate until their emotional energy subsides and thus lead to a purging of emotions at the end of the play. In summation, Gretchen serves as the tragic heroine of Faust, Part I, because of the play’s classical structure, purposes, and the presence of catharsis. The dungeon scene incidentally also serves as Goethe’s own cathartic experience, because Goethe judged a similar death sentence when he was a privy councilor in Weimar, Germany and did not find a pardon as a feasible choice under the current law.

The Historical Development and Social Meaning of the Faust-Figure

Caitlin Koseck

Faculty Advisor: Ingrid Rieger
Department of Modern Languages and Literature
Oakland University

Goethe’s Faust is generally recognized as the author’s masterpiece and the most important work of German literature. The story of a man, “Faust”, who sells his soul to the devil, however, did not originate with Goethe. Goethe’s drama follows a series of other Faust stories. Goethe’s story was influenced by the past but is unique. In order to discover the uniqueness of Goethe’s Faust, we must explore the history of the epic Faust legend.  

The history of Faust has an important historical basis in a real, historical Faust. The earliest indication of a historical Faust emerged in 1507 in a letter by Bishop Trithemius from Würzburg. He says,

The man about whom you have written to me, Georgius Sabellicus, who dares to call himself the prince of necromancers, is a vagrant, a charlatan, and a rascal, deserving to be scourged with rods, that he might not venture in future to profess publicly what is so abominable and hostile to the Holy Church…Thus the title he has adopted truly befits him: Master Georgius Sabellicus, Faustus junior, fountainhead of necromancers, astrologer, the second Magus, chiromancer, aeromancer, second in hydromancy. (Wentersdorf 201)

He wrote this letter to his friend Virdung, a professor at the University of Heidelberg. Obviously, the man who called himself “Faust” was well known in this elite social circle. In 1513, a personal letter written by the humanist Konrad Muth from Erfurt mentions him again. He writes about, “a certain palm-reader named Georg Faustus, [calling himself] the Demi-god of Heidelberg.” (Wentersdorf 202). However, he was not only mentioned in personal letters. Numerous official documents confirm the existence of Faust. In Bamberg in 1520, financial documents confirm a “Dr. Faustus” who was hired to create a horoscope for Prince George III. Later the same year in Ingolstadt, official documents show that the city denied Dr. Faustus citizenship because of his fortune-telling. In 1532, the government of Nürnberg forbade “Dr. Faustus Nigromanticus” to live in the city. The scathing personal accounts and the official documents clarify that people were suspicious of Faust. At this time, the Faust figure was a famous man who was often mocked and despised. He made many people nervous and angry because he had no consideration for the Catholic Church as an institution. Despite this, he was a popular magician and seemed to be a cult figure of the time. After his death in about 1539 stories about him appeared in print. These stories and legends all contain the devil and his demands for the soul of Faust. Scholars generally accept that the real Faust died a bizarre public death, most likely during a magic trick. In view of the fact that people already thought of him as diabolical, this event probably caused the belief that the devil had finally claimed him. During this time the
church encouraged stories such as this legend. It warns people about their fate if they were to ignore the Catholic dogma. Thus the legend functions to strengthen the authority of the church.

The first major work about Faust was the Historia von D. Johann Fausten. The book was printed in 1587 by Johann Spies. Exactly like Goethe's character Faust, the Historia's Faustus studies almost every subject. He thoroughly studies magic, an accepted scholarly discipline at the time. Because of his studies in magic, Faustus wants to meet the devil and he plans and prepares for an encounter. The devil arrives in a dramatic storm, and they discuss the possibility of making a deal with one another. The devil offers: 1. To serve Dr. Faustus for Faustus' whole life 2. To supply Dr. Faustus with every piece of information for which he asks. 3. He will never lie to Dr. Faustus. And in return: 1. Faustus prepares to give his body and soul to the devil after 24 years. 2. Faustus must sign the contract in blood 3. Faustus must also renounce his Christian beliefs (Ashliman 1). They agree and he lives a life of luxury and prosperity. He travels through hell and the universe, however, at the end of the 24 years he realizes that he has made a mistake. He dies an awful death and his students discover him in the morning. The Historia says, “In the end, [the students] found his body lying outside in the dung, which was awful to behold, with his head and limbs all quivering” (Spies 151). The general message is that one should follow God and avoid all temptations. Just as the previous legend, this story was supposed to be educational and uses Faustus as a bad moral example for the Christians, but the gruesomely sensationalized death in the Historia indicated the necessity for the church to intimidate its members even more than before. The Historia can therefore be seen as a tool that the Church used in order to keep control of the more critically inclined public around the time of the Reformation.

The Historia was translated into English and dramatized by Christopher Marlowe in 1589. Marlowe did not change the plot or the message of the story very much. Just like in the other stories, the evil devil snatches Faust. He says, “for vain pleasure of twenty-four years hath Faustus lost eternal joy and felicity. I writ them a bill with mine own blood: the date is expired; the time will come, and he will fetch me” (Marlowe 39). During the 1600s, the serious and tragic story developed. Thereafter, the legends began to be more amusing, until they often contained slapstick comedy. This continued until the play was not nearly as serious as it once was. Finally, Faust became the most popular traveling puppet show. This was how Goethe first saw the story. The Faust legend had developed into a simpler and sillier plot whose main audience was children. By this time the people seem to have made the legend of Faust their own and turned the tool of intimidation previously used by the Church into their most beloved source of entertainment, thus reversing the authoritarian gesture.

When Goethe adopts this material, he keeps the same basic story. However, there are many important differences in the details. For example, Goethe's Faust has also studied many subjects, but the studies of other Fausts in the area of magic are much more comprehensive. Goethe’s version of Faust seems to be a scholar in all subjects, but he has some experience with black magic because his father treated patients with it. Goethe’s Faust also seems to be a bit resentful of Christianity. We can see that the previous Fausts were originally Christians because they had to renounce their Christian belief. In the other stories the devil gives boundless power to Faust for life, and in return, the devil gets his soul. In Goethe’s version, Faust and the devil make a bet that if the devil serves Faust and Faust above all has a perfect moment, then the devil gets his soul. Other Fausts seek fame, but Goethe's Faust does not like fame because it makes him feel isolated. We see this in the Easter scene. Faust says to Wagner, “The applause of the masses sounds to me like ridicule” (1030). In the original legend, Faustus accepts that the devil will not

answer questions about the destiny of people in life after death or questions about hell, but Goethe’s Faust demands to know everything and to test human limits. Goethe's Faust would not allow Mephisto to hold information from him for no reason (especially such interesting information!). Above all, the most fascinating difference lies in the attitude towards the devil. In all other stories and legends the devil personifies pure evil and the enemy of Christians and Christianity. In Goethe’s, Mephistopheles participates in the creation. He is clever and criticizes God. It seems that he helps the world system to run smoothly. At the worst, he is a necessary evil. One of the biggest differences in Goethe’s drama is the insertion of the tragedy of Gretchen. This tragedy stresses the feeling that Goethe personalizes his Faust drama. It seems that Faust contains a lot of Goethe’s personality. This includes his own strive for knowledge and his predilection at times for simple women who are not educated. The other big difference in Goethe is the ending. All the other Fausts lose their souls and endure an awful and violent death, but Goethe's Faust is saved.

Many differences originate from a clear fact - Goethe had a different intention than the intention of the previous authors. The other stories show God as purely good and the devil as purely evil. These stories portray the devil lying in wait to destroy the people who stray from Christianity. The other stories also show examples of mortal sins. Although Faust understands his mistake and expresses sincere remorse, he is not saved. With Goethe, this is completely different. Faust and Gretchen commit mortal sins, but both are saved. Gretchen says, „I am Yours father! Save me, your angel!” (4607-9). This example shows that Gretchen repents and gives herself over to God. Therefore, she is saved. The God of Goethe’s version exhibits tolerance, and reflects Goethe’s own ideas of God and also the changes that came with Protestantism. In Goethe’s story, Faust is saved because of God’s grace alone. Goethe’s message that one must not be especially religious to be saved was a breakthrough in the Faust legend. In other stories Faust suffers punishment because he tries to search for too much knowledge. With Goethe, God appreciates Faust because of his efforts. Goethe’s Faust projects the message that striving is one of the best qualities of mankind. God agrees in the “Prologue” that one will find the right way no matter how far away from God personal investigation and efforts take a human being. This reflects the thinking of the enlightenment, and conflicts with the message of previous Faust stories.

Goethe developed the legend to mirror his times. It is still a relevant drama because of its reflection of our modern times. Faust feels isolated in a mass of people just like many people feel today. Goethe also encourages self-reflection and exploration. He does not agree with the traditional idea of blind faith. In the past, the church simply told the people what to do and what to believe. If the people did not believe, they were condemned as sinners. In Goethe’s drama, Faust both doubts and sins, but gains some sense of morality through compassion. Thus, Goethe frees the Faust legend from limiting church pedagogy and aligns it with the open-ended metaphysical discourse of today and the future.

---


13 For example, “F@ust: Version 3.0.” is a stage performance based on Goethe’s Faust that has been adapted by Pablo Ley to portray the Faust legend in terms of the internet and computer technology.
Bibliography


Marlowe, Christopher. Tragical History of Doctor Faustus. Print.


Nationalism in *Sab, La Clase Media, and María*

Kristin Castelvetere

Faculty Advisor: Cecilia Saenz-Roby
Department of Modern Languages and Literature
Oakland University

Nineteenth century Latin American romantic authors express nationalistic sentiments through a prideful description of the physical territory, civic discourse, the evocation of regional customs and characters constructed as models of the ideal nation. After the conquest, the hegemonic powers perpetually exploit Latin America’s natural resources as well as the indigenous, marginalized inhabitants. They take unmitigated advantage of the New World. However, during the second half of the eighteenth century, this marginalized people witness two revolutions: French and American. The Europeans have grown tired of the monarchy’s restrictions and will not support them any longer. Moreover, Napoleon Bonaparte refocuses his power on Europe during this era, invading various countries including the infallible Spain and Portugal. As a result, the Spanish monarchy loses the resources necessary to control their South American territory. There is a profound revolutionary air and an explicit precedent. As a result, Spain withdraws from the land and explores new economic avenues. However, it leaves the region undeveloped and not sustained by the countries that invaded it. European merchants take what they can and vanish. “Robaron los conquistos una página al Universo!” (Ortega, *Formación* 132)

Now the people remain in a third space: they cannot return to the same life as before the invasion, and still do not have a defined nation of their own. “This third space displaces the histories that constitute it, and sets up new structures of authority, new political initiatives, which are inadequately understood…” (Bhabha 211). Latin America does not fit into any space except that of their indistinct environment. It has separated from hegemonic power but still lacks validity. “The process of cultural hybridity gives rise to something different, something new and unrecognizable, a new area of negotiation of meaning and representation (Bhabha 211). The nation has created a new path with no direction. However, in order to internally define themselves, the regions require a clear sense of national identity. Chasteen explains:

> Nationalism foster[s] collective self-respect by positively reinterpreting the meaning of Latin American racial and cultural difference. The nationalists [declare] psychological independence from Europe. No longer slaves to European fashion, Latin Americans would create styles of their own, especially in painting, music, dance, and literature (218).

These “styles” provoke feelings of pride and nationalism that manifest themselves in *costumbrista* elements in the nineteenth century Latin American novel. In particular, Jorge Isaacs, a Columbian writer, describes the customs of his region “con una objetividad casi fotográfica” en su novella *María* (22). He illustrates the wedding of two slaves in such detail that he even describes the silver garnish on a machete. More importantly, Isaacs discusses the culture of the slaves and countrymen, a subaltern sector that would become modern Columbian culture.
Issacs paints a portrait of the celebration. He mentions the clothing, flowers, room and music with splendid detail.

No [hay] sino dos flautas de caña, un tambor improvisado, dos alfandqoques y una pandereta; pero las finas voces de los netritos entonaban los bambucos con maestría tal; había en sus cantos tan sentida combinación de melancólicos, alegres y ligeros acordes; los versos que cantaban eran tan tiernamente sencillos, que el más culto dilettante hubiera escuchado en éxtasis quella música semisalvaje (Issacs 62).

It is interesting to note that although “semisalvaje,” Issacs exalts the music of the slaves: it is complex and evokes a myriad of emotions. Issacs also delineates the dialect of the negritos in the text: they utter “ñor” and “ña” in place of señor and señora. The various descriptions of this culture in bloom and of both the national and colloquial languages validate the nation. “Somos otros porque nuestro lenguaje es otro. [...] La libertad, la democracia, están en el origen de esta amplitud nueva del lenguaje, de esta capacidad de decir más. La cultura es una reserva de identidades en el proceso de reconocer las nacionalidades” (Ortega, Formación 145).

On the other hand, nineteenth century authors also unify the people through the great detail with which they describe the magnificent land that all inhabit. They glorify the common denominator of every human being, mother earth, and make note of the marvels of the regional territory. In fact, the Spanish dictionary maintains that the word identity comes from the Latin word idem which signifies “the same” and refers to the quality of the identical (Ortega, Identidad). This sense of similarity just as the prideful description of the land promotes a sense of nationalism. Juan Díaz Covarrubias, a Mexican writer, even mentions his land as “obra mestra de Dios” (94). He continues describing, as the other authors, the flora and the fauna in great detail in order to glorify the precious nation. In essence, nature represents “la sociedad en crecimiento, y la cultura en formación. Esto es, sociedad y cultura son, emblemáticamente, ‘obras’ de una Naturaleza, a su vez emblema de creación, proceso, y diferencia” (Ortega, Formación 132). In addition, Díaz Covarrubias writes about palaces and temples in ruins as well as “nuestra infeliz historia, desde Moctezuma hasta Santa-Anna...” in order to create a uniform history for the nation (92). “Esta hablando de los pueblos precolombinos, de su proceso interrumpido por la conquista” (Ortega, Formación 132). In fact, the use of the word nuestra denotes a fraternity between the author and the reader as well as a brotherhood between Mexicans in general. Díaz Covarrubias continues illustrating other invasions of the land, evoking nationalist sentiments in order to remind the reader of various foreign threats. As a result of these invasions and different wars in nineteenth century Mexico, many orphans appear in Díaz Covarrubia’s narration. Similar to any blood-filled war, a myriad of mutilated soldiers remain. The author focuses on several case studies, in particular the unfortunate family of Víctor and Elena:

Componíase, de un anciano military, que después de haber pasado su juventud en el campo del honor [...] atravesó varias veces los abrasados desiertos de Tejas y el Potosí, para defender la integridad del territorio nacional, había quedado paralítico [...] y medio loco al verse lanzado por el gobierno al espantoso abismo de la miseria, lo cual facilmente se comprenderá al saber que el capitan Castillo, este es el nombre del anciano, en cuarent años que había permanecido en servicio, jamas se había pronunciado (23-4).
Víctor and Elena’s father has dedicated all of his life to defending his nation and has sacrificed everything so that his family can achieve a higher quality of life. In this civic discourse, Díaz Covarrubias criticizes the Mexican government for not caring for its nation. A mass of soldiers remains crippled because of their dedication to the state, and they receive no governmental assistance. Their families die of hunger and their country has abandoned them.

Isaacs also includes a civic discourse in María with respect to the family of Efraín. In contrast to other works, distinguished families treat the marginalized people with respect. For the first time, the slaves and mountain people are treated as human beings and not as animals. Efraín’s family represents the better, humane half of the aristocracy. They always give gifts to the highlanders and assist them in innumerable ways. In fact, Efraín’s father permits his poor neighbors to use his water. Efraín states, “Mi padre consiente en que usted tome cuanta necesite de las potreros de abajo […]” (Isaacs 258). However, this treatment does not reflect the treatment en other haciendas in Cauca. Other slaves bear the marks of mistreatment from their proprietors and the detrimental nature of their work. A poor negrito named Choto exhibits a multitude of scars on his arm from working a sugar cane mill (Isaacs 102). The novelist shows great contrast between the treatment of the mountain people and the slaves in order to emphasize the ethical treatment from Efraín’s father. Isaacs teaches that the aristocracy has an obligation to assist its countrymen, especially the less fortunate. The romantic authors mentioned exalt the indigenous people because they live in nature: the most immaculate place in the world. Civilization has not yet corrupted them; they are pure and perfect. In some ways they posses more wisdom than who live in the city, the center of civilization.

Finally, the nineteenth century authors cannot only criticize the nation, but they must further their theory by defining the ideal nation. Some have depicted the nation through protagonists that model the utopian country. In fact, they echo French author François-René Chateaubriand’s precursory novel Atala in which he has defined the nation through the personality of the protagonist of the same name. Latin American romantic authors continue this precedent including both men and women as prototypes of the exemplary citizen. In the eyes of the romantics, the pure and sublime person produces for his nation; he is hardworking and does not exploit others for his own interest. The ideal citizen is educated and always possesses a righteous morale. According to these novelists, social class does not define a person. In fact, the majority of these prototypes are orphans, including Sab who is a poor slave. Sab represents the budding Cuban culture because he is mulato: a mix of both nations that have generated the young country. Although a slave, Sab immediately stands out from the others; he is “un mulato perfecto” (Isaacs 104). Sab is distinct; he is intelligent and has a particular physique.

Es hermosa el alma de ese pobre Sab, ¡muy hermosa! […] él ha trabajado con sus manos los toscos muebles que me eran necesarios: él me ha dado todos sus ahorros de muchos años para aliviar mi miseria: él con su cariño, con su bondad ha hecho renacer en este viejo y lacerado corazón las emociones deliciosas del placer y la gratitud (Isaacs 182).

This dialog of the poor indigenous Martina shows Sab’s love for the nation, even the discriminated sector. He shares what resources he has with Martina because the state has neglected her. Similarly, the humble orphaned Teresa is a young, virtuous woman that strikes
the reader as fatigued and withered. The world has inflicted much pain on her, and for this she views humanity from an idiosyncratic perspective. Teresa utters:

Seres fríos y duros, almas sin compassion que pretenden hacer un bien cuando anticipan el momento fatal del desengaño […]. Hombres crueles, que […] destruyen en un momento la felicidad de toda una existencia. […] Respetad esas frentes puras, en las que el desengaño no ha estampado su sello; respetad esas almas llenas de confianza y de fe […]. (Gómez de Avellaneda 198)

Teresa explains that those less fortunate should not destroy others’ good spirits. The ideal citizen, like her, should honor the spirit of the people and treat them with consideration.

On the other hand, in La clase media Díaz Covarrubias has created a model as well as an anti-model for the nation. “Qué doloroso contraste formaban Eulalía é Isidoro, con Amparo y Roman. Una feliz, alegre, ebsequiada, cubierta de oro y adulacion. La otra desdichada, llorando huérfana las consecuencias de un crímen que no había cometido sin embargo” (Díaz Covarrubias 72). Isidoro and Eulalia are degrading youths that ruin numerous lives of the poor throughout the novel. They were raised without morals and only think of their own means. For example, the malicious Isidoro rapes Amparo solely because he desires to. He could attract any woman he chooses with his wealth and charm, but he chooses a young girl with no regard for him. Amparo, like Teresa, is a cultured orphan, raised with good morale from her mother. Both Amparo and Román work diligently and humbly for their nation. However, the upper class burdens them; it diffuses their labor. The aristocracy revels in wealth and abundance while the needy suffer and die.

Equally, before María became an orphan, her mother instilled virtues in her. The girl later continued refining herself in the hands of Efraín’s family where she learned homemaking skills. She also studied literature, geography and history: subjects that foment a sense of national identity. In addition, Isaacs compares her to the Virgen, the mother of the nation. She always cares for her people and is suffered and humble. Likewise, Efraín studies medicine just as Román. He goes to Bogota and later to London in order to achieve a better education. He respects his countrymen and follows in the footsteps of his philanthropic father.

During the centuries of marginalization and injustice in Latin America after the conquest, feelings of independence swell and further polarize the nation. The novelists publish reflections of the poor’s unjust treatment. Nineteenth century romantics adore the emerging nation; they describe it with diligence. The novelists exemplify how to care for the country and contribute to it. Romantic novels of the New World are a call to action, manuals for how the quintessential citizen should act in order for the nation to flourish. They teach the audience to make the most of themselves by developing their talents and educating themselves in order to evolve the country. The romantics take the reins of the aristocracy and awaken the people. They seize control of the nation and seek to revolutionize the nation into egalitarian consideration for all.
Bibliography

<http://blogs.brown.edu/project/ciudad_literaria/2006/02/identidad_y_postmodernidad_en.html>


Religious Elements in *Sab* and *La clase media*

Laura Spangler

Faculty Advisor: Cecilia Saenz-Roby
Department of Modern Languages and Literature
Oakland University

The literature and arts of the Middle Ages, which at the time were used to educate the masses, centered on religion. The following movement, the Enlightenment of the 18th century, rejected the religious focus of its predecessor and instead placed emphasis on the logical and scientific. Being that one movement is always a response to that which precedes it, it is no surprise to see the reappearance of religion in the Romantic literature of the 19th century, a movement which is “a response to enlightenment reason” (Jager, 793). According to Jager, there is a “decisive shift toward appreciating the Bible’s figurative, symbolistic and metaphorical resources” (803). With the arrival of Romanticism, religion converts from being the central theme it was during The Middle Ages, into a literary element that serves to enrich newly emerging central themes. In the romantic works *Sab* by Gertudis Gómez de Avellaneda and *La clase media* by Juan Díaz Covarrubias, Christianity and religious symbolism have two purposes. First, they are employed so that readers can distinguish between the good and evil characters; second, they reinforce the authors’ messages about the societies in which they lived.

Religion holds an important, although not always obvious, position in *La clase media*. Díaz Covarrubias believed that Lamartine “combined love and religion in an admirable way” (Spell, 328) and followed his example by using religion in his own work. He uses it in a way that allows the reader to identify the good and evil characters. Of these evil characters, Spell says “they belong to the aristocracy, and are so entirely cruel, heartless and immoral that they resemble more nearly demons than human beings” (339). Beginning with the very first chapter this connection to the diabolical can be seen. This comes from the frequent use of the word “Diablo” by the aristocratic men. By being part of their daily conversation and vocabulary, the devil becomes part of their daily life as well and thus these men can be identified as evil characters. The men of the aristocracy are not the only evil characters, but also the upper class women. The malevolence of Amparo’s stepmother, possibly the most sinister of all the characters, is also demonstrated through the use of religion. Amparo says that once, upon attempting to go to confession, “mi madrastra me lo prohibió, diciéndome que era yo bastante Buena y virtuosa para tener que confesarme” (*my stepmother forbade it, telling me I was virtuous enough without needing to confess*) (Díaz Covarrubias 51). This revelation demonstrates the evil character of the stepmother for having interrupted Amapro’s religious act while at the same time revealing Amapro’s purity for wanting to go to confession without having sinned.

The use of religion continues on with other references to the good characters. The two young women from the novel that are the “good” characters are Guadalupe and, as previously mentioned, Amapro. Díaz Covarrubias reinforces their wholesomeness with the fact that both girls have received religious education at some point during their childhood. After the death of her father, Guadalupe “había pasado su infancia en un convento” (*spent her childhood in a convent*) (Díaz Covarrubias 20). Amapro says that “[mi madre] me daba esa educación religiosa” (*my mother gave me this religious education*) (Díaz Covarrubias 42). Religion also draws attention to the high moral character of Ramón, another central character. In order to prepare for
his duel with Isidoro, Ramón goes to church in order to prepare himself and attends “una misa en la catedral con la devoción de un niño” (*a mass in the cathedral with the devotion of a child*) (Díaz Covarrubias 87), while Isidoro, his foe and a member of the aristocracy, simply practices with his pistol. By comparing each man’s behavior, the difference in moral character that exists between them is evident.

While Díaz Covarrubias uses religion to mark the morality of multiple characters, Gómez de Avellaneda focuses her use of religion on supporting the morality of a single character; Sab. As the son of a slave mother and a white father, Sab is a mulato and a slave. Despite being part of the racial minority and victim of slavery, he is represented as a good person. Dorris Summer refers to this in her work *Sab C’est Moi*, saying “Out of traditionally incompatible characteristics” Sab is “more angel than monster” (115). Alzola refers to the same concept with the term “salvaje noble” (*noble savage*) in *El personaje Sab*. In order to form this good impression, Gómez de Avellaneda creates connections between Sab and Jesus Christ.

The first connection is made by the author’s placement of Sab in the role of savior. Literally speaking, Sab has saved Enrique’s life twice. First when he fell from his horse and later in the caverns. After the second time, Enrique says to Sab “eres en la tierra mi ángel protector” (*you are my guardian angel on Earth*) (Gómez de Avellaneda 175). Sab also saves the lives of Luis and Leal when they are trapped in a house fire. Martina, Luis’s grandmother, describes the event saying:

¡Sab le salvo! Por entre las llamas y quemados los pies y ensangrentadas las manos, sofocado por el humo y el calor cayó exánime a mis pies, al poner en mis brazos a Luis y a Leal. (*Sab saved him! He came through the flames with burned feet and bloodied hands and suffocated by the smoke and heat, he fell at my feet, placing Luis and Leal in my arms*) (Gómez de Avellaneda 181)

The salvation in this scene has a double meaning. It’s true that there is literal salvation, but more important is the fact that Sab saves them from a fire. Symbolically he is saving them from hell, reinforcing the connection to Jesus.

Also similar to Jesus, Sab has a mission to fulfill with his life. His mission is to assure Carlota’s happiness. Before his death, Sab hears a voice from within that tells him “Pocas horas de sufrimiento te restan, y tu misión sobre la tierra está ya terminada(*few hours of suffering remain and your mission on the Earth will be complete*)” (Gómez de Avellaneda 236). The completion of this mission results in Sab’s death. He passes away in the exact moment that Carlota gets what she most desires, the moment that she weds Enrique.

His death represents yet another common characteristic between Sab and Jesus, sacrifice. Sab is sacrificing his life to insure Carlota’s happiness. Sab has two options, as Alzola points out, “su pasión solo puede culminar en la realización o en la muerte” (*his passion can only end in realization or death*) (291). This shows that “la devoción de Sab por Carlota no conoce limites de sacrificio personal” (*Sab’s devotion to Carlota does not know the limits of personal sacrifice*) (Alzola 28). Sommer says that Sab has a “preference for self-sacrifice over struggle” (123). It is due to this aspect of Sab’s personality that in having to choose between dying or seeing Carlota suffer, his passion causes him to opt for sacrifice.

The purpose of religion does not end with the moral differentiation of characters. Its second purpose, and its most important is to support the authors’ most important messages. The purpose of *La clase media* by Díaz Covarrubias is to bring to light the social injustice that
existed in Mexican society and that this injustice prevents society from functioning properly. According to Brushwood in his work *Juan Díaz Covarrubias: Mexico’s Martyr-Novelist*, during the time that Díaz Covarrubias was writing, “the social scene was one of injustice rampant” (304) and the author “wanted to correct the wrongs that existed in Mexico” (305).

To expose this reality, Díaz Covarrubias uses his character María, the ailing daughter of Amparo. The author gave her this name in order to connect her to the Virgin Mary and to use the irony created by this allusion. The differences in situation between Díaz Covarrubias’ María and the Virgin Mary show that society in Mexico is not in agreement with the world God had desired. The Virgin Mary sees the suffering of her child and weeps for him. In *La clase media* the roles are reversed. María is a child rather than a mother and is wept over while she is suffering. More important than these inverted roles is the fact that the Virgin Mary was a mother via the Immaculate Conception while Díaz Covarrubias’ María is a product of her mother’s rape by an aristocratic man. Díaz Covarrubias believed that the members of the middle class were “victims of views held by the ruling social class” (Spell 335) and María’s situation is the strongest example of this in the entire novel. She, like her mother Amparo, is a victim of society. To reveal this injustice, the author has completely inverted the situation of the Virgin Mary.

In combination with showing the corruption present in society, as he has done with María, Díaz Covarrubias also wants to give faith to the middle class and tell them that in the future circumstances will change. The author speaks directly to his readers, telling the middle class

---

...ten fe y esperanza clase media, clase inteligente, clase virtuoso, la democracia y la igualdad vienen, el siglo avanza arrastrando en su empuje a los malvados y los traidores. ¡Fe y esperanza, si es suyo el presente, tuyo es el porvenir! (...have faith and hope middle class, intelligent class, virtuous class, democracy and equality are coming, the century is moving forward sweeping away the wicked and the traitors. Hope and faith, if the present is theirs, the future is yours!) (96).

---

This is not his only method of sending his message. He also adds to it through the use of two characters with religious significance, Gabriel and Guadalupe. Traditionally, Gabriel is an archangel and a messenger of God. Our Lady of Guadalupe is the patron saint of Mexico.

It is not simply the name that connects Gabriel the character with Gabriel the angel. Gabriel’s appearance reinforces his angelic image. He is dressed in “ropa blanca, siempre limipa” (*clean, white clothes*) (Díaz Covarrubias 19). His actions also associate him with the powers of God. Gabriel acts as Ramón’s guardian angel and savior after the duel. When Ramón was shot, “cayó en los brazos de Gabriel” (*he fell into Gabriel’s arms*) (Díaz Covarrubias 95). Gabriel is preventing the fall of the hero because Ramón has the grace of God. Afterwards, Gabriel takes him to a safe place where he can receive medical attention and in effect, Gabriel saves his life. A set of wings are all that are missing from the complete image of an angel.

These aspects alone are not enough to instill faith in a particular group of people. As Spell says, “it was for these people and the unfortunate middle class that Díaz Covarrubias sacrificed his life” (343), and it is due to the position that Gabriel has within society, amongst the middle class, that Díaz Covarrubias can give faith to its members. Gabriel lives alongside the other members of the middle class and because he represents God’s grace, the author is telling his beloved middle class that they have God’s favor.

This message of faith is reinforced with the addition of Guadalupe. Because she shares her name with the patron saint of Mexico, this character represents the country and its
inhabitants. At the end of the novel, following a pure and silent romance, there is a union between Gabriel and Guadalupe. “Una noche, Gabriel, trémulo y conmovido, hizo entre suspiros la declaración de su amor a Guadalupe” (One night Gabriel, trembling, declared his love for Guadalupe between sighs) (Díaz Covarrubias 108). This is a union not only between the characters, but also metaphorically between Mexico and God. Spell says of the author that “his own sufferings led him to sympathize with all the downtrodden” (327). It is because of this that he uses the symbolism of this union to show that God has given Mexico his grace and that the citizens can put their faith in Him.

Brushwood focuses on Díaz Covarrubias’ pessimism and says that “The middle class is seen as a group with great ambitions, but little hope” (304). Although it is true that the characters of the middle class are resigned to their situations, this is neither the central theme nor the most important message from Díaz Covarrubias. On the contrary, his use of symbolism shows that he wanted defend the middle class and give them faith and hope.

The central theme of Sab, which like La clase media focuses on the injustice of society, is supported through the use of religion as well. This central theme is the oppression of slaves, represented by Sab, and the oppression of women, represented by Carlota. Gómez de Avellaneda wants to show the inequality that existed in the Cuban society of her time. In her novel, she has placed a chapter that in its entirety is a religious symbol reinforcing this message. Chapter VI is dedicated to the description of the garden and although the most important events do not occur here, it is an essential component of the novel.

This importance comes from the fact that the garden is not simply a garden, but rather a symbol of the Garden of Eden is several ways. Sab has created the garden for Carlota, his angel, and so the garden becomes a place with a nearly religious significance for him as well as for Carlota who, as Skattebo says, “often turns to the nature of her domesticated garden for solace” (189). It is in the garden that Carlota appears most innocent, watching the birds and chasing butterflies. She is described as “joven” (young), “pueril” (pure) and “hermosa” (beautiful) (Gómez de Avellaneda 145). This reinforces the idea that an angel occupies this space and shows that although the surrounding world has been corrupted by man, the garden is place of innocence and purity.

The flowers and birds in harmony, by creating an image typical of Eden, also add to the allusion to the biblical garden. However, these birds have a more important purpose than simply making the garden seem exotic. The birds symbolize harmony between races and classes. First, Gómez de Avellaneda says “las palomas berberiscas…las gallinas americanas…llegaban a coger el maíz” (The Barbary doves...American hens...nearly to collect the corn) (143). The Barbary doves, originally from Africa, represent the slaves and the American hens, a mixture of birds from Spain and Cuba, represent the criollos. Gómez de Avellaneda continues “Más lejos el pavo real rizaba las cinéreas y azules plumas de su cuello, presentando con orgullo…mientras el pacífico ganso se acercaba pausadamente a recibir su ración” (Farther off, a peacock ruffles its silver and blue feathers, strutting with pride...while the pacific goose nears tentatively to receive its ration) (143). In this case, the peacock, a beautiful and proud bird, represents the aristocracy and the goose, a simple, humble bird, represents the lower classes. These birds eating together in peace show that the garden is the symbol of the world that God intended to create.

This idea of equality within the garden is demonstrated again when several slaves pass through on their way to their work. In this scene, Carlota tells them “¡Pobre infelices!..Cuando yo sea la esposa de Enrique…ningún infeliz respirará a mi lado el aire emponzoñado de la esclavitud” (Poor souls! When I am Enrique’s wife...no one shall breath the poisonous air of
slavery) (Gómez de Avellaneda 146). Here in the garden, norms no longer apply and, as Lindstrom says, Sab “intenta construir un espacio donde no imperen las restricciones de su sociedad” (attempts to create a space where the restrictions of society no longer apply) (54). Paraphrasing Lindstrom, the garden is place where one can escape from society (55). By using the garden as a symbol of Eden, Gómez de Avellaneda demonstrates that the oppression present in society is not aligned with God and thus the use of religion supports her most important message.

These examples show that during the Romantic Movement, the use of religion has returned to be not only a literary device of, but a crucial component. Although they use religious references in different ways, Juan Díaz Covarrubias and Gertrudis Gómez de Avellaneda have used them to reach the same goal, which is to share their strong messages. Whether it be the characteristics of a character, as with Sab, or the situation in which they are found, as with María, or simply a reference to a biblical location, as with the garden, these authors have successfully used religion to reinforce their principal themes.

Works Cited


Tom Stoppard’s Mirror: How Stoppard’s *Rosencrantz and Guildenstern Are Dead* and *Travesties* Are a Reflection of the Modern Man

Nusrat Hossain

Faculty Advisor: J. Caitlin Finlayson  
Department of Literature, Philosophy, and the Arts  
University of Michigan-Dearborn

In “Writing the Life of Tom Stoppard,” Ira B. Nadel says, “Stoppard knows that one cannot separate art from life, even though he has, until recently, never admitted it” (Nadel 22). Nadel justifies this statement by noting the apparent “doubleness” in Stoppard’s own life, such as his identities as an Englishman and as a Czech, and the indifference he seemed to display at his recent discovery of his Jewish heritage, which came after years of speculation from the curious public. Indifference, Nadel says, that is reflected in the characters of Stoppard’s first play, *Rosencrantz and Guildenstern Are Dead* (1964), where the title characters are in confusion about their identities and their role in the greater action that is the plot of Shakespeare’s *Hamlet*.  

Similar to *Rosencrantz and Guildenstern Are Dead*, Stoppard’s *Travesties* (1974) relies on another well-known play from the English canon, Oscar Wilde’s *The Importance of Being Earnest*. However unlike Rosencrantz and Guildenstern, Henry Carr, the geriatric narrator and main character who was an actual British consular official, somewhat tries to actively make sense of his world by creating memories of his supposed acquaintances with three of the most influential revolutionaries of literature, art, and politics of the twentieth century, James Joyce, Tristan Tzara, and Vladimir Lenin. Nonetheless, just like how Rosencrantz and Guildenstern’s lack of commitment to any one ideology, identity etc. rendered their ends meaningless, Carr’s wife Cecily takes away his credibility in the end when she reminds him that the memories he was sharing with his audience never actually happened.

Stoppard’s *Rosencrantz and Guildenstern Are Dead* is most often paralleled to Samuel Beckett’s *Waiting for Godot*. Beckett wrote in the tradition of the Theatre of the Absurd, which was a genre of dramas that make no apparent sense and/or where not much happens. Although both Beckett’s and Stoppard’s dramas are similarly nihilistic in tone, by re-writing a couple of well-known English plays, Stoppard presents a world with recognizable traits and values. At the same time, Stoppard subverts those familiar values when he makes minor characters into majors ones in his plays and then further explores their roles as spectators of the actions in the very plays that they are now starring in. This further blurs the boundaries between real life and fiction. By melding the lives of real people into the fiction of the play, Stoppard complicates the search for a true identity. As Nadel suggests, Stoppard is aware that his writings are influenced by his own life and that he is a writer living in the modern world, in the late twentieth century when this play was written. I would argue that his characters are representations of the modern man who is in a constant state of stasis, unable to take action even if for his own good. With his often fragmented dialogue, his rewriting of classic texts, exploration of the characters relationship with identity, and the nihilistic endings, Stoppard suggests that in order for the modern man to avoid living in an increasingly ambiguous and meaningless world, he has to actively participate in the actions that surround him, make choices and be aware of everything.

On the surface, Stoppard’s *Rosencrantz And Guildenstern Are Dead* is a play where very little, or at least nothing that is not already expected, happens. Stoppard’s audience, one he
expects to be knowledgeable about Shakespeare’s *Hamlet*, is already aware of the plot. As the title itself states, Rosencrantz and Guildenstern will die before the end. What then is the point of the play? When Stoppard was asked this question early on in his career, he said that this play “had nothing to do with the condition of modern man or the decline of metaphysics” (Delaney 280-281), by which he meant to separate any likeness between his characters and himself. He later said, “I write plays because dialogue is the most respectable way of contradicting myself,” (Delaney 280), which ironically contradicts his earlier statement that refuted the idea that he modeled his characters after his own self.

Stoppard is the modern man, unsure of what his ideologies are, and so the dialogues he writes are essentially a reflection of himself. Does this mean that Stoppard “slipped” on his point of view or are his contradictions themselves a comment on the complexity of human nature? This slippage of identity is also reflected in the characters of Rosencrantz and Guildenstern. Stoppard carefully constructs the characters so that neither can be entirely differentiated from the other, with each getting only one “character note” (Stoppard 11) which basically makes them two sides of the same coin. Rosencrantz’s is that he “betrays no surprise” (Stoppard 11) yet “is nice enough to feel a little embarrassment (Stoppard 11),” while Guildenstern’s is that he “is aware but not going to panic” (Stoppard 11). Despite these minor notes that Stoppard indicates early on, both of the characters manage to forget their own traits and identities when in Act I Rosencrantz introduces himself to the Player as Guildenstern, and vice versa. The two then “confer briefly” (Stoppard 22) and Rosencrantz corrects himself saying, “(Without Embarrassment) I’m sorry – his name’s Guildenstern, and I’m Rosencrantz” (Stoppard 22), thus showing that in this world nothing, not even something that is as prized and guarded as individuality and one’s own identity, is certain.

In the beginning of Act II of *Travesties*, there is a similar slippage of identity but here it is between fictional and “real” identities. When Carr and Cecily, his wife in the play and Carr’s actual wife, first meet at the library where she works, Cecily reads his visiting card and says, “Tristan Tzara….Why, it’s Jack’s younger brother!” (Stoppard 46). That is, he is Algernon Moncrief from *The Importance of Being Earnest*, who has assumed the identity of “Ernest,” the fake brother that Jack, in the original Wilde play, invented to let him escape to the city. By also calling him Tzara, who was an actual person just like Carr himself, Cecily combines a real identity with a literary one to further confuse Carr’s own identity. By layering all of Carr’s possible identities, furthered by Cecily herself being a literary character and originally a character from an Oscar Wilde play, Stoppard confuses not just his characters in the play but his audience as well, in order to show the fluidity of individual identity.

Stoppard further explores the dangers of losing or perhaps never even properly forming an identity from the very beginning of *Travesties*. By choosing Henry Carr to narrate a fictionalized account of his acquaintances with Joyce, Tzara, and Lenin, Stoppard sets up the idea that though the entire situation is a façade, it is based on fact. Carr, Joyce, Tzara, and Lenin were actual people who all lived in Zurich in 1917. In fact, Carr and Joyce were both involved in a production of Oscar Wilde’s *The Importance of Being Earnest*, the play which Stoppard reworks into *Travesties*, after which the two filed lawsuits against each other because of a quarrel over money (Stoppard ix-x). In attempting to re-create that animosity between the two in his play, Stoppard’s Carr says of Joyce, he is “in short a liar and a hypocrite, a tight-fisted, sponging, fornicating drunk not worth the paper…” (Stoppard 7). In this way, Stoppard presents Joyce, as well as the others, Tzara and Lenin, as an idea rather than a real person. By having Carr introduce Joyce with a series of negative adjectives, we have been set up to keep these qualities
in mind for when we actually see Joyce later, thus further showing how fluidly an identity can be changed. Since we are Carr’s captive audience, we are exposed to his version of events and his thoughts on what Joyce was like as a person. Thus, rather than allowing us to formulate our own opinions about Joyce’s personality from his lines with that of the one that Carr initially “remembers,” Stoppard is showcasing just how easily identities can be altered and/or re-created.

Furthermore, we cannot overlook the fact that Henry Carr, both the actual person and character, would be unknown to the audience had it not been for the encounter between him and Joyce on which Stoppard based his drama. In an attempt to make him the central figure, Stoppard creates an identity for Carr that relies on the latter’s association with Joyce, Tzara, and Lenin. Thus, Stoppard makes it so that without those three famous men, Carr would have faded into obscurity - a comment on the modern man as a bystander to life. For example, though Carr is the main character, the play begins with “places for JOYCE, LENIN, TZARA” (Stoppard 1) and after several lines from each, Carr finally speaks and delivers a soliloquy on Joyce, starting with “He was Irish, of course” (Stoppard 5). Travesties is set in Carr’s mind, yet the first words we hear from him are about Joyce, then Lenin, and lastly Tzara, Which is why when at the end of the play, Carr’s wife, Cecily, refutes each of his claims to knowing the men, we are made to realize that everything said, even the identity that Carr, via Stoppard, had set up for himself, was a falsehood. Doing so, leaves both the audience and Carr confused as to who he actually is, especially since the entire play was a narration by Carr. By the end, we realize that he never met Lenin and Tzara, and his wife, who is a fictional character and not his actual wife, never helped Lenin write his book. So then, we are left to ponder the identity of a man that we had thought we had gotten to know over the course of the play. Thus, Stoppard is giving an example of the confused state that the modern man finds himself in, unable to rise to the occasion of being the central figure in his own life, and properly forming and holding onto an identity.

Cecily’s exposure of the truth to Carr’s claims is nihilistic in that they reveal the lack of solidity in identity. This idea is strengthened by the fact that in Wilde’s The Importance of Being Earnest, the character of Cecily, much like Carr, constructs her own romantic narrative. She keeps a diary, from which she later reads to Algernon upon his proposal to her, that they had already been engaged and broken up and then engaged again – all of this according to what she’s written in her diary. In this way, Cecily tries to take control of her future by fictionalizing her own narrative, similar to what Carr, the consular officer that not many people would know about, tries with his entire narration. However, unlike Cecily’s fiction, which ends up as truth since she and Algernon do get married, Carr’s are revealed as falsehoods. Furthermore, the revelation is done by Carr’s wife, Cecily, who in The Importance of Being Earnest was the embodiment of forming an identity via the creation of self-narrative. However, the facts that Cecily is not the name of Carr’s actual first or second wife (Stoppard xi), and that this Cecily also confuses characters in Stoppard’s play with those in Wilde’s, leave the audience wondering if she is any more believable than Carr. Thus, by shaking the credibility of his characters, Stoppard subverts the happy ending in Wilde’s play by leaving us entirely uncertain about which and whose truths to believe.

Stoppard further subverts the traditional roles and values presented in The Importance of Being Earnest, by making Carr, a male character, the one who attempts to fictionalize his own narrative. Wilde’s Cecily keeps a diary because it was the societal norm for young women to record their daily lives to perhaps share with their friends. However, by using Carr as his narrator, Stoppard shows his audience that the world that they are in now is different from Wilde’s world. The inclusion of the three famous revolutionaries, Joyce, Tzara, and Lenin and
their conversations about art and politics indicate that Travesties is not a comedy of manners. This is a play that presents a world where everything is pointless, including the narratives we create for ourselves in order to try and navigate its strangeness.

Stoppard’s re-working of Shakespeare’s Hamlet similarly echoes this sentiment. While Hamlet takes place in a world where the title character, the prince of Denmark, is internally struggling with his morals, ideals, and values, and questioning “to be or not to be,” Stoppard’s Rosencrantz and Guildenstern are in an alien world, confused as to where they are and thus, unable to take any kind of action. For example, right after Claudius leaves the pair with the request that they help him understand “Hamlet’s transformation” (Stoppard 35), Rosencrantz turns to Guildenstern and says, “Shouldn’t we be doing something constructive?” (Stoppard 41). The two then uncertainly throw ideas back and forth but do nothing till Hamlet and Polonius enter the stage. While Hamlet’s is a world that is recognizable to the audience, both because of the values being explored and the fact that it is a classic text, Stoppard’s relies on his audiences’ knowledge and destabilizes it by re-positioning two minor characters, who do not serve much of a purpose in the original version of the events, as the main characters. In this way, Stoppard offers his audience a world that is different from the one that they are use to, letting them know from the beginning that this play explores a world where their expectations will not be rewarded in the way that they think they ought to be.

Nevertheless, while all three characters, Hamlet, Rosencrantz, and Guildenstern ponder their purpose, Hamlet, unlike the other two, does come out of his state of stasis. Although Hamlet waits to take action against his uncle, Claudius, in order to avenge his father’s murder, he does ultimately do so, thus affirming his status as the tragic hero. The play that Stoppard presents, however, is all about waiting, waiting till it’s too late to do anything to change events as they worsen (if, that is, they could ever be changed since their fates are foretold in the title). Rosencrantz and Guildenstern allow themselves to become bystanders by not being able to comprehend the greater action of Hamlet though Stoppard’s play is named for them, something that would normally indicate that the characters are central to the plot. Thus, Stoppard is commenting on the modern man’s state of stasis that renders him unable to change or take charge of his proper identity.

Using them as representations of the modern man, who is stuck and unable to act, Stoppard’s Rosencrantz and Guildenstern are alienated from everything and left completely unaware as to how and why they are in Elsinore. In between musings about fingernails and toenails, the pair questions their surroundings and Rosencrantz concludes, “We were sent for…That’s why we’re here. (He looks round, seems doubtful, then the explanation.) Travelling” (Stoppard 19). However, when they chance upon the Tragedians soon afterwards, they seem to forget about their purpose all over again, and engage in conversation with the Player. Thus, Stoppard is suggesting that the modern man’s, as represented by Rosencrantz and Guildenstern, distracted efforts do not rouse him from his state of stasis but they only further confuse him as to what his goal is. In other words, we are easily sidetracked from our true purpose which is why we remain trapped engaged in meaningless actions, and unable to comprehend the world.

Stoppard further explores Rosencrantz and Guildenstern’s roles as spectators in their own plays, i.e. their own lives, employing them as plot devices in the same way that Shakespeare did in Hamlet. In the same way that Stoppard’s play relies on Hamlet to make sense at all, Rosencrantz and Guildenstern depend on the actions of the other characters to exist at all. For example, right after the Player leaves and Rosencrantz discovers that their latest coin toss had
finally yielded tails, their surroundings change and they suddenly find themselves inside Elsinore, witnessing Hamlet curiously holding Ophelia and then the two running “off in opposite directions” (Stoppard 35). Thus, indicating that since Rosencrantz and Guildenstern’s identities lack solidity due to their incomprehensibility of the world, they do not have control over what happens to them or their surroundings. This, of course, only further drives them into confusion, which in turn, further renders their actions or lack thereof, meaningless.

The greatest consequence of this is that their ends, just like their lives, are also rendered meaningless. Since they remain bewildered for the entire play, Rosencrantz and Guildenstern are unable to see when their tragic ends near, something that Guildenstern actually ponders out loud at the end of the play right before he dies. He says, “There must have been a moment, at the beginning, where we could have said—no. But somehow we missed it…” (Stoppard 125), regretting his and Rosencrantz’s inability to seize an opportunity and take action before it was too late. He, as a representation of the modern man, is lamenting their lack of awareness of their world, which could have saved their lives. For example, if the two had been properly aware of the play that the tragedians were putting on for Claudius and friends, they would have been forewarned as to their fates and then perhaps, taken action to avoid it. Perhaps Rosencrantz and Guildenstern’s inability to act and their bewilderment at the happenings that surround them, could have been understandable, and forgivable even, if it were not for the fact that they failed to recognize their own likenesses in the tragedian’s play. If they are indeed representations of the trapped modern man, then Stoppard is suggesting that individual responsibility has a lot to with the situations we find ourselves in. Thus, Stoppard is commenting on Rosencrantz and Guildenstern’s pointless death which came as a result of their pointless lives, similar to Henry Carr’s pointless storytelling.

This pointlessness of their existence and death is made complete when the two simply “disappear” from stage one after the other. Rosencrantz accepts his imminent death with an, “All right then. I don’t care…[and then] disappears from view,” while Guildenstern, after initially not noticing the disappearance of his friend, calls “Rosen--? Guil--?” (Stoppard 125), to show that he still was not entirely sure who he was. By keeping their use as plot devices in Hamlet intact in this play, Rosencrantz and Guildenstern remain spectators in the world that the audience is presented through their eyes.

The pair’s often fragmented dialogue also lends insight into their confusion as to what their roles are. When they first figure out that they were summoned to Elsinore castle, yet were not given any directions as to how to get there, Guildenstern says, “We have not been picked out…simply to be abandoned…set loose to find our own way…We are entitled to find some direction…I would have thought” (Stoppard 20), with the ellipses in the sentence indicating his uncertainty. The question that arises from this line is who does Guildenstern expect to have gotten directions from? Since the pair were only minor characters in Shakespeare’s original, they had very few lines and were of little importance to the overall plot of the play; they are seen onstage for only a few scenes. Thus, since Stoppard’s play attempts to re-create what might have happened to the pair during all of the instances we did not see them onstage, something that Shakespeare did not account for, it makes sense that they are left confused. Shakespeare did not give them much guidance as to what they are supposed to do. This can be paralleled to “acting” where actors play their interpretation of characters but not without some guidance from their director. By comparing theatre to real-life, Stoppard explores our proper roles and identities. If “All the world’s a stage” (Shakespeare 129) as Shakespeare is oft-quoted, Stoppard then offers a
reflection of the modern man’s confusion over life’s direction and his attempts, however feeble, to make sense of it.

As much as Stoppard could have denied that *Rosencrantz and Guildenstern Are Dead* and *Travesties* are philosophical debates about the state of the modern man’s mind, the evidence in his plays prove otherwise. All three main characters, Rosencrantz, Guildenstern, and Henry Carr, who is a bit more active than the other two because of his story-telling, are engaged in the quest for their purpose and an identity. Similarly, the endings of all three are also rendered meaningless because they fail to capture what they were searching for. While the nihilistic actions that Stoppard displays are meant to be funny in their pointlessness, the darker implications should make us uncomfortable, nervous, and maybe even fearful when imagining ourselves to take the places of the main characters. After all, Stoppard has us, his audience, laughing at our own imagined demises.

Works Cited


Good Heartedness and Virtue in Henry Fielding’s *Tom Jones*

Mary Kathleen Angel

Faculty Advisor: Brian Connery
Department of English
Oakland University

In the eighteenth century novel, *Tom Jones*, Henry Fielding responds to Samuel Richardson’s emphasis on chastity in his novel, *Pamela*, by introducing a hero whose dichotomy causes us to reconsider the importance of chastity in comparison to other virtues. The sexually promiscuous but good-hearted hero demonstrates that although Fielding believed in fidelity, he wished instead to bring to light a virtue he considered more potent: good nature. *Tom Jones* embodies Fielding’s belief that a good heart is the foundation upon which, with learning, one can build a truly virtuous and happy life. The hero’s innate generosity makes his transformation believable, and his flaws allow him to function as a more effective role model.

Fielding describes good nature as “that Generosity of Spirit, which is the sure Foundation of all that is great and noble in Human Nature” (578). To Fielding, good heartedness is an attribute that has the capacity to bring forth all forms of benevolence. As he tells us in his essay on the subject:

Good-nature is a Delight in the Happiness of Mankind, and a concern at their Misery . . . This is that amiable Quality, which, like the Sun, gilds over all our other Virtues; this it is, which enables us to pass through all the Offices and Stations of Life with real Merit. This only makes the dutiful Son, the affectionate Brother, the tender Husband . . . Whereas all other Virtues without some Tincture of this, may be well called *Splendida Peccata* (shining faults). (311)

Fielding would have listed Richardson’s version of chastity as one of the *Splendida Peccata*. His short novel, *Shamela*, mocked Richardson’s portrayal of chastity in *Pamela*, revealing it as an empty virtue or perhaps a bargaining tool, rather than a quality that contributes positively to the well being of others. *Tom Jones* completes Fielding’s response by offering the alternative view that compassion is more important than chastity since it might manifest that virtue as well as others that are equally beneficent. This philosophy underlies the plot of *Tom Jones* and forms the character of its hero, making Fielding’s novel a demonstration of his faith in the importance of good nature as a foundation for all substantial and genuine virtue.

*Tom Jones* has what Fielding describes as “a kind and benevolent Disposition, which is gratified by contributing to the Happiness of others” (242). His ability to feel compassion for others and to experience joy from their happiness is evident from his early years. After the family gamekeeper, Black George, loses his position, Jones feels a sense of responsibility toward George and his family. He tells his father, “I could not bear to see these poor Wretches naked and starving, and at the same Time know myself to have been the Occasion of all their Sufferings” (130). Compassion and generosity do not leave Tom even when he is overwhelmed with his own troubles. When he is in London and believes he has lost Sophia, he offers financial
help to Mrs. Miller’s cousin and also facilitates the marriage of Mrs. Miller’s daughter, Nancy. Fielding tells us that Jones “was never an indifferent Spectator of the Misery or Happiness of any one” (719). Jones experiences deep satisfaction from alleviating the suffering of others. This inner gratification, according to Fielding, is the true reward of real virtue, as opposed to the vain and material rewards reaped by Richardson’s Pamela for her unwavering chastity. Mrs. Miller tells Allworthy, “I do not pretend to say the young Man is without Faults; but they are all the Faults of Wildness and of Youth; Faults which he may, nay which I am certain he will relinquish, and if he should not, they are vastly over-balanced by one of the most humane tender honest Hearts that ever Man was blest with” (779). As she intimates, Tom is not without flaws. His generous heart is an insufficient guide and often leads him into imprudent acts.

Tom is an imperfect hero. But although he engages in a number of affairs over the course of the novel, his sense of compassion and honor remain evident to the reader. Tom falls in love with Sophia while he is in a relationship with Molly Seagrim, and he struggles with his thoughts of quitting Molly since “he had sworn eternal constancy in her Arms . . . The ruin, therefore, of the poor Girl, must, he foresaw, attend his deserting her; and this Thought stung him to the Soul . . . His own good Heart pleaded her Cause” (197). His liaison with Lady Bellaston occurs because “his very love to Sophia made it necessary for him to keep well with the Lady” (627). Even his decision to sleep with the lady is explained in the light of his good nature and sense of honor: “He knew the tacit Consideration upon which all her Favours were conferred; and as his Necessity obliged him to accept them, so his Honour, he concluded, forced him to pay the Price” (636). Tom helps us to further consider his unfaithfulness when he tells Sophia that sex is an act separate from the true desires of the heart: “The Delicacy of your Sex cannot conceive the Grossness of ours, nor how little one Sort of Amour has to do with the Heart” (866). He explains that his actions do not reflect his true love when he tells her, “Oh my Sophia, my only Love, you cannot hate or despise me more for what happened . . . than I do myself: But yet do me the Justice to think, that my Heart was never unfaithful to you” (642). Within the context of the story, Tom’s illicit acts come to light as careless manifestations of his good nature rather than demonstrations of a profligate nature or lack of reverence for Sophia.

Jones is flawed because Fielding believes we will learn more from him than from an idealized character. When Fielding tells the reader, “If thou dost delight in . . . Models of Perfection, there are Books enow written to gratify thy Taste” (460), he is referring to Richardson’s paragon of virtue, Pamela. While calling into question the true intent behind her unwavering chastity, Fielding also questions the efficacy of a seemingly irreproachable character. Since a perfectly virtuous hero is an abandonment of reality, an imperfect hero becomes a more believable role model: “For we do not pretend to introduce any infallible Characters into this History; where we hope nothing will be found which hath never yet been seen in human Nature” (123). Jones’s imperfections are Fielding’s attempt at close representation of real life. They lend credibility to Tom and to the story, allowing the reader to relate to the character and to transfer the story’s moral purposes to his own life. In Chapter 1 of Book X, we see the summation of Fielding’s purposes in creating an imperfect hero:

In Fact, if there be enough of Goodness in a Character to engage the Admiration and affection of a well-disposed Mind, though there should appear some of those little Blemishes . . . they will raise our Compassion rather than our Abhorrence. Indeed, nothing can be of more moral Use than the Imperfections which are seen in Examples of this Kind; since such from a Kind of Surprize, more apt to affect
and dwell upon our Minds, than the faults of very vicious and wicked Persons. The Foibles and vices of Men in whom there is great Mixture of Good, become more glaring Objects, from the Virtues which contrast them, and shew their Deformity; and when we find such Vices attended with their evil Consequence to our favorite characters, we are not only taught to shun them for our own Sake, but to hate them for the Mischiefs they have already brought on those we love. (461)

The existence of the flaw of inconstancy in Jones helps to facilitate Fielding’s didactic purposes. Fielding hopes to convey to the reader that although a kind nature is the pathway to virtuous living, it is not a foolproof guide. Through Tom’s recognition and correction of his mistakes, the reader is able to associate undesirable outcomes with poor choices and, in the end, to see the true happiness that can be acquired through thoughtful living. Illustrating his hard-won prudence, Tom tells Allworthy, “My Punishment hath not been thrown away upon me: Though I have been a great, I am not a hardened Sinner; I thank Heaven I have had Time to reflect on my past Life, where, though I cannot charge myself with any gross Villainy, yet I can discern Follies and Vices more than enough to repent and to be ashamed of; Follies which have been attended with dreadful Consequences to myself, and have brought me to the Brink of Destruction” (854). In return, Allworthy affirms the importance of good judgment: “You now see, Tom, to what Dangers Imprudence alone may subject Virtue (for Virtue, I am now convinced, you love in great degree.) Prudence is indeed the Duty which we owe to ourselves“ (854). With these testimonies, we see that it is not Tom’s nature but his actions that need to change.

In the end, Tom’s ability to overcome his flaw seems natural and credible since, over the course of the novel, his essential character does not change. Fielding believed that “for a Man to act in direct Contradiction to the Dictates of his Nature, is, if not impossible, as improbable and as miraculous as any thing which can well be conceived” (357). The possession of an underlying good heartedness makes Tom’s transformation to constancy more believable than Richardson’s Mr. B, whose unconvincing conversion to faithful husband leaves us baffled. Tom possesses good heartedness from the start but simply learns prudence, which brings his actions into confluence with his good nature.

Tom Jones’s realization that he must change is as much a result of his desire for real love as it is his acquisition of prudence. Because of his good heart, he is able to recognize the happiness that can be found in fidelity. He learns that in order to have the one thing that means most to him, he must be faithful. Sophia tells him, “I will never marry a Man . . . who shall not learn Refinement enough to be as incapable as I am myself of making such a distinction” (866). Furthermore, Fielding’s story demonstrates the transformative power of genuine love. The narrator tells us that Jones’s “whole Thoughts were now so confined to his Sophia, that I believe no woman upon Earth could have now drawn him into an Act of Inconstancy” (771). In the end, Fielding teaches us that fidelity is not an act of self-denial but is instead rewarded with the joy of harmonious union.

*Tom Jones* demonstrates the reformative possibilities of one who first possesses the quality of good heartedness. Fielding’s novel is his discourse on virtue, prudence and the construction of believable fiction.
References

The ideas in this paper were informed by class discussions as well as the following books and articles:


Breath-molecules: Order and Chaos in Jorie Graham’s *Overlord*

Benjamin Malburg

Faculty Advisor: Gladys Cardiff
Department of English
Oakland University

James Gleick says in his book *Chaos Theory: Making a New Science*, “believers in Chaos” are reforming the tendency of traditional science to overlook “the irregular side of nature, the discontinuous and erratic side”—the “monstrosities” that stand in the way of a logical solution—in a revised attempt to find “the whole” (3). Like these believers, Jorie Graham breaks down illusions of determinism, predictability, and order within *Overlord* so that she does not add to the illusion by “fabricating” a meaning that is reductive (Gardner *Incandescence* 169). The reader, in return, is pulled between two agendas: one that unmakes illusions of order and one that tries desperately to make true order and meaning. As Graham investigates modes of defamiliarization, plurality, and alterity, she seeks and prays for “wholeness in a fragmented world” or an order-making overlord; for without order, all meaning becomes dissolution (Karagueuzian 151). Graham dramatizes the dissolution of order through formal strategies involving harsh transitions, unpredictable lineage and gaps, unorthodox punctuation, disjunctions, and unreliable metaphors. By means of highlighting and demonstrating the failures of language and science, Graham hopes to “open a live space where the torments and powers of finite human existence are experienced to their fullest” and also force the reader to a state of alterity untainted by poetic imposition (Gardner *Incandescence* 169).

As Susan McCabe and other literary critics have stated, Graham’s *Overlord* amalgamates theological, historical, and theoretical ideas as she “investigates [the] still-haunting” effects of WWII today (joriegraham.com). The title *Overlord* stems from the term “Operation Overlord,” popularly referred to as D-Day (Graham 91). McCabe describes Graham as “a singer of too-lateness” as “Graham weaves these [WWII] voices into the cataclysmic present: a world of global warming, contaminated drinking water, minute-by-minute species extinction, the torture of prisoners, homelessness, and the war in Iraq” (joriegraham.com). The present tense adds to the illusion of spontaneity and requires readers to “participate responsibly in a process...[that] is always happening” (Ingram 145). Unpredictable punctuation and spontaneous style changes continually jump out of the overall prose-like tone, thus giving way to a disorderly and chaotic underbelly of this seemingly austere collection. In summary, Graham welcomes the disorder in her attempt to embody the whole and not to delude the reader by fostering an illusion.

According to Adalaide Morris in his article “The Act of the Mind,” traditionally, science and poetry have been made “into two distinct realms” (147). However, as science became more speculative due to inexplicable concepts and imperceptible subjects, “the borders between the visible and invisible, real and imaginary, scientific and poetic, ceased to be self-evident” (147). It is in this realm that Jorie Graham conducts what Morris calls “thought experiments,” which are imaginary interpretations where a poet “aim[s] to find out what something is, or to find out what’s happening” (149). Through her own thought experiments, she scrutinizes language and images of nature, individuality, history, religion, poetry, language, and culture. Before examining Graham’s thought experiments, however, it should be noted that the human need to understand and the consequences of that need play a crucial part in her poetry. This urgency provokes the
breaking down of natural systems into logical, imaginary systems—logical, though not always accurate because just as traditional science relies heavily on approximation and speculation, so does poetry. In this light, the very act of experimentation is an imposition of order.

Graham worries that poetry, as well as other order-making constructions like science and religion, “by implications of their formal characteristics were providing a metaphysical view of the world which might be a terrible illusion” because they only offer speculative answers (Gardener Interview 220). In accordance to this, critic Calvin Bedient describes Graham’s collection as having an air of “hopelessness” because of “humanity’s failed experiments at making itself something through ‘difference’” (joriegraham.com). “Difference” is one tool of making order and experimentation. In “Praying (Attempt of June 8 ’03),” a poem that explores “difference” as a means of war organization, Graham writes “We have to / make up / something that will count as difference—real difference—how / different does it have to be, the difference, to count, to do its job / trying as it is to save us, or so history would have us believe” (ln. 12-16). The job of “difference” is to impose limits so that systems recognizably perform within those limits and, therefore, can be predicted and understood. When Graham questions how different those limits have to be, she adapts a scientific concern that spurred the chaos movement. Traditional science frequently overlooked erratic or irregular behavior (difference that does not “count”) (Gleick 3). Chaos theory, on the other hand, investigates systems in their entirety in their quest for the “exact”—an element that feels continually absent throughout Overlord (“Praying (Attempt of Feb. 6 ’04)” ln. 78). The creation of order through difference, then, does not denote truth or “wholeness” but may inadvertently create an illusion of truth or an artificial ‘other.’

Despite her own reservations about making differences, Graham cannot help but do the same in her thought experiments. If the difference is lost, then the limits disappear and result in the unmaking of the thing or, as she refers to this in “Praying (Attempt of Feb. 6’ 04),” an “extinction”—the absence of meaning. Before analyzing her experiments, it should be stated that this manuscript focuses primarily on “Praying (Attempt of Feb. 6 ’04)—a poem that characteristically dramatizes the making and unmaking of order. It should also be noted that the long block quotes in this manuscript are necessary in reviewing the extensive imagery and metaphors in Overlord. In order to facilitate the readers, I have included the line numbers in brackets before the designated lines. In “Praying (Attempt of Feb. 6 ’04),” Graham tries to save meaning from “extinction” in the following lines:

[66] Like a breath
[67] After the sentence is uttered, done, mouth shut with
[68] Meaning. That breath is in the air, isn’t it, literally in it—
[69] An exam of some kind would find them, the breath-molecules—no?—
[70] And the said thing?—well, yes, it too is there, somewhere—
[71] And the music—god what an orchestration

In the lines above, Graham asserts that even if the breath is undone or becomes “extinct,” the meaning that is said is not unmade as well. In the combination of “breath” with the word “molecules,” we get a glimpse of how Graham’s mode of imaginative experimentation unfolds.
In an effort to save the said thing, she imposes a new order by making a difference: she breaks down the term breath—a “breath” being something that is simple, singular, differentiated in time, and personalized in space—by combining it with the term “molecules.” Through this union, or scientific hypothesis if you will, breath becomes “breath-molecules,” which are plural, partial, unpredictable, and unquantifiable. Under this hypothesis, even if the breath dissipates, Graham speculates that the molecules and the said thing can persist. As she infers, “an exam of some kind would find them,” she confronts us with a thought experiment that attempts to redeem a meaning through determination. Yet, the suspended space of the dashes in this excerpt, along with the questioning “no?” and “the said thing?,” add to the uncertainty and unsettling tone that is felt here, as if both language and science have reached their limit, causing the illusion or hypothesis to break down. It is under these pretensions of indeterminacy and threat of chaotic disarray that Graham turns to a more hopeful, broader hypothesis of an “orchestration.” In this way, the poem through its language and images continually “ramifies, collapses, and regroups” under a new order (Morris 159). In this fluid environment, readers are engaged in “a mobile negotiation of otherness” resulting from “the making and unmaking of meanings” and the discursive limits of difference (Ingram 145).

Graham’s illusion of the “orchestration” delineates the hypothesis of “the whole,” in which material and immaterial function, precisely and organized, in the making of an absolute and collective meaning/music. Graham seems to be sifting through this idea of “the whole”—including “adaptations from scientists, philosophers, linguists, naturalists, poets, and cultural critics”—in order to find the “genuine” (Morris 152) (Ingram 144). However, the existence of chaos poses innumerable complications to her hypothesis. Though the reader may have accepted the metaphor, Graham cannot accept it without proof, testing, and making “differences.” In other words, Graham needs to know that her “said thing” is adding to an emergent order. Graham must now investigate the system she is proposing through imaginative experimentation. Graham continues on to write:

[71] And the music—god what an orchestration—of all the footsteps
[72] at once, right now, on this planet, I will not list all the surfaces
[73] they tap against, I will put in all the grammars playing themselves out
[74] in all the languages, spidery, all speaking at once, wind moving through
[75] the corn, the speakers speaking stopping listening speaking.
[76] I see the trunks of first-growth being piled. I try to imagine all the doorways
[77] on the planet, bodies passing through, followed by light.
[78] A name called out. An age [exact!] attached to
[79] each body. And garments. And all the invisible fingers that move so rapidly
[80] to make those garments. And factories, archipelagoes, more factories. This is
[81] not going in a good direction. I think of all the hearts
[82] beating right now—first in all the humans of all
[83] the sizes, then add the animals,
[84] the dying person with his strong young heart, the about-to-be
[85] born with his heart eating up time. Starting to eat it. Hunger. Each beat
[86] a clench of muscle. Worldwide orchestration of
[87] so many darks
[88] to hold so many clenchings. Also see
[89] all the chests ripped open. Then no. Try to unsee.

The I will’s, I try to imagine, and I think, as mentioned earlier, are setting us up in another thought experiment as Graham tests and works out her illusion by making differences; through these differences, she hopes to visualize how the overall order is made and how its constituents contribute to that order. However, the first signs of irregular or erratic behavior are immediately apparent in the aesthetics as the lines and syllabic metric vary unpredictably and resist falling into a pattern. In Graham’s attempt to dissect the “orchestration,” Graham’s lines expand, jump out, or are cut short, eliciting the lines inability to make order, and therefore, inferring already that the illusion has failed. As Helen Vendler informs us, “The conventional view of the poetic line…associates it with breath…The physiological regulation of breathing makes natural breaths roughly isometric—in, out; in, out. And isometric breathing is the basis for regular lines, orderly and successive ones” (81-2). Although the lines do not outride to succeeding lines, some max out at 21 syllables, which is a rather lengthy breath-unit. On top of that, Graham “combines the long line with its apparently ultimate narrative partner, the long sentence” (Vendler 85). Therefore, the reader is forced to choose between the competing sentence length and line length, both of which push the reader from long to short and unregulated breath-units. As a result, the reader has to constantly adapt to each line. The long line, according to Vendler, then becomes the “formal equivalent of mortality, dissolution, and unmeaning” by acting as “a force which is the diametrical opposite of those sequential, incremental, and orderly processes” (77-8).

Similarly, the gaps create another dimension to the poem’s unpredictability. Line 87, for example, gaps the left margin alignment and therefore, the very formatting of the poem. As a result, the gap appears as though someone had erased the first part of the line, leaving only a few words to read on the unaligned and staggering right margin. Because there is no predictable order to the appearances of these gaps, they come across like ‘errors’ or failures in the text to maintain right alignment and leaving the impression that something important has been left out or, as Bedient says, the feeling that “the All is missing” (joriegraham.com). Like the long lines, the gaps give evidence that the poem or experiment is unable to maintain order in the poem, therefore, resulting in a failed experiment.

Furthermore, the punctuation, usually the basic element for making order in written language, complicates and disrupts Graham’s mental “orchestration.” Much like her failure to break up and list all the material aspects of the “orchestration,” she cannot seem to determine the appropriate form of punctuation as she varies between periods, dashes, brackets, and commas—none being able to make a predictable “difference.” In the lines above, her use of commas, periods, and dashes are inconsistent. For example, the first half of the quote on page 11 is comma heavy, but the commas gradually give way to a heavy use of periods in line 78. Sometimes she uses her punctuation to break up complete thoughts, such as “I see the trunks of first-growth being piled.” Other times, she fragments her thoughts, such as “Starting to eat it,” while some
lines enjamb and others endstop. In line 75, she completely leaves the punctuation out, “speakers speaking stopping listening speaking,” contradicting her seemingly overuse of punctuation in the previous lines. Through this punctual collage, Graham leaves no room for prediction and thwarts expectation. Though the section seems to have some kind of order as a whole, the order-making faculty of basic punctuation feels fractured and untrustworthy. As a result, the reader cannot predict the punctuation by its conventional use or its frequented use in the poem. As Longenbach says, “She eschews all punctuation, suggesting that the poem itself has reached a condition or openness beyond the conventions of grammar and syntax” (93). This “openness” is the result of the language breaking down and losing its determinability to create difference within the poem.

Though the speaker tries to find the “exact” components to this Grand orchestration and how these components fit together, the words and phrases form disjunctions, enjambs to succeeding lines, transition abruptly, and come across overall meshed together—proving detrimental to the precise and organized arrangement the illusion warrants. Though an imaginary experiment, Graham must observe and write as she imagines, thus she has to deal with visual limitations, as she finds that “the world changes more quickly than the poet can describe it” (Karaguezian 118). This limitation causes a convoluted collage of narrative sentences, fragments, long and short lines, enjambments, and sometimes harsh subject transitions. Thus, Graham discursively passes from image to image—from footsteps to languages to corn to doorways to humans to animals to humans and so on—as she attempts to compile, list, and organize her image. Graham rephrases herself in several areas of this poem as she aspires to determine a more “exact” meaning, but her clarifications tend to distract and clutter these long lines. In line 74, Graham’s attempt to reduce the image to language causes her to say “all the languages,” then “spidery,” and “all speaking at once.” Since these phrases are positioned in a sequential order, they come across like clarifications as if the previous phrase’s transference was not of a satisfactory exactitude. In doing so, she takes unpredicted turns, for she says, “this is not going in a good direction” and also “then no. Try to unsee.” In this way, “her own tropes and metaphors call attention to their peculiarities and failures: they hesitate and backtrack, they fall flat, they ‘stand like madmen facing into the wind’…[and] make the readers conscious of an urgent desire for the very closures the poems resist” (Ingram 144). This self-limiting and self-revising in the poetry resist and disrupt the listing and also hinder the exactness that Graham is aiming for. Under this disposition, the poem starts to break down and needs to once again reorganize itself.

Though alarming, the failure of order is crucial to Graham’s poetry, because it forces the reader to “admit our relationship to the world is one of unknowing” (Gardener Interview169). By “constantly creating the illusion then destroying it,” Graham removes the very illusions of order that poems, science, and humans naturally hunger for in hopes that from the ruins, truth will be found (Gardener Interview 217). Graham admits that by “putting oneself in a poem as a protagonist instead of a narrator,” she is essentially creating a “situation where one might not get a poem” because order and meaning might not have been achieved (Gardener Interview 227). Morris writes, “If the undeniable advance in chaos theory is its ability to stress dynamics over structures, complexity theory’s advance over chaos theory is its ability to linger at the edge between non-order and order where self-organization occurs” (158). Overlord, in its entirety, tests this theory as it breaks down on every level of its content (from the very arrangement and titles of the poems right down to punctuation). It seems that despite Graham’s efforts to make-order and unmake order, she must now trust the poetry to self-organize or that the reader will fulfill the absence of an “Overlord” by imposing their own order. The alternative to making-
order, then, would include the “acceptance” or “gratitude” that Graham sought from the beginning of the poem and again turns to in the last lines of the poem as she describes a dying mother and a girl reviewing a brochure in a hospital waiting room. Though the speaker “can’t / see really / what it is,” Graham knows that there is some important meaning there as the girl says, “This, mom, / this part here is the part I’m excited about” (ln. 111-2). “Acceptance” is having hope and letting an emergent order arise out of chaos without self-imposing order or knowing why or how it exists.

References

Attitudes on Dating Violence Among African-American Adolescents

Teila S. Pickett

Faculty Advisor: Pamela McAuslan
Department of Behavioral Sciences
University of Michigan – Dearborn

Abstract

Dating violence has become an important issue in today’s society. The present study examined the attitudes regarding dating violence among African American adolescents. The participants included 64 teens (39 females and 25 males) that completed a demographic questionnaire and the Attitudes Towards Dating Violence Scales (Price et al., 1999). The teens were more accepting of girls’ use of violence than of boys’ use of violence; boys were more accepting of dating violence than were girls; and psychological violence was more acceptable than physical and sexual violence. Additionally, those who have had a steady dating partner were least accepting of physical dating violence, while those who had not had a previous were least accepting of sexual violence. The implications for dating violence prevention programs among African American adolescents will be discussed.

Introduction

Dating violence has become an important issue in today’s society. It becomes highly relevant for adolescents because it is during this developmental stage when dating violence is said to begin (Hokoda, Ramos-Lira, Celaya, Vilhauer, et al., 2006). It is estimated that 15-20% of teens report physical and sexual violence in their dating relationships. Little attention has been given to this topic among African American youth. This study will focus on the attitudes of African American adolescents regarding dating violence.

Dating violence has been defined as including physical abuse, psychological, and sexual abuse; done in order to dominate or control another individual and it causes some level of harm (Hokoda et al., 2006; Ulloa, Jaycox, Marshall, & Collins, 2004; Wolfe, Wekerle, Scott, Straatman & Grasley, 2004). Attitudes on dating violence are linked to actual occurrences of perpetration and victimization (Ulloa et al., 2004; Sears, Byers, & Price, 2007; Windle & Mrug, 2009). Boys who had been psychologically, physically, or sexually abusive with their girlfriend were more accepting of dating violence than those who were not. Psychologically or physically abusive girls were more accepting than non-abusive girls (Price, Byers, & the Dating Violence Research Team, 1999; Sears, Byers, & Price, 2007).

Acceptance of dating violence varies by the gender of the perpetrator (Bethke & DeJoy, 1993). Males have been found to be more accepting of both female and male perpetrated psychological, physical, and sexual dating violence (Price, et al., 1999). Both boys and girls were more accepting of female rather than male perpetrated dating violence (Price, et al., 1999). Moreover, male perpetrators were seen as inflicting much more physical and emotional harm than female perpetrators (Bethke & DeJoy, 1993).

In the present study attitudes on dating violence were assessed. The participants were asked to complete a demographic questionnaire and The Attitudes Towards Dating Violence Scales (Price, et al., 1999). Attitudes on dating violence have been found to be good predictors of the actual occurrence of dating violence (Ulloa et al., 2004). By learning about attitudes,
insight may be gained on actual behavior. Additionally, research is lacking on the acceptance of dating violence in regard to African American adolescents. This study may aid in developing programs geared towards dating violence prevention. However, to develop an effective program, it is important to know what specific attitudes need to be addressed.

**Hypothesis**

It is predicted that boys will be more accepting of dating violence than girls, and female-perpetrated dating violence will be more acceptable than male-perpetrated violence for both boys and girls. Psychological dating violence is predicted to be more acceptable than physical and sexual violence. Finally, participants who have not begun dating will be less accepting of violence than those who have begun dating because there has been no exposure to dating violence.

**Method**

**Participants**

The participants were a convenience sample of 64 African American adolescents. Twenty-three participants were from a Methodist church in Detroit. Other participants were recruited using a referral method (n = 41). The teens from the church referred friends to participate in the study. Participants ranged in age from 13 to 19 years (M = 16.17; Median = 16; SD = 1.87). Of the participants, 60.9% were female and 39.1% were male. Most of the participants (73.4%) reported that they have had a previous steady dating partner; while 26.6% had not.

**Instruments**

*Demographic Questionnaire.* The demographic questionnaire included questions on age, gender, ethnicity, dating history, religious attributes and behaviors, parents’ marital status and education, and primary caregiver.

*The Attitudes Towards Dating Violence Scales.* The Attitudes Towards Dating Violence Scales (Price et al., 1999) assess attitudes towards the use of psychological, physical, and sexual dating violence for adolescent males and females, separately, for a total of six scales. Each scale consists of 12-15 items, with five-point Likert response options ranging from “strongly disagree” (1) to “strongly agree” (5). Higher scores represent a greater acceptance of abuse. The scales have good internal consistencies (ranging from .75 to .87), construct validity, and criterion-related validity. Cronbach alphas in the present study ranged from .56 to .75 (M = .71) indicating that five of the six scales had adequate internal consistency. The AFDV-Psych had low reliability in the present study.

**Procedure**

Participants were recruited from a youth group at Methodist church as well as through referrals from group members. Because some of the participants were under the age of 18, their parents’ consent was obtained prior to participation. Information on seeking help for dating violence was also provided. A list of resources was given to each participant with information on seeking help for dating violence.

Referred participants were given a packet by a youth group member, which consisted of a parental consent form, participant consent form, all questionnaires, the dating violence resource sheet, and an envelope. These participants completed the survey packet at home and returned it.
to the youth group member upon completion, who then gave the sealed packet to the student researcher.

**Results**

*Acceptance of Dating Violence*

The level of acceptance of dating violence among African American adolescents was assessed. Table 1 shows the means and standard deviations on each of the Attitudes Towards Dating Violence Scales for both boys and girls.

**Table 1: Descriptive Statistics for the Six Attitudes Towards Dating Violence Scales**

<table>
<thead>
<tr>
<th>Subject’s Gender</th>
<th>Gender of Perpetrator</th>
<th>Scale</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>Male</td>
<td>AMDV - Psych</td>
<td>2.04</td>
<td>.48</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AMDV - Phys</td>
<td>1.71</td>
<td>.54</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AMDV - Sex</td>
<td>1.79</td>
<td>.52</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>AFDV - Psych</td>
<td>2.45</td>
<td>.51</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AFDV – Phys</td>
<td>2.36</td>
<td>.66</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AFDV - Sex</td>
<td>1.90</td>
<td>.58</td>
</tr>
<tr>
<td>Male</td>
<td>Male</td>
<td>AMDV - Psych</td>
<td>2.62</td>
<td>.54</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AMDV - Phys</td>
<td>2.04</td>
<td>.76</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AMDV - Sex</td>
<td>2.46</td>
<td>.64</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>AFDV - Psych</td>
<td>2.62</td>
<td>.43</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AFDV – Phys</td>
<td>2.61</td>
<td>.63</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AFDV – Sex</td>
<td>2.41</td>
<td>.61</td>
</tr>
</tbody>
</table>

To assess the hypotheses regarding attitudes towards dating violence, a 2x2x3 repeated measures ANOVA was conducted with the gender of participant as the between subjects factor and the gender of the perpetrator (Male, Female) and type of violence (psychological, physical, sexual) as the within subjects factors.

*Gender of the Participant.* It was hypothesized that boys would be more accepting of dating violence than girls. A significant main effect was found for gender of the participant \[F(1,62) = 17.07, p <.001\]. Boys (\(M = 2.46\)) were significantly more accepting of dating violence than were girls (\(M = 2.04\)).

*Gender of the Perpetrator.* It was also predicted that female-perpetrated dating violence would be more acceptable than male-perpetrated violence for both boys and girls. A main effect was found for gender of the perpetrator \[F(1,62) = 26.90, p <.001\]. Overall participants were significantly more accepting of female (\(M = 2.39\)) perpetrated dating violence than male (\(M = 2.11\)) perpetrated violence. Additionally, there was a significant gender of perpetrator by gender of participant interaction \[F(1,62) = 4.92, p<.05\]. Female participants were the least accepting of male perpetrated dating violence (refer to Figure 1).
Violence Type. Psychological dating violence was predicted to be more acceptable than physical and sexual violence. There was a significant main effect of violence type \([F(2,60) = 16.77, p < .001]\). As predicted, psychological violence \((M = 2.43)\) was the most acceptable, with physical \((M = 2.18)\) and sexual violence \((M = 2.14)\) viewed as less acceptable. A marginal interaction was found between the gender of participant and violence type \([F(2,60) = 2.71, p = .08]\). Refer to Figure 2 for means. Girls found sexual violence the least acceptable, followed by physical violence, then psychological violence. Boys found physical violence the least acceptable, followed by sexual violence, and psychological violence the most acceptable. A significant gender of perpetrator by type of violence interaction was also found \([F(2,60) = 19.40, p < .001]\). Refer to Figure 3 for means. Male perpetrated dating violence was rated as less acceptable when it was physical relative to sexual and psychological, while female perpetrated sexual violence was rated less acceptable than physical and psychological violence.
Dating History and the Acceptance of Dating Violence

It was hypothesized that those who have not begun dating as well as those who have not had a steady dating partner would be less accepting of violence than those who have begun dating and have had a previous dating partner. To test these hypotheses, two 2x2x3 repeated measures ANOVAs were conducted with the dating history of participant (first date and previous steady dating partner) as the between subjects factor and the gender of the perpetrator (Male, Female) and type of violence (psychological, physical, sexual) as the within subjects factors. In the first repeated measures ANOVA which compared those who had and had not been on a date, none of the main effects or interactions were statistically significant. In the second repeated measure ANOVA which compared those who had and those who had not had a steady dating partner, the main effect was not significant. However, a significant interaction was found between previous steady dating partner and violence type \([F(2,58) = 6.04, p =<.05]\). Those who have had a previous steady dating partner found physical dating violence the least acceptable, followed by sexual then psychological (refer to Figure 4 for means). Those who have not had a previous steady dating partner found sexual dating violence the least acceptable, followed by physical then psychological.

Figure 4: Mean Scores for Violence Type by Previous Steady Dating Partner
Discussion
The findings of the present study offer a comprehensive picture of attitudes associated with dating violence among African American adolescents. The understanding of teen dating violence has been limited due to a lack of research that focuses solely on this population. The acceptance of dating violence was found to be associated with participants’ dating history. The purpose of this study was to aid in developing programs geared towards dating violence prevention among this demographic group. Specific attitudes were identified that may be helpful in the development of an effective prevention program.

Acceptance of Dating Violence

Gender of the Participant. Boys were found to be more accepting of dating violence than girls. This is consistent with past research findings, predominately on Caucasian teens (Reese-Weber, 2008; Price et al., 2000). Males are typically socialized to be aggressive, while females are not. Parents, especially fathers, who give their children a great deal of both positive and negative reinforcement when it comes to gender related activities, typically have children who are highly gender schematic (Renzetti & Curran, 2003). This reinforcement teaches gender-typed behavior. Aggression falls in that category of gendered behavior. Moreover, men are taught to consider aggression a viable way to establish and maintain control over others, thus assuming authority (Conklin, 2004). Conversely, women are taught to avoid aggression because female aggression is viewed as an inability to control their impulses. Therefore, any display of aggression may seem more acceptable by one who has been taught that aggression is tolerable as opposed to someone who has been taught that aggression is unacceptable.

Gender of the Perpetrator. In keeping with past research, female perpetrated dating violence was found to be more acceptable than male perpetrated violence among both the male and female participants (Reese-Weber, 2008; Price et al., 1999; Bethke & DeJoy, 1993). Gender stereotypes may be a factor. Women are stereotypically viewed as less dangerous or harmful than men (Renzetti & Curran, 2003). Consequently, dating violence perpetrated by females would seem less threatening. Additionally, because there is a greater acceptance of female perpetrated violence, it may be difficult for girls to properly identify their own behavior as abusive. Furthermore, female participants were the least accepting of male perpetrated dating violence as compared to female perpetrated dating violence. Females may recognize the large potential for harm as the result of male violence. Physical injuries from intimate partner violence are more likely to be inflicted by male perpetrators rather than female perpetrators (Conklin, 2004; Renzetti & Curran, 2003). Furthermore, injuries by men are usually more severe and more likely to require medical attention as compared to injuries by women.

Violence Type. Psychological dating violence was the most acceptable among the male and female participants. This finding is supported by past research (Price et al., 1999). The components of psychological abuse are not as easy to identify as the components of physical and sexual abuse, thus, making psychological dating violence difficult to distinguish as abuse. Society tells us that physical violence should not be tolerated. But, what does it say about cursing, yelling, or trying to control one’s partner? There is not such a strong backlash for these types of behavior.

Furthermore, in a study of African American college students, those who reported incidents of psychological abuse in their dating relationships were also likely to report physical or sexual assault by their partners as well (Berkel, Furlong, Hickman & Blue, 2005). This finding suggests that psychological abuse may accompany or may even be a precursor to other
forms of dating violence. Therefore, finding that psychological violence is most acceptable is somewhat disturbing. These teens may be opening the door to more severe dating violence in their own relationships by being tolerant of psychological abuse. There evidently is a lack of understanding between the relationship of psychological and physical and sexual abuse. This inability to connect the various types of abuse supports the need for education about all forms of dating violence.

Females were least accepting of sexual violence. It has been established that rape is the crime that women fear the most (Ferraro, 1995). Girls may find sexual violence the most devastating because there can be greater ramifications in regard to sexual abuse, particularly rape, for the woman. One could contract a life-threatening disease, such as AIDS or other sexually transmitted diseases. Additionally, an unwanted pregnancy could result. That is a burden that only a female can carry, thus making the impact of sexual violence more dangerous for a woman than for a man.

Additionally, there is a double standard about sexuality for men and women (Renzetti & Curran, 2003). Society typically permits young men to engage in sexual activities; while young women are condemned for the same behavior. Guys are viewed as always wanting sex; thus a male is expected to be receptive to any sexual advances. On the other hand, girls are taught to be more cautious about sex due to its possible negative consequences. There is also a possibility of developing a bad reputation from having a large number of intimate partners. Given this sexual double standard, it was interesting that female perpetrated violence was the least acceptable when it was sexual. The sample in the present study was predominately female. Being that females are given a bad reputation for being overly sexual, it could be that these females are in fear of this reputation and thus respond negatively to female sexual dating violence.

Male perpetrated dating violence was the least acceptable when it was physical. So much attention has been given to males being physically aggressive that the focus may already be targeted at male physical abuse. Approximately 89% of physical violence is in American society involves males (Renzetti & Curran, 2003). However, it is also a matter of biology. Men are typically bigger and stronger than women (Renzetti & Curran, 2003). They could do great bodily harm to a woman, thus the danger of physical injury may influence the perception of the acceptability of physical violence by males. This danger of injury is also associated with women’s fear of sexual violence; which, as previously noted, is a crime that women are quite fearful of (Ferraro, 1995).

**Dating History and the Acceptance of Dating Violence**

Involvement in abusive relationships increases the acceptance of dating violence (Windle & Mrug, 2009; Price et al., 1999). Therefore, those who have had a greater number of dating partners (i.e. more dating experience) may also have had increased potential of exposure to dating violence than those with fewer partners. However, no significant differences were found between those who had and those who had not had a previous steady dating partner. Nevertheless, those who had a previous steady dating partner were the least accepting of physical dating violence. This form of violence may lead to the most injury, thus it is not tolerated.

**Limitations & Future Research**

Several limitations of this study warrant discussion. First, the sample size was too small. There is a limited ability to detect differences in the group. Second, the AFDV-Psy Psych had low reliability in the present study. It may not be accurately measuring the intended variable.
Therefore, results from this scale need to be interpreted with caution. Third, by design, this sample consisted exclusively of African Americans. Even though this is an important group to examine, further research is needed on other samples to determine whether the present results can be generalized to all youth. Fourth, the survey administration technique created some concerns. For many of the participants, the survey was taken in a group setting. There was some horseplay among the male participants. Take-home surveys for everyone may have been better. Individuals could possibly focus more on answering the survey questions. One’s answer choices could have been influenced by the surrounding participants.

While the present study provided important insight on attitudes as they relate to dating violence among African American adolescents, additional research is needed to more accurately address this topic. Future research should be done on a larger, more diverse sample. In addition to measuring attitudes, actual experience with dating violence should be measured as well. A longitudinal study of adolescents would be ideal. Dating violence attitudes and beliefs could be measured among a group of young teens and a follow-up would be done with them so see if their beliefs were actually predictive of their experiences with dating violence.

**Conclusions**

In summary, of the three forms, psychological violence was significantly more acceptable than physical or sexual. It can be inferred from this attitude that psychological abuse may actually be tolerated. But this is not a component of a healthy relationship and thus, should not be tolerated in any capacity. Another finding that warrants attention is how gender plays a role in victimization and perpetration. Female perpetrators are viewed less severely than male perpetrators; and boys were significantly more accepting of dating violence than girls. Efforts are needed to counteract such attitudes and hopefully this will limit the occurrence of dating violence.

Prevention programs should be geared towards defining the various forms of dating violence, outlining what healthy relationships consist of, building conflict management skills, and refuting gender stereotypes reflected in the media. Program incentives should also be tailored to address the specific attitudes of girls and boys individually; thus attitudes on dating violence may be modified.

**References**


Fighting Corruption: Should We Rely on Altruistic Punishment?

Jonathan M. Bertin

Faculty Advisor: Natalia V. Czap
Department of Social Sciences
University of Michigan – Dearborn

Abstract

The purpose of this study is to test what factors influence individuals’ altruistic punishment of corrupt behavior. Previous experimental research found that individuals are willing to engage in costly punishment of bribing and corruption after experiencing negative externalities of corrupt behavior. In this paper we are reporting the results of an experiment in which the punishing parties do not suffer from negative externalities of corruption, so that their decision to punish can be considered altruistic. The strongest support was found for the hypothesis that unequal distributions by the public official prompt punishment. The results suggest that a considerable proportion of people are willing to punish instances of corruption even in the absence of negative externalities or selfish strategic considerations. This indicates that transparency together with empowerment of citizens may be an effective strategy to fight corruption in the field.

Introduction

The purpose of this study is to test what factors influence individuals’ altruistic punishment of corrupt behavior. Altruistic punishment is distinct in two ways: altruistic punishment does not involve negative reciprocity or strategic considerations. This means the punishment is not in retaliation for a past behavior, and it is not to deter future behavior in the interest of whoever is punishing. Given these restrictions it may seem impossible to find situations in which altruistic punishment would apply; however, corruption may provide fertile ground for such research. Most economics agree that corruption has severe economic consequences at the macro level; however, there is little reason to believe that individuals living in corrupt countries feel wronged personally by acts of corruption. In addition, most individuals do not encounter repeated acts of corruption from the same individuals. This leaves no reason to punish with negative reciprocity or in an attempt to discourage future behavior.

With this in mind, we have designed a corruption experiment with which to study altruistic punishment. The experiment involves a four player bribery game with two bribers competing for the favor of a public official and a citizen who may punish the public official for his behavior. The paper addresses to what extent altruistic punishment varies based on the public official’s levels of equality, efficiency, and bribe acceptance. The findings suggest that punishment does increase when the public official does not equally distribute funds, but no significant differences were found due to different levels of bribe acceptance or underproduction.

The paper is divided into five sections. After this introduction, Section 2 reviews the previous literature related to punishment within the context of corruption experiments. Section 3 introduces our experimental design and procedures. Section 4 presents our results. The paper ends with Section 5 which presents our conclusions and policy applications.
Punishment in Corruption Experiments

Previous Experiments on Corruption

Several studies have demonstrated the usefulness of experiments in studying corruption. Abbink et al. (2002), have used a variation of the trust game to study levels of reciprocity between two subjects playing the roles of a briber and a public official. They conducted this experiment with three different treatments: the first treatment was based solely on a trust-reciprocity game. The second treatment introduces negative externalities by withdrawing currency from all groups partaking in the experiment when a public official acts favorably towards the briber. The final treatment included a chance that both players could be ejected from the game and not compensated for their participation. They found significant levels of cooperation (bribery) across all three treatments. They also found that the introduction of negative externalities did not decrease the frequency of bribery, but that the chance of being punished significantly reduced the amount of reciprocity from the public official. This last finding supports the idea that better understanding punishment may prove vital to fighting corruption.

In another experiment, Barr and Serra (2008) explored to what extent framing and negative externalities affect the behavior of a bribing citizen and a public official. To model negative externalities, the experiment included subjects playing as “other members of society” who lost money in the event of bribe acceptance. Consistent with the findings of Abbink et al. (2002), they found no change in behavior when varying either the degree of negative externalities or the framing of the language; however, the interaction of these two seems to lower levels of bribing. Using a similar experiment, Barr and Serra (2009) found evidence that the level of corruption in one’s country of origin does affect bribery decisions in experiments, demonstrating the ties between corruption and culture.

Alatas et al. (2009a, 2009b), and Cameron et al. (2009) utilize a different experiment that consists of a three player game, in which players occupy the roles of a firm, a public official, and a third player acting as a citizen. This experiment differs from Abbink et al. (2002) in that corrupt acts made by the public official impose a direct negative externality on the citizen, who is then given the option to retaliate with punishment. Using this design, Alatas et al. (2009a, 2009b) and Cameron et al. (2009) have examined bribe and punishment dynamics as they pertain to differences in nationality, culture, gender, and familiarity with corruption across several countries. While there are additional studies that utilize experiments on corruption, only those mentioned above address punishment as something to be directly imposed on a corrupt official (Azfar and Nelson (2007) have modeled punishment by the loss of the position of public official, but their focus on embezzlement rather than bribery make it less relevant to our study). To the knowledge of the author this paper is the first to address altruistic punishment within the literature on corruption experiments.

Previous Literature on Punishment

Cameron et al. (2009) have found that the frequency and magnitude with which individuals punish and engage in corruption varies greatly by culture. Within the four countries which their study focused on, rates of punishment varied from 28% in India to 66% in Australia, with Indian subjects punishing less than their Australian counterparts at the 5% significance level. Cameron et al. (2009) also explored how corruption is punished when it is welfare enhancing or welfare reducing, they find that when negative externalities are introduced those playing the role of the citizen tend to punish less often, but by larger amounts. The authors suggest that citizens having
already lost money find costly punishment less appealing. These findings suggest that punishment may function as a luxury good, where only individuals with a greater amount of wealth feel they can afford to do so.

Neither Alatas et al. (2009a, 2009b) nor Cameron et al. (2009) address strategic punishment, since both of their experiments involve one-shot games. However, the Abbink et al. (2002) finding that levels of corruption fall significantly when the chance to be punished is introduced seems to suggest that punishment would be effective if used strategically. However, neither of these studies provide insight into punishment that occurs in isolated incidents by bystanders.

**Description of the Experiment**

**Experimental Design**

Our experiment consisted of a 4-player game in which a Public Official (PO) is in charge of distributing governmental funds between two firms. The firms had no defining features other than being identified as firm A or firm B. In addition, a fourth participant played the role of a citizen uninvolved with the fund distribution. Each round the players were given an endowment (E) based on the role they would play, which was 150 (for each of the firm), 200 (for PO), and 300 tokens (for Citizen). The game involved three separate stages of play: on the first stage each firm was given the option to transfer a “private payment” (B) to the Public Official using tokens from their endowment. Each round the players were given an endowment (E) based on the role they would play, which was 150 (for each of the firm), 200 (for PO), and 300 tokens (for Citizen). The game involved three separate stages of play: on the first stage each firm was given the option to transfer a “private payment” (B) to the Public Official using tokens from their endowment. In the second stage, the Public Official was required to decide whether to accept each of the bribes; if the PO declined the bribe, the full amount of the bribe was returned to the respective firm. This was done to assure the firms’ behaviors were not driven by risk aversion. The Public Official could then distribute 400 tokens of governmental fund (GF) between Firm A and Firm B in any combination, including leaving funds unallocated. Undistributed funds were discarded at no benefit to any of the players. Finally, in the third stage the Citizen was presented with a full account of the decisions made in the previous stages of play and was given the option of punishing (P) the Public Official at a price of a third of the size of the punishment. The final payoffs are presented in Table 1. Above was the description of Treatment 1 “Any Distribution Allowed and PO May Reject Bribes”. Each of the other three treatments are shown in Table 2.

**Table 1. The final payoff for each of the roles**

<table>
<thead>
<tr>
<th>Role</th>
<th>Payoff Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm A</td>
<td>150 −αB_A + GF_A, where α=0 if the bribe is rejected by the PO and 1 if accepted</td>
</tr>
<tr>
<td>Firm B</td>
<td>150 −βB_B + GF_B, where β=0 if the bribe is rejected by the PO and 1 if accepted</td>
</tr>
<tr>
<td>Public Official</td>
<td>200 +αB_A +βB_B −P</td>
</tr>
<tr>
<td>Citizen</td>
<td>300 −(1/3)P</td>
</tr>
</tbody>
</table>
Table 2. Treatments

<table>
<thead>
<tr>
<th>Treatments</th>
<th>PO May Reject Bribes</th>
<th>Bribes are transferred automatically</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any Distribution Allowed</td>
<td>Treatment 1: AD + MR</td>
<td>Treatment 2: AD + TA</td>
</tr>
<tr>
<td>Complete Distribution required</td>
<td>Treatment 3: CD + MR</td>
<td>Treatment 4: CD + TA</td>
</tr>
</tbody>
</table>

Experimental Procedure
The experiment included 160 participants and was carried out in eight separate sessions; each session consisted of 20 participants. The experiment was programmed and administered using zTree (Fishbacher, 2007). All experimental instructions were displayed on the computer to reduce experimenter bias. The instructions utilized the loaded wording found in Abbink and Hennig-Schmidt (2006), and were used to frame the experiment as a situation of corruption, which was necessary in the absence of direct negative externalities. Participants were informed that they would be paid for their earnings in one of the 20 rounds (at an exchange rate of 10 tokens to $1), and that the round would be determined randomly. Subjects were then privately paid their earnings in cash. The participants earned $28.40 on average. After the participants read the instructions, they were randomly assigned a role to play for the remainder of the session. In the beginning of each round (in total 20) the subjects were randomly assigned into groups of 4 players. Each treatment involved 40 participants (20 firms, 10 public officials and 10 citizens) and 800 observations.

Experimental Results
Comparing proportion of citizens who punished and average punishment
We first were interested in how frequently altruistic punishment occurs depending on whether or not the public official distributed funds equally, and when punishment does occur to what extent. As seen in Fig. 1a, a large proportion of citizens did choose to punish, although the proportion does not seem to vary greatly depending on equal or unequal allocations of funding. As far as the magnitude of the punishment, those who chose to fine the public official punished an average of 80 token, which results in a loss of about half the public official’s pre-bribe endowment and about 10% of the citizen’s.

Figure 1a, b
Having established how frequently citizens were willing to punish public officials without respect to bribe acceptance, we began to look at how citizens’ decisions were affected by differences in the number of bribes accepted. The results are shown in Fig. 2. As one would predict, the proportion of punishment decreased as the number of bribes decreased; however, surprisingly, the average magnitude of punishment did not follow the same pattern. This anomaly is likely the result of the low number of observations involving both bribes being rejected and fines imposed (it only occurred 32 times). These results provide some support that altruistic punishment increases in frequency as the level of corruption increases.

**Figure 2a, b**

Finally, we looked at whether or not citizens chose to punish public officials for distributing less than the entire amount of governmental funds available. Distributing less than the amount of funds possible is analogous to situations of underproduction, since any undistributed funds were lost to all players of the game. The data show a clear distinction between both the frequency and magnitude of punishment when comparing full with partial allocations of funds (Fig. 3), suggesting that wasteful public officials experience punishment more often and in larger amounts than their more efficient counterparts.

**Figure 3a, b**

**Estimating models of punishment behavior**

The presence of learning as the rounds progressed in addition to the data not being normally distributed restricted our ability to use OLS to analyze the data. To counteract this
problem, we used a mixed effects regression with maximum likelihood estimation. Below we present the results of the estimation of our three hypotheses. We first tested the hypothesis that the unequal distribution of the governmental funds between the two firms will lead to more punishment. To remove the possibility of any differences being due to different amounts of bribe acceptance, we only used the treatments 2 and 4 in which the public official automatically received funds from the firms. We tested the following regression model:

\[
\text{Fine} = \beta_0 + \beta_1 D_{\text{Less400}} + \beta_2 D_{\text{unequalGF}} + \epsilon
\]

where \( D_{\text{Less400}} \) is the dummy which equals 1 for treatment 2, \( D_{\text{unequalGF}} \) is the dummy which equals 1 if the firms got different shares of the governmental fund, \( \beta_i \) are the coefficients, and \( \epsilon \) is the random error.

In line with our expectations, the coefficient in front of \( D_{\text{unequalGF}} \) is highly significant and positive (Model 1 in Table 5). The coefficient means that all things equal, a public official who distributes funds unequally will on average be punished 16 tokens more than the one who distributed the funds equally.

We then tested the hypothesis that the bribe acceptance will affect the punishment levels. In this case the model was constructed using only treatments 1 and 3, where the public official has to choose whether to accept or reject the bribes. We tested the following regression model:

\[
\text{Fine} = \beta_0 + \beta_1 D_{\text{Less400}} + \beta_2 D_{\text{accept2}} + \beta_3 D_{\text{accept1}} + \epsilon
\]

where \( D_{\text{Less400}} \) is the dummy which equals 1 for treatment 1, \( D_{\text{accept2}} \) and \( D_{\text{accept1}} \) are the dummies which equal 1 if the bureaucrat accepted both or only one bribe respectively.

| Table 3. Results of the mixed effects regressions with random effects for subjects |
|---------------------------------|-----------------|-----------------|-----------------|
|                                 | Model 1         | Model 2         | Model 3         |
|                                 | Coefficient    | t-stat.         | Coefficient    | t-stat.         | Coefficient    | t-stat.         |
| Intercept                       | 19.6           | 1.52            | 73.5**         | 2.30            | 41.39**        | 2.10            |
| Round                           | -0.24          | -0.63           | 0.50           | 0.63            | 3.73***        | 3.41            |
| D_Less400                       | -16.1          | -0.99           | 24.6           | 0.78            |                |                 |
| D_unequalGF                    | 16.0***        | 2.99            |                |                 |                |                 |
| D_accept2                      | 24.8           | -1.18           |                |                 |                |                 |
| D_accept1                      | -30.5          | -1.36           |                |                 |                |                 |
| D_AccRej                       |                |                 | 16.05          | 0.62            |
| D_underproduction               |                |                 | -15.42         | -1.15           |
| Akaike Info Criterion          | 4202           | 1827            | 1630           |
| LogLikelihood                  | -2095          | -906.7          | -809.2         |

*** - significant at 1%; ** - significant at 5%; * - significant at 10%.

We found that if the bureaucrat accepted both bribes (\( D_{\text{accept2}} \)) he received a 24.8 tokens higher fine than the bureaucrat who accepted none (Model 2 in Table 5). Surprisingly, accepting only 1 bribe (\( D_{\text{accept1}} \)) led to 30.5 tokens lower fine than accepting none. However, neither of these findings are significant. It is not understood why citizens seemed to disregard the number
of bribes taken, although one possibility is that citizens do not take issue with the public official accepting bribes so much as they do with the public official acting on bribes.

Finally, we tested the hypothesis that wasteful public officials were punished at higher levels. The regression was constructed using the data from treatments 1 and 2 in which the public officials could distribute less than all of the funds. We tested the following regression model:

\[
\text{Fine} = \beta_0 + \beta_1 D_{\text{AccRej}} + \beta_2 D_{\text{underproduction}} + \epsilon
\]

where \( D_{\text{AccRej}} \) is the dummy which equals 1 for treatment 1, \( D_{\text{underproduction}} \) is the dummy which equals 1 if the bureaucrat did not distribute all governmental funds. As can be seen by the low t-statistics, public officials who failed to distribute all of the funding were not punished at significantly different levels than those who had distributed all governmental funds (Model 3 in Table 5).

In summary, only the hypothesis addressing unequal funding was confirmed. Unequal distributions of government funding are punished at a higher rate than even distributions. In contrast, we found no evidence suggesting differences in the level of altruistic punishment based on bribe acceptance or underproduction on the part of the public official. These findings suggest that the dynamics of altruistic punishment are complex, and that further research is necessary to uncover the reasoning behind participants’ punishment decisions.

Conclusions and Policy Applications

This paper presents the results from a bribing experiment that allowed for the punishment of corrupt behavior. We have found evidence that individuals will punish corrupt behavior at a cost to themselves, even in the absence of strategic considerations or negative externalities. There is also strong evidence that citizens’ willingness to punish increased when public officials unequally distributed funds; however, it is uncertain whether citizens were punishing inequality itself or whether inequality happened to occur when the public official showed a preference towards one firm or another, and citizens were punishing the public official’s reciprocity to a high bribing firm. Furthermore, we found no evidence showing that greater levels of bribe acceptance or lack of public official’s productivity led to higher levels of punishment. This finding ran contrary to expectations, as it would seem to follow that both of these behaviors would be punished at higher levels. It is possible that subjects felt more of a need to punish acting on a bribe rather than simply accepting one, which could help explain why unequal funds were found to have significant effects but bribe acceptance levels were not. Further research is necessary to determine to what extent reciprocity between the public official and the higher bribing firm affect punishment.

We conclude that there is mixed evidence as to whether or not altruistic punishment can be relied on to fight corruption. On one hand, it does not appear that citizens are willing to punish either bribe acceptance or unproductive behavior on the part of the public official. Since these two characteristics account for a large part of the defining features of corruption it seems that altruistic punishment should not be exclusively relied to fight corruption. However, citizens’ strong willingness to punish unequal allocations of funds may be the more significant of the findings, since it is not until the public official has made decisions influenced by bribes that they have crossed the line into corruption. Comfort with public officials willingness to accept bribes is somewhat analogous to our own political system’s use of lobbying, where it is socially acceptable for officials to receive funding and a number of other privileges from third parties but
illegal to behave on such influences. This suggests that corruption is punished altruistically and that given the right degree of transparency and a mechanism to punish, people can be relied on to fight corruption even without having been affected by it themselves.

These findings further complicate the issue of transparency in the fight against corruption. Increased transparency is often suggested as a sort of panacea in the fight against corruption; however, our findings show no increased tendency to fight corruption when presented with public officials who accept bribes or squander resources. While increased transparency is likely to be effective with the proper regulatory bodies in place, any institution relying on its workers to regulate one another are relying on their workers’ willingness to fight corruption altruistically. If this is the case, it is less likely for workers to act against the discovery of a coworker’s bribe taking or under productivity than finding specifically what illegal acts these things have led to. Our findings of individuals’ willingness to punish altruistically suggest that increasing workers’ awareness of other employee’s actions is an effective policy measure in the fight against corruption.

References


Vision and Commitment in Transformational Change:  
Workers’ Perceptions of Management’s Leadership Abilities  

Natalie Lowell  
Faculty Advisor: Thomas Callahan  
College of Business  
University of Michigan-Dearborn  

Abstract  
This research investigates hourly workers’ perceptions of management’s ability to lead transformational change. Creating change in an organization is defined by acquiring a new company, closing down facilities, or implementing major reorganization. The study involved 257 subordinates who assessed their managers’ leadership abilities and behaviors. Previous research revealed several variables that may influence the dependent variable: change, vision, commitment, rewards, and persistence. The results of this study identified only two key variables that had a statistically significant effect on workers’ perceptions of management’s abilities to lead change initiatives: (1) the leader’s ability to create a compelling vision and (2) the leader’s commitment to stay the course for change. Based on the research and literature review, this study recommends a leadership approach for management that positively influences hourly workers during times of transformational change.

Literature Review  
Organizational Change  
In today’s changing business environment, management must lead their organization through strategic business challenges due to external factors such as changing markets, new technology, government regulations, global competition, or a changing workforce. As a result, management is divesting significant assets, making acquisitions, and downsizing or reorganizing. They are allocating financial resources to research and development, implementing new technologies, and developing new products in an effort to reduce costs, gain market share, and compete globally (Nadler & Tushman, 1989). Organizational change of this magnitude impacts the employees, customers, and key stakeholders and has a tremendous affect on the culture of the organization.

Analyses by Kotter and Schlesinger (1979) examined strategies that companies chose when faced with a tsunami of competition that forced implementation for organizational change. A key finding from the analyses is to understand that people fear change because it interrupts their existing work environment, and is a threat to employees’ investments in the current work. Research indicates four universal reasons people resist change: 1) fear of losing something of value, 2) misconceptions about the change and its implications, 3) the proposed change doesn’t make sense for the company and, 4) people have a low tolerance for change (Kotter & Schlesinger, 1979).

According to Nadler and Tushman (1989), when organizations modify or realign to address business needs, elements of the system are affected that impact the organizations’ strategies, processes, and people. During the change process, management must maintain congruence while implementation is underway. Three critical factors were identified for
managers to migrate through the change process: manage political dynamics, motivate with constructive behavior, and actively engage in the transition plan. To enable change in the work environment, the actions and behaviors exhibited by a leader have a direct influence on the results of the change initiative (Drucker, 1999). Effectively implementing change across the enterprise requires a unique management style known as transformational leadership. These leaders are highly strategic and tactical thinkers who understand the existing culture of the enterprise and can realign the culture to support the vision of the organization’s future (Bass & Avolio, 1993). Transformational leaders are unique because they can transform something old, into something new.

Four Variables That Influence Change

Vision

According to Rafferty & Griffin (2004) “…leader vision is defined as the expression of an idealized picture of the future based around organizational values.” The starting point for a leader to create change is his or her ability to articulate a clearly defined vision of the future (Awamieh & Gardner, 1999). How do leaders get the attention of the target audience to create and communicate their vision and successfully grab the attention of their followers? People are busier than ever, juggling multiple projects, managing social media and business travel, or planning their next family vacation; therefore, the first step in communicating a vision for change is to get individuals’ urgent, rapt attention (Denning, 2008).

To understand what gets the attention of a person over a one-week time span, sixty executives participated in an experiment conducted by Davenport and Beck (2000). The conclusion from the experiment: “Overall, the factors most highly associated with getting attention in rank order, were: the message was personalized, it evoked an emotional response, it came from a trustworthy source or respected sender, and it was concise. The messages that evoked emotion and were personalized were more than twice as likely to be attended to, as the messages without these attributes.” Thus, evidence indicates that sending a personalized and emotion driven message from a trusted or known source would most likely be reviewed (Davenport, et al., 2000). On one hand, creating an effective vision for an organization should grab the attention of management and its workers. According to Nadler and Tushman (1989) six key attributes that clearly communicate the corporate vision are: stating the rationale for change, providing clarity of direction to stakeholders, communicate organizational values and structure, provide future performance objectives, and corporate operating style. On the other hand, if the vision is communicated poorly, does not include the key attributes, and is at significant odds with management behaviors, hourly workers will become skeptical of management and lose faith in their leadership abilities. To avoid this mishap, management must grab the attention of the workers and stakeholders with enthusiasm, and guide them towards the newfound vision. When followers gain confidence in leadership’s ability to achieve results, the followers will begin to mobilize towards the organizational vision.

Commitment

A commitment to change by management seems to be driven by an organization’s mission and corporate values (Marrone, Hoff, & Gold, 1999). In the management leadership study by Bennett (2009) IT subordinates identified transformational leadership as the ideal
leadership style they were committed to follow, work with, and support in the change initiative. Management with behavioral traits relating to transformational leadership, inspire others, create a vision employees can actively pursue, and set direction for the organization. This approach encourages greater commitment, loyalty, trust and respect from employees, and increases the overall effectiveness of organizational change (Bass, 1985). An effective strategy for ongoing commitment from subordinates is to plan small wins to keep team members motivated and committed to the vision (Kouzes & Posner, 1988).

According to Bass (1985) companies leading the change initiative with transformational leaders result in employees performing beyond expectations. This important finding is reflective of the followers’ commitment to its leaders’ sense of purpose and mission. To engage employee commitment towards the proposed change, management must communicate the nature of the change, consistently, and frequently (Armenakis & Harris, 2002).

When creating the message for change and recruiting employee commitment, two components important to workers’ perceptions are principal support and personal valence (Armenakis, Harris, & Field, 1999). Workers need to see management provide the principal support necessary to ensure resources, and leader commitment, is readily available. More importantly, employees’ want to know what their personal valence will be, that is: "What is in it for me?" If the proposed changes do not reveal meaningful personal valence for the worker, then resistance is likely to occur. In a case study conducted by a multinational company, employees revealed that personal valence encompassed taking pride in implementing a new product, under the guidance of a proven leader. Additionally, employee valence included employment stability, opportunities for advancement, and allowed workers to have more control over their own destiny, in the new organization (Armenakis, et al., 1999).

**Rewards**

It’s not enough for leadership to have a clear vision and commitment for organizational change. To sustain change, the company must implement an appropriate reward system. Bass (1990) recognized that transactional reward systems developed by leadership based on making promises, negotiating pay increases, advancements for high performers, or threats and discipline for low performers was a prescription for mediocrity. Burns (1978) indicates this transactional type of reward system is a “favor-for-favor” exchange and only rewards workers for expected outcomes. Another type of reward system is pay-for-performance (Beer, Eisenstat, & Spector, 1990) which helps managers differentiate between high and low performing workers. Managers find challenges with this system because it’s difficult to create a new method for evaluating performance and techniques to handle performance issues. In traditional rewards systems, managers perform the annual employee evaluation process, and unfortunately, this may be the only source of feedback an employee receives (Kouzes & Posner, 1988).

Research on compensation indicates that an integrated reward system supports each phase of the process for organizational change. Leaders who celebrate milestones, create win-win solutions, and provide rewards for incremental change received positive reactions from workers (Lussier, 2006). A reward system defined by Kouzes and Posner (1988) starts with encouraging the heart and has two components. The first component is to recognize individual contributions towards each project. The second component is to celebrate team accomplishments regularly. To implement an effective reward system, it should be fluid, dynamic, and take into account, the changes an organization is migrating towards. The rewards must also support
employees’ progress as they meet, and exceed, the desired outcomes (Gilley, Gilley, & McMillan, 2009).

**Persistence**
To sustain change, leaders persist through turbulent times. They tackle challenges and deal with adversity fully knowing, that organizational change cannot be achieved overnight. Leaders persevere and use tact along the way to accomplish their goals (Kanter, 1982). According to previous research (Bass, Avolio, Jung, & Berson, 2003) leadership behavior provides inspirational motivation, meaning, and challenge to the followers’ work. As leaders persevere, they translate their knowledge into action by communicating a compelling vision that invigorates motivation in others. To persist with change, motivation becomes a driving force that transcends to deeply involved, and committed behavioral changes, by the followers.

In 2010, a longitudinal study conducted by Griffin, Parker, & Mason on leadership vision revealed, that vision was an important motivating force that challenged employees, and those with a high level of self-efficacy, to actively promote change (Griffin, et al., 2010). When leaders actually “do what they say they will do” they gain credibility from their followers. This credibility generates evidence of a leader’s commitment, persistence, and steadfast pursuit to achieve results and organizational goals (Kouzes & Posner, 1988).

**Method**

**Participants**
Organizations were approached to participate in this study based on the existence of significant levels of change or uncertainty in their operating environments and industries. The UAW was targeted because of the economic and industrial challenges associated with competition and its employers. The UAW agreed to provide participants for the study from their membership. There were 1,890 surveys distributed and 257 useable surveys returned. The response rate of 14% was low, but not unusual for this type of research. Participants came from five industries including, automotive (50%), aerospace (11%), agricultural implements (8%), heavy truck (9%), parts & supplies (15%), and other industries (7%). Participant’s employment status included, currently employed (58%), unemployed (18%), and retired (24%).

**Procedure**
Subjects were invited to participate in a questionnaire distributed by mail on leadership. The survey was designed to be anonymous, in that the only individual demographic information requested was the subject's industry and employment status. When responding to the survey, subjects were asked to think about the way his or her leader has handled change initiatives in his or her organization now or in the past. The leader was defined as the individual to whom he or she directly reported.

**Instrument**
The final survey contained 26 survey items for which the subjects responded in two categories: importance and frequency. The first category inquired about how important it was that the leader exhibit the behavior described by the survey item. The second category inquired about how frequently the worker observed the leader exhibiting the behavior described in the survey item. As an example, a survey item from the persistence category on leadership behaviors stated, "My leader drives change." This question asked the respondent to give information about
how important it was for a leader to exhibit the behavior, and how frequently the leader exhibited the behavior.

**Analysis**

The data were analyzed using factor and reliability analysis. Four scales resulted from this process: vision, commitment, rewards, and persistence. The first scale (VISION) assessed the workers' perceptions of the leader's knowledge and ability to articulate a compelling case for change ($\alpha = .93$). The second scale (COMMITMENT) gauged the leader's ability to describe the change and stay the course to execute the change ($\alpha = .82$). The (REWARDS) scale indicated the leader's willingness to design a reward system that reinforces the performance and behaviors associated with the change desired ($\alpha = .92$). The (PERSISTENCE) scale assessed the leader's drive, motivation, and perseverance to implement change ($\alpha = .83$). Finally, the dependent variable (CHANGE) assessed follower's overall perceptions of the change process in the organization ($\alpha = .88$).

**Results**

Vision significantly predicted change scores, $\beta = -.315$, $t(257) = -4.55$, $p < .00$. Commitment also significantly predicted change scores, $\beta = -.154$, $t(257) = -2.36$, $p < .05$. $R^2 = .180$, the amount of variance accounted for in the analysis.

**Discussion**

This research studied 257 hourly workers' perceptions of management’s ability to lead transformational change. Difference scores were used for all items, with negative numbers representing greater perceived relationship between importance and frequency. If the variable was very important and frequently done, the difference score would be zero and that would predict a positive change.

As a result of this research, and literature review, there is evidence that subordinates’ perceptions of management’s leadership abilities reflect traits related to a transformational leader. These traits are consistent with the perspective of Bass (1985) in that transformational leaders broaden and elevate the interests of their employees by providing greater awareness of the organization’s vision and mission. The leader helps the subordinate to look beyond their own self-interest and work towards the greater good of the group. Mobilizing employees to execute a successful transformational change through vision and commitment seems to call for a higher-order leadership style. Transformational leadership is not synonymous with transformational change. Based on this research, relationships between effective transformational change and leadership style exist. Does organizational change result when a transformational leader is in place to guide the workers through the change initiative? Our study shows that at least a perception of change will most likely occur.

In today’s global knowledge-based society, should organizations recruit, promote, and train individuals with characteristics of transformational leadership or, is there another leadership style that works more effectively from the hourly workers’ perspective? The opportunity exists to examine this further. This research is a step in providing individuals with information to achieve organizational change, by understanding the connections between a manager’s behavior, and how that behavior is perceived by their employees.
References


Student Success and Professor Salary: A Statistical Analysis

Michael El-Zein

Faculty Advisor: Patricia Smith
Department of Economics
University of Michigan-Dearborn

Abstract

This paper presents a statistical analysis of one aspect of the relationship between professors and students at the University of Michigan-Dearborn. Specifically, it looks at the correlation between professors’ salaries and students’ perceived chance of success in a professor’s courses. The statistics were derived from a sample of 199 professors. The hypothesis that is ultimately tested and rejected predicts a positive correlation between the two variables. Surprisingly, the analysis instead provides evidence of a statistically significant negative correlation between the variables: higher professor salaries are associated with a lower perceived chance of success.

Introduction

Each year, the faculty at the University of Michigan-Dearborn is awarded a salary for their hard work in helping to provide students with a quality education. Of course, different professors receive different salaries, and one cannot help but wonder just how those salaries are determined. While the question may not interest all readers, as taxpayers who help to fund the school, and consequently professors’ salaries, the issue is of relevance. Professors, unlike some employees at the University, are forced to interact directly with the student population, as it is an essential part of their job.

This puts professors in a unique position at the University, in that one of the main functions of their job revolves around fulfilling the students’ demand for education. Students, in turn, demand the services of certain professors over others. There are multiple reasons why students may have certain preferences, and many of those can be found online using the popular review website, ratemyprofessors.com. This paper focuses on the effect that students’ perceived chance of successes in a professor’s courses have on their demand for that professor’s services, and therefore the professor’s salary.

Theory

Using the classic economic model of supply and demand, one can predict the outcome that students’ demand will have on professors’ salaries. In the following diagram price represents a professor’s salary, and quantity represents the number of hours they are willing and able to teach. The supply line represents the number of hours a professor is willing and able to teach at each salary, and is upward sloping due to the law of supply. The law of supply states that the quantity of a good supplied raises as the price rises (Ehrbar, 2008). The demand line represents the number of hours that students are willing and able to enroll in at each salary, and is downward sloping due to the law of demand. The law of demand states that the quantity of a good demanded falls as the price falls (Ehrbar, 2008).

As students perceive that they have a greater chance of success in a professor’s courses, they increase the amount that they are willing to pay for every hour of teaching provided by that
professor. This leads to an increase in demand, which can be seen in the shift from D1 to D2 on the diagram. This changes the equilibrium from E1 to E2, which increases both the hours taught, from Q1 to Q2, and the salary received, from P1 to P2. Therefore, I predict that students’ perceived chance of success in professors’ courses and professors’ salaries will be positively correlated.

Methodology

Two variables are studied in this analysis: salary and perceived chance of success. Salary refers to each individual professor’s officially published eight month salary. This measure was obtained directly from the University of Michigan, through their 2008 Faculty and Staff Salary Record. From that data, which lists the salaries for all University of Michigan faculties, at all three campuses, I selected only those who taught at the Dearborn campus. From that list I excluded all lecturers, chairs, and deans, selecting only assistant professors, associate professors, and full professors. I then eliminated all those professors who did not have a rating available on ratemyprofessors.com. This left me with a list of 199 professors from the University of Michigan-Dearborn for my sample. The salaries are continuous quantitative variables, representing cross-sectional data. Quantitative variables are “values that represent qualities,” (Berenson, Krehbiel, & Levine, 2009) and continuous variables are those variables which “produce numerical responses that arise from a measuring process.” (Berenson et al. 2009) The data are cross-sectional in that it is an observation of a variable at one point in time across individuals.

Perceived chance of success refers to the students’ perception that they will receive a passing grade in a professor’s courses. This variable was obtained from ratemyprofessors.com, and was measured using the “easiness rating.” (ratemyprofessors.com) The “perceived chance of success” is a continuous, quantitative variable, representing cross-sectional data. The easiness rating from ratemyprofessors.com was chosen to represent students’ perception that they will be able to pass a professor’s class because many students consult and use the site. It can be assumed that those who pass a course with a professor will rate it higher on the easiness scale, which ranges from one to five, five being the easiest. Likewise, those who fail a course will likely rate the professor lower on the easiness scale. Ratemyprofessors.com offers a composite score for each professor, dependent upon all students who have rated the professor from the time that they were first reviewed on the site; all rating for this analysis were taken from the site in November of 2009.

Descriptive Analysis

To turn the sample data from a simple list of numbers into a useful tool for analysis, it is necessary to first perform a descriptive statistical analysis. This is done in order to organize, summarize, and present the data. Once that has been done, one can begin to actually examine the
data, and prepare to draw conclusions based on that information. A descriptive statistical analysis was performed using Excel, for each variable in the sample, along with a bivariate analysis comparing the two.

**Salary:**

<table>
<thead>
<tr>
<th>Salary</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>78475.15201</td>
</tr>
<tr>
<td>Standard Error</td>
<td>1439.785654</td>
</tr>
<tr>
<td>Median</td>
<td>74052</td>
</tr>
<tr>
<td>Mode</td>
<td></td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>20310.67609</td>
</tr>
<tr>
<td>Sample Variance</td>
<td>412523563.3</td>
</tr>
<tr>
<td>Skewness</td>
<td>0.799444446</td>
</tr>
<tr>
<td>Range</td>
<td>85068</td>
</tr>
<tr>
<td>Minimum</td>
<td>51845</td>
</tr>
<tr>
<td>Maximum</td>
<td>136913</td>
</tr>
<tr>
<td>Count</td>
<td>199</td>
</tr>
</tbody>
</table>

To measure the central tendency, or “extent to which all the data values group around a typical or central value,” (Berenson et al., 2009) of professors’ salaries, three statistics were calculated – the mean, median, and mode. The mean, or arithmetic average, (Berenson et al., 2009) salary was $78,475.15. The median, or “middle value in an ordered array of data that has been ranked from smallest to largest,” (Berenson et al., 2009) salary was $74,052. The mode, or “value in a set of data that appears most frequently,” (Berenson et al., 2009) salary was unavailable, because both $56,200 and $60,000 occurred three times in the sample. Due to the fact that the mean and median are not equal, the salary data are not symmetric. Instead, because the mean is greater than the median, salary is said to be positively, or right-skewed. (Berenson et al., 2009) This means that there are some positive outliers, or values located “far away from the mean.” (Berenson et al., 2009)

To measure the variation, or “amount of dispersion, or scattering, of values away from a central value,” (Berenson et al., 2009) of professors’ salaries, five statistics were calculated – the range, interquartile range, variance, standard deviation, and coefficient of variation. The range, which “is equal to the largest value minus the smallest value,” (Berenson et al., 2009) equals $85,068. The interquartile range, which “measures the spread in the middle 50% of the data,” (Berenson et al., 2009) is $28,746. The variance, which is a measure of “the average scatter around the mean,” (Berenson et al., 2009) is 412,523,563.30 dollars squared. Obviously, dollars squared are not a useful measure, which is why the standard deviation has also been calculated. The standard deviation is also a measure of “the average scatter around the mean,” (Berenson et al., 2009) and for the salary data is $20,310.68, which makes it much more useful for analysis than looking at the variance in dollars squared. Lastly, the coefficient of variation is a “relative measure of variation,” (Berenson et al., 2009) which will prove useful later, is 25.88%.

Additionally, the frequency and location of the salaries were measured. Frequency is used to look at how often a value occurs within a sample. In this case, 96.5% of the sample data had an absolute frequency, or occurrence, of one. With that being the case, one can look to a
location measurement to get a better idea of some of the “major characteristics of the data.” (Berenson et al., 2009) Quartiles are used to measure the location of data, and split the “data into four equal parts,” (Berenson et al., 2009) leaving the total relative frequency, or proportion (Berenson et al., 2009), of all the variables in each quartile at 25%. The chart below provides a detailed description of the quartiles for the salary sample data.

<table>
<thead>
<tr>
<th>Quartile</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
<th>% Below Lower Bound</th>
<th>% Above Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>$51,845</td>
<td>$62,353</td>
<td>0</td>
<td>75</td>
</tr>
<tr>
<td>Q2</td>
<td>$62,353</td>
<td>$74,052</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>Q3</td>
<td>$74,052</td>
<td>$91,299</td>
<td>50</td>
<td>25</td>
</tr>
<tr>
<td>Q4</td>
<td>$91,299</td>
<td>$136,913</td>
<td>75</td>
<td>0</td>
</tr>
</tbody>
</table>

**Perceived Chance of Success:**

<table>
<thead>
<tr>
<th>Perceived Chance of Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>Standard Error</td>
</tr>
<tr>
<td>Median</td>
</tr>
<tr>
<td>Mode</td>
</tr>
<tr>
<td>Standard Deviation</td>
</tr>
<tr>
<td>Sample Variance</td>
</tr>
<tr>
<td>Skewness</td>
</tr>
<tr>
<td>Range</td>
</tr>
<tr>
<td>Minimum</td>
</tr>
<tr>
<td>Maximum</td>
</tr>
<tr>
<td>Count</td>
</tr>
</tbody>
</table>

In order to measure the central tendency of “perceived chance of success” three statistics were calculated – the mean, median, and mode. The mean rating for the sample is 2.92, while the median for the sample is 2.9. This implies that this variable is essentially symmetric, being only slightly positively skewed. The mode for the sample is 2.6, which occurred in the sample fourteen times. The absolute frequency for each variable on the rating scale, which goes from one to five, with five representing the greatest chance of success, can be seen in the Pareto graph below.
To measure the variation of “perceived chance of success,” five statistics were calculated - the range, interquartile range, variance, standard deviation, and coefficient of variation. The range for the “perceived chance of success” in the sample is four, as the scale ranges from one to five, while the interquartile range is .9. The variance of the sample is 0.563563271 ratings squared, while the standard deviation is 0.751 ratings. The coefficient of variation for “perceived chance of success” for the sample is 25.72%. Additionally, one can look at the coefficient of variation for each of the variables in order to compare their level of variation. As stated above, salary has a coefficient of variation of 25.88%, and “perceived chance of success” has a coefficient of variation of 25.72%. By comparing the two coefficients of variation, it is clear that relative to their respective means, the two variables demonstrate an almost identical level of variance. This is not immediately apparent when looking at the raw data, as the two variables have such drastically different ranges.

As a measure of location, provided below is a detailed description of the quartiles for the “perceived chance of success” for the sample data.

<table>
<thead>
<tr>
<th>Quartile</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
<th>% Below Lower Bound</th>
<th>% Above Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>1.0</td>
<td>2.5</td>
<td>0</td>
<td>75</td>
</tr>
<tr>
<td>Q2</td>
<td>2.5</td>
<td>2.9</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>Q3</td>
<td>2.9</td>
<td>3.4</td>
<td>50</td>
<td>25</td>
</tr>
<tr>
<td>Q4</td>
<td>3.4</td>
<td>5.0</td>
<td>75</td>
<td>0</td>
</tr>
</tbody>
</table>

**Bivariate Analysis:**

In order to gain preliminary evidence for my theory, two statistics were calculated - the covariance and coefficient of correlation. Bivariate analysis is used to look at the relationship between two variables, in this case salary and “perceived chance of success.” The covariance “measures the strength of the linear relationship between two numerical variables.” (Berenson et al., 2009) For salary and “perceived chance of success,” the covariance equals -2,937.26, as seen in the chart below.

<table>
<thead>
<tr>
<th>Salary</th>
<th>Perceived Chance of Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>410450580.6</td>
<td>-2937.257956</td>
</tr>
</tbody>
</table>
| 0.560731295 | }
This implies a negative relationship, which provides evidence contradicting my hypothesis. One drawback to the covariance is that it does not tell us the relative strength of the relationship, as it can take on any number; rather, it only tells us the direction of the relationship.

To get a more useful picture of the strength of the relationship, one can calculate the coefficient of correlation. The coefficient of correlation measures the “relative strength of a linear relationship between two numerical variables.” (Berenson et al., 2009) This is because the “values of the coefficient range from -1 for a perfect negative correlation to +1 for a perfect positive correlation.” (Berenson et al., 2009) The coefficient of correlation for salary and “perceived chance of success” is -0.1936, as seen in the chart below.

<table>
<thead>
<tr>
<th>Salary</th>
<th>Perceived Chance of Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salary</td>
<td>1</td>
</tr>
<tr>
<td>Perceived Chance of Success</td>
<td>-0.19361</td>
</tr>
</tbody>
</table>

This implies a small negative correlation. This association can be reflected graphically using what is known as a scatter plot, which is seen below. Notice that the trend line has a slightly negative slope.

Inferential Analysis
In order to make an informed decision about the population from the sample, it is necessary to go further than providing a simple descriptive statistical analysis. Inferential statistical analysis provides the necessary tools to better test my hypothesis. While the preliminary results from the descriptive analysis show evidence contradicting my hypothesis, inferential analysis can provide more concrete evidence as to whether or not my hypothesis of a positive correlation for the population is incorrect based on my sample.

Salary:
To estimate the population parameters for professors’ salaries, both point and confidence interval estimates were drawn from the sample data. Unlike the previously examined sample
statistics, population parameters refer to the entire population of University of Michigan-Dearborn professors, not just the 199 contained within the sample. A point estimate is “the value of a single sample statistic,” (Berenson et al., 2009) while a confidence interval estimate is “a range of numbers, called an interval, constructed around a point estimate.” (Berenson et al., 2009) Both methods of estimation were used to look at the population mean. The point estimate for the population mean salary is simply equal to the sample mean, $78,475.15.

For the confidence interval estimate, a 95% level of confidence was used. This means that one can say with 95% confidence that the population mean lies within a certain range. In this case, the interval is calculated using the sample statistics of a mean of $78,475.15 and a standard deviation of $20,310.68. The result is that one can say with 95% confidence that the population mean lies between $75,653.17 and $81,297.13.

In addition to point and confidence interval estimates, it is helpful to conduct a hypothesis test regarding the salary data. Due to the fact that chairs and deans were excluded from the sample of professors, it is possible that the actual population mean salary is greater than the upper bound found using the confidence interval. That idea can be referred to as the alternative hypothesis, while the idea that the population mean is actually below $81,297.13 can be referred to as the null, or accepted hypothesis. In this case, a 1% level of significance was used, which means that there was only a one percent chance of falsely rejecting a true null hypothesis (Berenson et al., 2009). Given that the observed sample statistic is -1.96 and the critical value is 2.3263, one cannot reject the null hypothesis, and must conclude that the true population mean salary is less than or equal to $81,297.13.

**Perceived Chance of Success:**

The point estimate of the mean population “perceived chance of success,” based on the sample data, is 2.92. Similar to the salary data, a 95% confidence interval was used in conducting the interval estimate. Given the sample mean of 2.92 and a standard deviation of 0.751, with 95% confidence one can say that the population mean “perceived chance of success” lies between 2.81 and 3.02.

In addition to point and interval estimates, a hypothesis test was conducted in regards to the “perceived chance of success” data. Those faculty listed as lecturers, who are typically younger people considered by students to be on equal standing with the professors included in the sample, were excluded from the sample. Lecturers may often be perceived as easier than the full professors, and therefore the actual population mean may be higher than the upper bound of 3.02 found by the confidence interval. One can consider that notion to be the alternative hypothesis, with the population mean being below 3.02 as the null, or accepted hypothesis. Again, a 1% level of significance was used; given that the observed sample statistic is -1.8783 and the critical value is 2.3263, one cannot reject the null hypothesis, and must conclude that the true population mean “perceived chance of success” is less than or equal to 3.02.

**Testing the Theory:**

The descriptive analysis provided preliminary information that contradicted my theory that professors’ salaries and students’ perceived chance of success in a professor’s courses are positively related. Recall that the variables had a coefficient of correlation of -.1936, implying a small, negative correlation. However, the significance of that correlation can be tested using inferential statistical analysis. This is done by once again using a hypothesis test, with a 1% level of significance. In this case the null, or accepted, hypothesis is that professors’ salaries and
students’ perceived chance of success are not linearly related. The alternative hypothesis that I have proposed, is that they are positively correlated. Given that the observed test statistic is -2.7697 and the critical value is 2.3263, one can not reject the null hypothesis, and must conclude that the two variables are not positively correlated. This leaves me with no statistical evidence to support my theory.

Due to the preliminary evidence from the descriptive statistical analysis that points to a negative correlation between the variables, rather than the positive correlation my theory predicts, I conducted further hypothesis testing. I used the alternative hypothesis that the variables were negatively related, instead of testing for a positive correlation. Using a 1% level of significance, the null hypothesis can be rejected because the observed test statistic is -2.7697 while the critical value is -2.3263. This suggests that professors’ salaries and students’ perceived chance of success in a professor’s courses are statistically significantly, negatively correlated at the 1% level.

Conclusion

While this study used a large sample (n=199), there are some major limitations. In regards to salary, the decision not to include certain faculty members, such as lecturers, may have provided an unrepresentative sample of those who are typically considered “professors” at the University of Michigan- Dearborn. This would essentially be a selection bias, resulting in estimates that differ from the actual population (Berenson et al., 2009). With respect to the “perceived chance of success,” using data from ratemyprofessors.com resulted in a huge nonresponse bias. A nonresponse bias results from “the failure to collect data on all items in the sample.” (Berenson et al., 2009) Essentially, the ratings were used to reflect the perceptions of the entire student body, while nowhere near that amount actually rated any of the professors. This bias was slightly counteracted by the fact that many students consult the site without actually ranking professors, and therefore use it to shape their perceptions regardless of whether or not they take part in the ranking. Furthermore, one could challenge whether or not “perceived chance of success” actually impacts students’ preference for a particular instructor.

With those limitations acknowledged, a thorough analysis of the two variables was done in order to test my theory. For both variables under study, salary and “perceived chance of success,” multiple descriptive statistics were calculated. Additionally, bivariate analysis provided preliminary evidence that directly contradicted my hypothesis. The statistics calculated from the sample data were then used to compile an extensive inferential analysis. Finally, hypothesis testing revealed that the data did not provide statistically significant evidence in support of my theory. It did, however, show that there was sufficient evidence to conclude there is an inverse relationship between “perceived chance of success” and professor salary. This means that while my theoretical explanation for the correlation between the variables is inaccurate, a different theoretical model may explain the negative correlation seen between them.
References


Rethinking “Rosie the Riveter”: The Intersection of Propaganda, Actual Experience, and the Women of Ford’s Phoenix Mill in the History of Women’s Involvement in World War II

Tiffany A. Baugh

Faculty Advisor: Pamela Pennock
Department of American History
University of Michigan-Dearborn

Introduction

Over the past several decades, the focus of women’s history scholarship that addresses women’s experiences during World War II has primarily been that of a generalized national experience, with specific cases focusing on the United States’ coasts. Although Detroit is often acknowledged as an integral part of the American victory in World War II due to the total conversion of the automotive industries, the scholarship has paid surprisingly little attention to the particular experience of women who worked in war defense industries in the Detroit area. Because Detroit was (and still is) largely a working class city, many Detroit women were thus accustomed to working outside the home; therefore, the propaganda campaign was less necessary and had less impact in Detroit than throughout the rest of the country. This did not mean, however, that there were not reflections of the broader propaganda campaign in Detroit.

In the Detroit area, the factories and village industries owned by Ford Motor Company recognized the importance of women to the success of the war effort, especially if the total conversion of the auto industry was to be successful in helping achieve victory in the war. The Willow Run Bomber Plant in Ypsilanti, Michigan (where the woman for whom Rosie was named worked) also employed a substantial number of women. The specific case of Phoenix Mill, located in Plymouth, Michigan, offers a fascinating portrait of women’s experiences during the war that differed from the national portrait painted by the propaganda. Phoenix Mill, along with the other Ford village industries, produced specific parts for a variety of Ford models – the Model T, the Model A, and the Ford V8 – and the complete parts were picked up and taken down to the Rouge Assembly Plant, beginning in the late 1920s and early 1930s. Phoenix Mill produced voltage regulators specifically. ¹⁴ (“Phoenix Mill Feasibility Study,” 13) During the pre-war years, Henry Ford employed only single, divorced, or widowed women at Phoenix, recognizing what he saw as the important role women played in the home during this era. Married women were considered for employment only if their husbands were unemployed or unable to work due to illness. (“Phoenix Mill Feasibility Study,” 13) Given Phoenix Mill’s complexity because of the total conversion of the auto industry to war production, the uniqueness of the all-woman workforce, and the fact that the propaganda campaign was less necessary in the Detroit area because of the working-class composition of the population, a more in-depth

¹⁴ The village industries that Ford used in the early to middle 20th century were smaller plants were a specific component from Ford’s automobiles could be produced and then shipped to the bigger plants. Ford’s reason for breaking up production in this way was to provide farmers in the area with a way to supplement their income, as well as a way to bolster the economy of the smaller communities surrounding Dearborn, where Ford’s largest plant was built. Phoenix is one of several of these village industries.
analysis of women’s war experiences at Phoenix Mill is important to contributing to the greater depth and breadth of the study of women’s experiences during World War II.

**Interrupting Social Norms**

The American government worked hard to create a bureaucratic apparatus comprised of the Office of War Information, the War Advertising Council, and the War Manpower Commission that could handle the massive propaganda campaign it created in order to bring women into the labor force and ensure victory abroad through war production. But why was such a Herculean effort necessary in the first place? Its explanation is more complex than a capitalist concern for the economic vitality of the advertising industry during the war, which had led to the initial idea for a propaganda campaign. (Honey, 58, 109) Women were restricted by societal gender norms that dictated that they should not work outside of the home and the propaganda campaign was initiated to help change these social norms so that the women they sought would join the labor force. However, the OWI, the WAC, the WMC and the various other organizations associated with the effort sought to change the norms in such a way as to indicate that this was a temporary change, which would make the removal of women from the workforce seem easier and more natural when soldiers returned home, and helped to allay fears over a new, post-war Depression. Once these changes in societal expectations of women were in the making, the propaganda campaign could focus not only on getting women into the workforce, but into nontraditional - that is male - jobs. We must keep in mind, however, that this was only a norm, and working class women had always worked. It is this discrepancy between the targeted audience and the resulting images of the campaign and the actual experience of women who worked during the war that caused the erasure of working-class women’s war experience.

The OWI realized that if the efforts of the government to convince women they were needed in the workforce were ever to be successful, they would need to eliminate the idea that working women were an exception in American life. They did this by placing the working woman more prominently in the public mind, on the frontlines of the war at home, so to speak. The OWI attempted to do this in a variety of ways. It began by “revising” what single women should be striving for during the war: “[the young woman] does not regard marriage as her only career in wartime. She stays in business circulation, knowing that the war program and her country need her brain and skills.” (Honey, 48) It is important to note that by asserting that marriage wasn’t her only career option in wartime, the new images of the “young woman” were expected to be constructed in such a way that allowed for the changes to disappear once the war was won. Advertisers also sought to portray women as “militant partners in the struggle to defeat the enemy” as many in a longer line of American “heroines who helped their men in wartime.” (Honey, 111) In this way, the change in societal norms that was required in order to “allow” women to work during the war was constructed as temporary in the same way the OWI’s single woman was changing her “career” aspirations only for the duration. (Honey, 49)

The emphasis on women’s brave and valiant efforts during war time meant that “the emphasis was not on women’s right to be treated fairly and judged as individual workers but on their heroic service to the nation, a duty that required self-sacrifice and putting the welfare of soldiers above one’s own desires.” (Honey, 51) By placing emphasis on the woman worker’s self-sacrificing ways, the propaganda campaign was actually upholding the gender norm of women as nurturing and selfless and therefore maintaining traditional gender expectations of women at the same time they were encouraging women to break out of these roles for the sake of
their country. This emphasis on self-sacrifice also draws parallels between women’s “heroic” service and the heroic service of soldiers overseas. (Honey, “Creating Rosie,” 54) In both cases, the war was the catalyst for change in normal peacetime routines, and once the war was over, men and women alike could return to their “normal” roles: women as homemakers and men as breadwinners. (Honey, 127) I argue, therefore, that rather than changing social norms that controlled the public’s perception of women and work during the war, the propaganda campaign merely interrupted those norms. In the same way the return to domesticity a decade later represented an interruption in the trends of American history, rather than a long-term change, the change in social norms for women during World War II were an interruption rather than any permanent change. This emphasis and strategy ignored the contributions working-class women, like the women of Phoenix Mill, made to the war effort, as well as their unique experiences during the war.

The “Around the Clock” Willow Run Publicity Shoot

If the national propaganda campaign contained messages that aimed to alert women of the need for their labor during the war, then the local campaigns repeated these messages in order to convince women to heed the call of the national campaign. It is therefore unsurprising to find the messages of the national campaign reflected in the messages of one of the most recognizable bomber plants that was active during the war.

During the early 1940s, the Ford owned and operated Willow Run Bomber Plant in Ypsilanti, Michigan, launched a photographic series called “Around the Clock” that documented the work day of one of the “Rosies” at the plant. The main messages of the national propaganda campaign – that women should be spurred into war work out of patriotic duty and the desire to bring home their loved ones serving overseas; that women could remain glamorous (or at the very least, feminine) even while doing non-traditional work; and that women’s participation in the work force would not disrupt traditional family dynamics – were all present in the photographs in the series. One photograph shows Rosie gazing up at one of the Liberator warplanes that were produced at Willow Run. (“Around the Clock,” no. 77449-47) She is alone and is dwarfed by the size of the bomber, looking contemplatively up at it. Her reverence in this photo seems to suggest that this Rosie is aware that she is part of something bigger than herself and that she is involved because of patriotic duty to this larger-than-life cause. In another photograph, Rosie is pictured sitting at a small writing table, pen in hand, gazing off into space. (“Around the Clock,” no. 77449-15) Prominently displayed are a picture of a man in military uniform and Rosie’s wedding band. Both suggest that Rosie’s underlying reason for the war work she is photographed doing in almost all of the other photographs in the series is personal, as it should be for the Rosies across the country. She is working to bring the soldier she loves home.

The emphasis on feminine beauty in propaganda messages of the national campaign is also reflected in the “Around the Clock” series and one photograph is especially revealing in how contrived this “norm” was. (“Around the Clock,” no. 77449 – 19) In the foreground of the photograph, Rosie is eating lunch with another woman from the factory. Rosie’s hair is pinned and curled and although the photograph is black and white, she is clearly wearing make-up. She remains very feminine, regardless of the work she is doing in the factory (her overalls indicate that she is working on the floor, rather than up in an office). What makes this photograph revealing is that although Rosie is very clearly made up to stress her femininity, the women who are eating in the background are also obviously Rosies and none of them look quite as “made up”
as the woman who is featured in the photograph. The femininity stressed by national propaganda messages is obviously more contrived than some of the other messages, perhaps precisely because women’s participation in war industry meant that they did forego some of the things associated with femininity. What use was make-up, after all, when a woman spent her day staring at a machine or crammed in hot, stuffy places where her “natural” nimbleness was an advantage? This photograph reinforces the idea that messages espousing traditional gender norms (including beauty standards) were necessary precisely because women’s lives did not reflect these norms (Rupp, 6). This reality, combined with the potentially radical changes that could have been brought on by women’s inclusion in the industrial labor force, necessitated a strong, stream-lined propaganda pitch that reinforced traditional gender roles if it was to be successful in sending women home at the war’s end.

The fourth photograph in the set supports not only the propaganda messages that assured the public that women’s participation in the work force would not interrupt family life, it also encouraged women’s return to the home at the end of the war. In the photograph, Rosie is out of her work clothes and back into her own living room. She is helping a toddler stand, while her husband is sitting down next to her. (“Around the Clock,” no. 77448-9) Rosie is totally focused on her small daughter and a smile can be seen on her face, although she is not looking directly at the camera. Despite how she might have felt about her war work – her obvious patriotism and pride, the companionship of women friends at lunch, and the fact that she found ways to remain feminine during the war – it is obvious that where she feels most at home is at home. And the fact that her husband is back from the war and that she is home indicates that the proper thing for women to do on the return of the soldiers who had fought overseas was to go back home again.

**Pre-War Rosies and the Phoenix Experience**

Willow Run’s publicity shoot reflected the national propaganda messages that were designed to convince women to take war work for the duration of the war, but the working-class women who lived in the Detroit area during the war were more likely to already be in the workforce and thus less likely to need prodding. For the women who worked in Ford’s Phoenix Mill, the necessity to work had always been part of their lives, and the Depression or the lingering fear over economic security in the years following it were more likely to be the impetus for their entrance into the work force than the war. For this reason, the national campaign, and its reflection in Willow Run’s shoot, seemed to have little place in their lives. Doris Avis moved into town from a farm on the outskirts of Plymouth so she could work and finish high school during the Depression. Merle Fisher Minehart, one of six children, took the job at Phoenix to help her family. June Hudson took the job because her family could not afford to send her on to college, which she said she would have liked to do. Evelyn Carey took the job in order to support her seven year old daughter. All three women recall making five dollars a day during the Depression and it is this experience that stands out for them, rather than the war itself. (“Motor City Memories: Phoenix Mill [002]”)

In most interviews, women only indicated the beginning of the war by describing the changes (if any) in the work they did at the mill. Some women weren’t even aware that changes in the plant were due to the war. Both Eldora Emily Melton and Merle Fisher Minehart worked until 1941, when they each married and they were both re-hired once the war started. Henry Ford changed his policy on hiring married women and mothers when the war began, aligning the policies of his factories with the policy being endorsed by the government for the war-time
economy. These changes were less obvious to the women who worked at Phoenix Mill because the war did not change who was working there, only their marital status. The beginning of the war jump started what had been their normal lives, which included work at Phoenix, rather than disrupting their lives as it did for so many other women. (―Motor City Memories: Phoenix Mill [001, 003]) Althea Schoemaker admitted that the line was sped up eventually during the war, but that the workers made no objection to it. Her reasoning for the speed up was that “the longer you did it [line work] the more efficient you became.” (―Motor City Memories: Phoenix Mill [001]) While the war translated into drastic changes in some women’s lives, the fact that Althea was already working meant the war only affected the speed at which she worked, something that had adjusted the longer she worked anyway.

Evelyn Carey, June Hudson, and Merle Minehart admitted that they noticed Henry Ford changed his policy on hiring married women in his factories and mills, but were not entirely sure why. (―Motor City Memories: Phoenix Mill [002]) Because their focus had already been on the work they did and the money they were able to make, the messages of war propaganda had almost no place in their lives. Only one woman in the Phoenix Mill interviews, Ruth Orwin, seemed cognizant of the fact that Ford hired married women because of the war. (―Motor City Memories: Phoenix Mill [003]) One could argue that because these women were not specifically asked about their experiences of working during the war, but rather more generally working for Ford, the effects of the war and how they felt about being “Rosies” got lost. I argue, however, that this absence of the war from their discussions about their work in Ford’s plants indicates that for women at Phoenix Mill, the war was not an impetus for change or even a moderate influence on their work lives. Because women in Detroit, and specifically at Phoenix, had often been drawn into the work force during the Depression by the promise of Ford’s five dollar workday, their experiences in the war were very different from other women across the country.

Rosie the Riveter has been, and probably will remain, one of America’s most recognizable and most powerful popular culture icons. She was inspired by, and inspired, several generations of women who heard their country’s call for their contribution to the victory of the United States in war. By recognizing the variety of experiences that “Rosies” had during the war, and recognizing the variable power of the government-sponsored propaganda campaign that propelled these Rosies into the workforce, we can better understand the millions of “Rosies” that served their country during the Second World War. As women’s historians, it is our duty to make sure that experiences of all women in history are not forgotten or made invisible by the tendency of the public imagination to “remember” women as monolithic creatures with little complication in their lives. The tensions, contradictions, joys, difficulties, happiness and chaotic lives of the women who went to work during World War II need to be studied and recognized. By studying the experiences of women that do not conform to the popular mindset concerning women’s experiences in the war – like those of the women who worked at Phoenix Mill in Plymouth, Michigan – and attempting to more completely understand all of America’s “Rosies” we can better acknowledge their contribution to the victory of the United States in World War II. The fact is, Rosie told American women they could “do it” during the war – go to work, manage homes, raise children, contribute to the victory of their country, – and they did.
Appendix A
Works Cited

“Around the Clock” photograph series at The Henry Ford, Dearborn, Michigan. Accession no. 833, box 227, folder 480a-b.


Role of the Prime Minister in Contemporary Japan

Lana Brown

Faculty Advisor: Seigo Nakao
Department of Modern Languages and Literature
Oakland University

Introduction

Japan is politically classified as a constitutional monarchy with a parliamentary government including a legislative, judiciary, imperial, and executive branches. The most powerful branch of the government is the bicameral parliament of Japan called the Diet. The Diet consists of the House of Representatives, Shugiin, and the House of Councilors, Sangiin. Members of the leading party in the Diet elect the prime minister. The executive role of the prime minister is important and constantly in transition. The primary focus of the paper will be the office of the Prime Minister in the new millennium in Japan. It is important to look into the Mori, Koizumi, Abe, Fukuda, Aso, and Hatoyama administrations spanning from 2000 to present in order to chronicle the ever-changing role of Prime Minister within Japanese politics.

“In Practice, most Japanese premiers have found themselves heavily dominated and influenced by political, business and bureaucratic interests which provide their support” (McCargo, 94). In order to understand the role of the prime minister one must first understand party politics in Japan. Since the president of the political party with a majority in the Diet becomes the prime minister the reigning party holds the legislative and executive authority, achieving party majority is of utmost importance. The Liberal Democratic Party (LDP) was the political party in power from 1955-1993 and 1994-August 2009. The Liberal Democratic Party has definitely leaned to the right. As the largest and well established conservative party the LDP has definitely created political enemies and public scrutiny. However the members were consistently reelected because the LDP downplayed party affiliation during elections and relied on name recognition of the certain constituency (Stockwin, 103). Former Prime Minister Koizumi even “promised to ‘smash’ the LDP from within” (Stockwin, 179) because he disagreed with many out dated views of the LDP.

Surprisingly, a new party came into power August of 2009, the Democratic Party of Japan (DPJ). The DPJ is considered a center-left party that was created in response to anti-LDP sentiments in the late 1990’s with a broad range of political views. In a recent statement current Prime Minister Yukio Hatoyama states, “I have taken the view that the recent general election was not a triumph for only the DPJ and its allied parties. Rather, the public’s unbearable distrust of politics, their dismay at the dysfunction of conventional politics and the government as well as their pronounced anger at this situation” (kantei.go.jp). There are many other third and minor parties such as the New Clean Government Party (NKP), Japanese Communist Party (JCP), People’s New Party (PNP), Your Party (YP), and Social Democrat Party (SDP), that join together to create coalitions to push their particular politics (state.gov).

Coalitions are key in any political arena. In order to push party or personal platforms it is essential to bargain and compromise with other parties or even other members within the same party. A good example of party coalition is the last election where a coalition of the DPJ and SDP allowed a new party to triumph over the reigning LDP (kantei.go.jp). An example of interparty politics is the factions in the LDP. The powerful Tanaka faction dominated the LDP.
and, therefore, the position of prime minister since the 1980’s despite the various scandals that rocked the Diet (Stockwin, 69). The Tanaka faction continued to control the LDP until the election of Yoshiro Mori in April of 2000 as prime minister.

Mori Administration

Yoshiro Mori was elected the 85th prime minister on April 5, 2000. Mori’s election was unconventional because it was an emergency situation. Prime Minister Obuchi suffered from a fatal stroke on April 2, 2000 so a select group of powerful LDP members choose Mori without opening it to party discussion (Stockwin, 99). This unrest eventually led to a revised election process where party members from each prefecture vote for prime minister. Mori is a Waseda University graduate and rugby enthusiast with a family history of local politics. Mori decided to take it to a national level in 1969 when he ran for the House of Representatives representing Ishikawa Prefecture. Yoshiro Mori was successfully elected to the Diet in December of 1969 at the ripe age of 32. “After his first election, Mori joined the Liberal Democratic Party and came under the tutelage of the noble-minded former Prime Minister Takeo Fukuda, who preached simplicity and humbleness” (kantei.go.jp).

The election of Yoshiro Mori notes an important shift in LDP power from the Tanaka faction to the Fukuda faction that will affect every LDP prime minister in the new millennium. The Fukuda faction was generally more ideological than the Tanaka faction that was stereotypically more interested in issues of finance, organization, and power (Stockwin, 101-102). Mori’s ideological platform of the “Rebirth of Japan” urged on his plans to promote economic recovery, social security, education, foreign policy, and restructuring the government (kantei.go.jp).

Mori was reelected on July 4, 2000 by the LDP making him the 85th and 86th Prime Minister. The new House of Representative election hurt the LDP slightly because it lost some seats and the DJP gained many seats. During Mori’s second term he focused on international diplomacy. While he did a lot of good for international relations his popularity within Japan dwindled because in some speeches he came across as promoting WWII ideals of an Emperor-centric government.

In February of 2001 his popularity took a crushing blow when a U.S. submarine crashed into a Japanese fishing boat off the coast of Oahu in Hawaii killing Japanese citizens. It was reported that Prime Minister Mori was playing golf when he found out and continued to finish his game instead of settle the situation. The backlash reminds me of the public response to President George W. Bush’s actions when he found out about the attack on September 11, 2001. President Bush had a photo opportunity at a school reading to young children. On film it is clear that a man whispered in his ear to tell him about the terrorist attacks, the President paused and continued reading. The public was shocked, much like the Japanese public was upset by Mori’s reaction to the loss of Japanese lives. It was clear that the LDP needed Mori to resign in order to save party popularity and control over the Diet (Stockwin 101-104). On April 26, 2001 Prime Minister Mori and his Cabinet resigned and Junichiro Koizumi was elected 87th Prime Minister of Japan by the LDP (kantei.go.jp).
Junichiro Koizumi is the best-known prime minister of the new millennium because between April of 2001 and September of 2006 he was reelected three times to be the 87\textsuperscript{th}, 88\textsuperscript{th}, and 89\textsuperscript{th} Prime Minister of Japan. Koizumi graduated from the Faculty of Economics at Keio University in 1967 and became secretary to member of the House of Representatives, Takeo Fukuda. He was elected a member of the House of Representatives for the Kanagawa Prefecture in 1972 and was thereafter reelected eleven consecutive terms. Koizumi held many prestigious positions throughout his time in the House of Representatives but the main focus of his positions were either financial or health related until he was elected for his first term as Prime Minister in April of 2001 (kantei.go.jp).

Koizumi was instantly recognizable because of his wavy silver hair and “maverick” persona within in LDP. He swept the 2001 election winning 41 out of 47 prefectures. The Cabinet played an integral role in Koizumi’s success. Previous prime ministers usually pick Cabinet members based on their faction in the LDP to represent the make-up of the party as well as the House of Representatives. When it came time to reshuffle the Cabinet, or \textit{Kantei}, Koizumi broke with tradition and choose members from different factions of the LDP as well as members from other parties and even from outside of the Diet. Five of Koizumi’s Cabinet members were women, most of which not from the LDP which rattled some metaphorical cages within Japanese politics (Stockwin, 105-108).

Shinoda goes into great detail in his book, \textit{Koizumi Diplomacy}, about the Cabinet’s major role in international relations during Koizumi’s reign as opposed to allowing the traditional Ministry of Foreign Affairs to keep their jurisdiction. A good example of Koizumi’s \textit{Kantei} approach of “top- down leadership” (Shinoda, 87) is Koizumi’s response to the September 11\textsuperscript{th} terrorist attack on the United States. Koizumi came out and openly supported President Bush in his military action and pushed a bill to deploy Japan’s Self-Defense Forces (SDF) into wartime conditions. The use of the SDF in any kind of military action had not been seen since its inception after WWII. Koizumi classified 9/11 as “a significant emergency” allowing it to be placed under Cabinet jurisdiction. This is important because the Cabinet proved
that they maintained a great amount of control in a crisis that fostered strong leadership. The bill was passed in an astounding time of only three weeks (Shinoda, 86-91).

While there were many successes and failures of Prime Minister Koizumi’s time as president of the LDP and prime minister he is most remembered as a confident and patriotic leader. Those qualities are not usually well received in Japanese society because confidence can come across as arrogant and patriotism is still tied to the taboo WWII wartime mentality, which is terrifying to most Japanese people and the international community. An important example of Koizumi’s patriotism is his official visit to Yasukuni Shrine where fallen Japanese soldiers are honored. It has been a political taboo since WWII to visit Yasukuni Shrine as Prime Minister because many international communities, such as China and South Korea, become irate with the fact that Japan is honoring the very people that terrorized a large part of the world during WWII (Goto-Jones, 144-145). Koizumi also choose the 60th anniversary of Japan’s Surrender, August 15, 2006, to visit the shrine (Stockwin, 130). “Koizumi was unapologetic, insisting that patriotism was a healthy and normal part of any national polity” (Goto-Jones, 144).

Throughout Koizumi’s five-year reign he rose above a good amount of party politics by relying on Cabinet support. He pushed both unpopular and radical reforms in defense and education. Japan’s “lost generation” of the 1990’s reinvented itself and was thrust back into international acclaim with a new sense of confidence. Koizumi made it public early in his third term that it was to be his last leaving the door open to a new leader to step in. Koizumi has continued to be a pop icon both in Japan and abroad since leaving office. There are manga (comic strips) and anime series (cartoon series) about Koizumi as a super hero. Junichiro Koizumi’s effect on politics as well as his long, quaff hair and rock star persona will surely hold his place in contemporary history.

Abe Administration

The young Shinzo Abe, Chief Cabinet Secretary to the third Koizumi Cabinet, ran for the office of Prime Minister in September of 2006 and swept the elections (Stockwin, 130). Tokyo born Shinzo Abe graduated from the Department of Political Science of Seikei University in 1977 and eventually elected into the House of Representatives in 1993 for Yamaguchi Prefecture. Abe was sporadically involved in the Cabinet since the 2000 Second Mori Cabinet to the 2005 Third Koizumi Cabinet. Abe became the 90th Prime Minster of Japan on September 26, 2006 (kantei.go.jp). Abe campaigned for the same ideals as Koizumi. Abe tied up Koizumi’s loose ends by creating the Ministry of Defense and enacting the Educational Reform Law in December of 2006 (Goto-Jones, 145).

The Educational Reform Law required schools to fly the national flag and sing the national anthem in order to promote a sense of nationalism in Japanese youth. Abe also wanted to revise Article 9, the controversial section of the Constitution leaving Japan completely demilitarized and under the protection of the United States (Goto-Jones, 145). Abe’s politics were increasingly unpopular with both domestic and international audiences. The comfort women scandal rocked the Diet in 2007 where former WWII prostitutes, basically military forced sex slaves, made their struggles public. Officials within the Abe cabinet made foolish and insensitive statements about comfort women and the atomic bomb that further hurt Abe. The scandal hurt Abe’s popularity and politics in and outside of Japan (Stockwin, 132-33).

On September 13, 2007 Abe was hospitalized for about ten days and decided to resign as Prime Minister on September 26, 2007 (Kantei.go.jp). Of course health reasons was the official reason for Abe’s resignation the announcement only caused mass speculation. BBC News writer,
Chris Hogg, hypothesizes that the LDP may have offered Abe as a sacrifice to opposing parties in return to their support of the American influenced Anti-Terrorism legislation. Hogg also speculates that the LDP’s loss of the upper house made Abe a sitting duck and that Abe was a weak leader compared to former Prime Minister Koizumi. “Mr. Abe will be remembered for the success he had in rebuilding relations with China and South Korea. But he will probably not be remembered for long” (Hogg).

Fukuda Administration

Another Waseda University graduate, Yasuo Fukuda, became the 91st Prime Minister on September 26, 2007. Fukuda was Prime Minister Takeo Fukuda’s secretary in 1977 and was elected to the House of Representatives in 1990 where he held many important offices. Fukuda pushed for review of the social security system and reforms in budgeting for road construction, which was a very corrupt system at the time. Fukuda also started to establish an Agency for Consumer Affairs and tried to promote the economy. Prime Minister Fukuda was the Japanese equivalent of President Lyndon B. Johnson. Fukuda, much like President Johnson, focused on domestic issues and honestly cared about the welfare of the citizens.

Throughout his time in office there was a scandal involving the Ministry of Defense and many national problems thrust upon him. “The political funding issue, the pension record problem, the Hepatitis C issue, and the scandals at the Ministry of Defense” caused Fukuda to resign after only one year as prime minister (Fukuda Press Release, kantei.go.jp). Fukuda did not possess the leadership or resourcefulness needed in order to overcome such intense obstacles. Prime Minister Fukuda is usually just barely mentioned in news articles or books reflecting on the prime ministers of the 21st Century. Fukuda had the gumption to take the first step in attempting to reform corrupt systems but his power fizzled out.

Aso Administration

The 92nd Prime Minister was elected on September 24, 2008. Taro Aso ran in every LDP presidential election since 2001 as a Representative of Fukuoka Prefecture. Aso graduated from Gakushuin University and attended both Stanford University and the London School of Economics to become the president of Aso Cement Co., Ltd. Aso was also the Chairman of the LDP for the Fukuoka Chapter in the late 1980’s. He was elected nine times to the House of Representatives until he was elected Prime Minister in 2008.

Prime Minister Aso was in office during an economic downturn and did not have time to make an impression on the Japanese people or international public. In a Japan Times Poll, Lisa Chan asked people, “What are the key issues new Prime Minister Taro Aso needs to tackle?” The Japanese people wanted him to focus on supporting women as mothers in the workplace, health care for the aging population, economic reforms to reduce the national debt, and supporting domestic farmers. On the other hand, Australian people wanted Aso to focus on international relations and proving that he is a strong leader compared to failure of Abe and Fukuda (Chan, Japantimes.co.jp). There wasn’t much information on Aso leading one to believe that he did not accomplish all the public had in mind for him.

Hatoyama Administration

Unfortunately for Prime Minister Aso, on September 16th, 2009 the DPJ won a majority in the Diet and they elected Yukio Hatoyama as Prime Minister and President of the DPJ. Hatoyama credits the DPJ success to the coalition with the Social Democratic Party and People’s
New Party. Hatoyama is the current Japanese Prime Minister with high expectations for himself and Japan (kantei.go.jp). In his “Basic Principles of the Hatoyama Government,” Hatoyama states:

“From this day, Japan will seek to break away from special-interest politics and a political system dependent on the bureaucracy that has supported such politics. We will transform this nation into one of popular sovereignty in the true sense, in which we undertake policies that enable each citizen to feel affluent in a real way” (Basic Principles of the Hatoyama Government, kantei.go.jp)

The depiction of Hatoyama is reminiscent of the American 2008 election of President Obama. In order to overcome the dominating parties there has been a lot of beautiful and forceful rhetoric from both leaders about what their respective countries need and it is exciting to see if they can follow through on campaign promises. Prime Minister Hatoyama is very critical of the former LDP run government of Japan and claims that he wants to reform every aspect of it.

Conclusion
The 21st Century has proved to be a tumultuous time for Japanese politics exemplified by the high turnover rate of prime ministers. It is clear that prime ministers are receiving less and less power over the years. Party politics are key. Political parties in Japan not only select the prime minister but they also decide when the prime ministers they hand picked should resign for the good of the party. While the LDP prime ministers under the Fukuda faction came in with idealized intentions the tense political climate since Koizumi’s final term has made it next to impossible to make real change. A symbol of change and hope for the Japanese government has come in the form of current Prime Minister Hatoyama and the rise of the DPJ. Only time will tell if Hatoyama succeeds in his monumental task.

Works Cited

Picture from www.kantei.go.jp/foreign/archives/
The Republic of Mauritius

Rashard L. Wagner

Faculty Advisor: Dauda Abubaker
Department of Africana Studies
University of Michigan-Flint

Abstract

The purpose of this paper is to provide readers with a very brief and detailed account of information obtained during my study pertaining to the Republic of Mauritius, a nation recognized as an African sovereign state. This paper will focus on particular areas concerning the nation’s history, geography, the type of economy it currently has, the government structure, the people, natural resources, its educational system, its practices of religion and any additional demographics affiliated with Mauritius. Further, this paper will elaborate on the nation’s successful legitimacy since the late 1960s and the success its government has obtained in keeping its stability by not experiencing hardships, strict colonial practices and corruption unlike its sister nations endured on the mainland. Finally, this paper will focus on the media’s everyday outlook on the African continent, what we see and hear and what we don’t see and hear.

Africa is the world’s second largest continent consisting of over 54 different nations. Although many Americans are aware of the several African nations receiving media focus such as Somalia, Nigeria, South Africa, Kenya, Ghana, and the Ivory Coast, many of us are not as aware of the nation of Mauritius. I personally knew nothing about this country until taking a political science course at the University of Michigan-Flint addressing politics in Africa.

Mauritius was first discovered in the 10th century in 975 A.D. by several explorers of Arabic decent, according to mauritius.org/uk. The nation was later surveyed by representative explorers of the Portuguese government in the early 1500s. The Dutch arrived later to occupy the island during the late 1500s. Both the Portuguese and the Dutch were successful in colonizing the land, but due to their inability to locate and extract natural resources from the island they decided to leave in search of different areas of land with natural resources to extract. The only natural resource that Dutch were able to extract from the land was ebony. In addition to the first European nations occupying the island during their respective times, slaves were brought over from the nation of Madagascar to assist in the labor activity including natural resource extraction from the land. The island of Mauritius was eventually occupied by the French for a certain period of time until they were defeated by the British. After the British defeated the French, they were able to gain control and access of the Indian Ocean area, officially making the island a British colony.

Mauritius is located near the southern area of the African continent east of Madagascar, in the Indian Ocean. According to the CIA World Fact book, the nation is said to be eleven times the size of Washington D.C. The capital of the Mauritius is Port Louis, named by French administrator, Guillaume Dufresne d’Arsel. The national language is English, with additional languages including Creole, Bhojpuri, and French. The population is 1,284,264; made up of the following ethnic groups: Indo-Mauritian (68%), Creole (27%), Sino-Mauritian (3%) and Franco-Mauritian (2%). The national currency is the Rupee. The national symbol is the Dodo bird.
The colors for its national flag are red, blue, yellow, and green; the red symbolizing the struggle for freedom, the blue representing the Indian Ocean, the yellow standing for the light of independence shining over the island, and green representing the nation’s agriculture.

The government began to form during its years as a member of the British Commonwealth of Nations, where Queen Elizabeth II acted as the head of state. Shortly following their independence from the United Kingdom on March 12, 1968, the island nation then decided to stick with what they’ve known politically and model their new government after the United Kingdom. It was from there that they established their own form of democratic government known as a constitutional monarchy. The Mauritian government has a unicameral parliament consisting of 70 seats, 62 are elected and 8 are appointed by the elections commission. The Mauritian parliament is known as the National Assembly. There is a president, vice president, prime minister and assistant or deputy prime minister; the executive leaders are elected for 5 years by the people of the nation in addition to being home to several political parties. The current president is Sir Anerood Jugnauth, who has served in office since 2003.

During the early period of Mauritian independence while under the leadership of its new government, there were two political parties that had issues with each other regarding elections, and additional matters, resulting in social and industrial unrest, formed by the Mauritian Militant Movement. The Mauritius website reports that the leaders of both parties were incarcerated for an entire year.

Since its independence from the British government, the Mauritian economy has developed and became more diversified than ever; forming various sectors or industries to help stimulate its growing economy. Some of the chief industries include: construction, tourism, finance, textile, fishing, clothing, information technology, and its sugarcane industry. Some of the natural resources of Mauritius include, ebony, arable land, and fish.

Unlike several of the African nations who endured colonialism and later the effect of colonialism by experiencing corruption and unstable legitimacy in government operations, Mauritius didn’t have to experience that type of instability due to the way their first executive officials decided to distribute power on the island. Shortly following its independence, citizens of the country immediately elected officials who they felt would serve as good representatives and officials in government. Also contributing to the legitimacy of the nation were the explorers from nations who settled there, notably by adding extravagance to the island by introducing certain crops from other areas of the mainland to be grown there.

There were also several other noted individuals very instrumental in the development of the Mauritian state before it became a nation. The government of Mauritius website records that Mahé de La Bourdonnais was the establishmentarian (founder) of the nation’s capital Port Louis; a naval base consisting of many earlier-constructed buildings that are currently in operation today. Also noteworthy is Robert Farquhar, who was one of the first British governors of Mauritius. Farquhar assisted in the many economic and social changes throughout the island. In addition to Mahé de La Bourdonnais and Robert Farquhar, there were several more people who contributed to the island’s development as well.

During the early years of the nation’s development, there was a constitutional conference held in Mauritius similar to the constitutional convention of the United States of America. Mauritius’ constitutional convention was known as the Council of Government, established in the 1800s shortly before the nation gained its independence later the next century. The prospective officials who had the charge of preparing and augmenting several components to the
constitution successfully prepared the way for their own sovereignty also. In addition the constitution of Mauritius provided for the inclusion of everyone to serve as representatives regardless of their ethnic identity.

The nation of Mauritius is home to several religions such as Hindu which is the main religion. Other religions practiced in the area include Roman Catholicism, Islam, Christianity, and Protestant religion. The 2000 census and the CIA World fact Book provides us with some additional data as it concerns the different types of religious groups within the nation and they are as follows, Hindu (48%), Roman Catholic (23.6%), Muslim (16.6%), Christian (8.6%), other (2.5%), unspecified (0.3%), and none (0.4%)

Mauritius has an educational system that boasts one of the highest literacy rates in the world among elementary through secondary school students with a very well developed educational system. The island’s educational system is set up as follows: at the formal academic level, students attend what is called pre-primary school which is equivalent to pre-kindergarten here in America, five years of primary school, and five – seven years of secondary school. In Mauritius, 80% of the primary schools are private and 76% of the secondary schools are also private. The students in Mauritius usually complete their formal education in twelve years. An exam is required of them to advance to the next grade level, and if a student fails an exam three times, alternative education may be provided as an option. Although the majority of both primary and secondary schools are private, the national assembly spends large sums of money to pump back into the schools so that its students can receive a valuable education. Mauritius has a ministry of education which presides over all academic affairs of the nation at both the primary and secondary level. There are five regional educational offices throughout Mauritius with regional Ministry of Education directors reporting directly to the national Minister of Education. Mauritius is also home to several colleges and universities that are located within the nation, such as the University of Mauritius, the Mauritius Institute of Education and the University of Technology – Mauritius.

Although Mauritius has become a modern and developing nation with a more diversified economy, the country is not without its own share of problems similar to any of the other nations on the mainland. One of the very serious issues facing this nation for quite some time is the act of prostitution. According to the 2005 Monitoring Report on the Status of Action Against the Commercial and Sexual Exploitation of Children, it is estimated that over 2,600 children are being sexually exploited in certain areas of the nation including the Port Louis the capital city. Also included in that report, the government has attempted to put in place a plan of action, the reports were implemented in 1998 and have used several entities of government such as the Police and Probation Officers, the ministers of Social Security, Health and Education, the UNICEF, and NGOs. This careful collaboration of government entities within the nation is working tirelessly to eliminate this current situation in the area.

Although the nation of Mauritius has its own share of problems, we cannot help but recognize the economic and political prosperity and the legitimacy that this nation has experienced for the past forty-plus years. One factor contributing to the nation’s prosperity was the different types of ethnic groups that currently reside in the nation and how they were able to live together as one in order to become a successful state. In addition to not only the distribution of power previously mentioned, there is also an allocation of resources to the population within the country as it relates to several areas including: education, religion, public services, etc.

Finally the future prospects of the success of the nation also takes us back to its early years when the nation was first developing itself as a republic during the time the Council of
Government was taking place (Mauritius Constitutional Convention). Since March 12, 1968 Mauritius was able to successfully take care of its own. Not being without obstacles and challenges as a nation during its development, the nation of Mauritius has been able to survive to this day. Hopefully when we see future reports of African nations in the news media they will highlight many of the positive aspects of the African continent; especially regarding prosperous nations like Mauritius of which we may have little if any knowledge.

References

1968 edition of the World Book Encyclopedia

National website for the Republic of Mauritius
http://www.gov.mu/portal/site/Mainhomepage/menuitem.cc515006ac7521ae3a9dbea5e2b521ca/

Nations Online One World
http://www.nationsonline.org/oneworld/

Mauritius
http://www mauritius net/index php

Africa Resource
http://www.africaresource.com

The Center for Electronic Resources in African Studies, the University of Iowa Libraries
http://www.lib.uiowa.edu/eresources/refsubject-results.asp?subj=2

Southern and Eastern Africa Consortium for Monitoring Educational Quality
http://www.sacmwq.org
http://www.sacmeq.org/education-mauritius.htm

All Africa
http://www.allafrica.com

The 2005 Monitoring Report on the Status of Action against the Commercial and sexual Exploitation of Children

The Mauritius United Kingdom Connection
http://www mauritius org uk/
Experimental Determination of Viscoelastic Relaxation Modulus of Polymeric Materials

Ravil Patel and Michael Isaac

Faculty Advisor: Olanrewaju Aluko
Department of Computer Science, Engineering and Physics
University of Michigan-Flint

Abstract

This study was carried out to quantify experimentally the viscoelastic behavior of polymeric materials under tensile loading at room temperature for different strain rates. The four polymers that were tested include: PVC, Polycarbonate, HDPE and UHMW. Among these specimens, Polycarbonate was found to be more stable, followed by PVC, then UHMW, and the least desirable being HDPE.

Introduction

A polymer is defined as “A compound of high molecular weight (normally organic) the structure of which is composed of chains of small repeater units” (Ca). Many everyday items are made of polymers including various plastics, wood, cotton, and rubber. These materials have a low electrical conductivity and are not magnetic however have many desirable qualities including a low density and high strength per mass unit. Many of these materials are also very ductile and pliable, allowing them to be easily worked and made into various shapes. These properties are given to polymers from their chemical makeup and structure. Viscoelasticity is the property of materials that exhibit both viscous and elastic characteristics when undergoing deformation. The viscoelastic behavior of polymeric materials depends on both time and temperature. Stress relaxation test is one possible technique to measure and quantify this behavior. During such test, specimen is initially strained rapidly in tension to a predetermined and relatively low strain level. Stress necessary to maintain this strain is measured as a function of time while keeping temperature constant. Stress (denoted, σ) is found to decrease with time due to molecular relaxation processes that take place within the polymer. The stress and strain equations are shown in Equations (1) and (2), respectively. Relaxation modulus $E_r(t)$ is defined as a ratio of time dependent elastic modulus for viscoelastic polymers where $\sigma(t)$ is Stress over time and $\varepsilon_0$ is the initial strain as shown in Equation 3.

$$\sigma = \frac{\text{Force/Area}}{}$$  \hspace{2cm} (1)

$$\varepsilon = \frac{\text{Change in length/original length}}{}$$  \hspace{2cm} (2)

$$E_r(t) = \frac{\sigma(t)}{\varepsilon_0}$$  \hspace{2cm} (3)

Owing to wide range of engineering applications of polymers ranging from sign post, building, and automobiles, many authors [1-5] have worked and provided useful information about the behaviors of polymers under mechanical loadings.
Experimental Procedure

The type of specimen used for testing was a dog bone specimen as shown in Figure 2. These samples are made from polymer sheets which were cut into approximately one inch, strips. A mill saw and mold are then used in order to create the slimmer groves and fillets in the specimen. Once the specimens are made, a Zwick/Roell tensile testing machine (Figure 1.) with a 5kN load cell capacity was used for loading the specimen. This was done by using previously created program called “American standard tensile”. Types of polymers used include: Polyvinyl chloride (PVC), Polycarbonate, High-density polyethylene (HDPE), Ultra high molecular weight polyethylene (UHMW).

This program requires the specification of specimen geometry before this test can be run. Also, a failure test was performed on each material to pre-determine their yield strength. Then a stress relaxation test was performed on each specimen at different strain rates and the force at every 20 second interval was recorded. This force allowed for the stress calculations to be performed. Finally, the viscoelastic relaxation modulus was then calculated for each specimen at each of the various strain rates.
Results and Discussion

The tensile test to failure was first carried out on Polycarbonate, PVC, HDPE and UHMW in order to experimentally characterize the behavior of these polymeric materials so as to pre-determine the required load level for stress relaxation test. Yield strength of 66MPa, 54MPa, 37MPa and 20MPa was obtained from Polycarbonate, PVC, HDPE and UHMW. Although the yield strength was much lower for UMHW at about 20 MPa, this polymer possesses high ductility and toughness.

For the case of stress relaxing test, Figures 3-5 document the effect of material properties on the stress relaxation of polymers at constant strain rate. From these figures, it can be seen for all the strain rates the materials that the rate of relaxation decreases with time. However, among the polymers tested, polycarbonate exhibited higher structural stability than others.

Also depicted in Figures 6-9 is the effect of strain rates on the stress relaxation of polymers. In these figures, it was very difficult to conclude about how strain rates affect stress relaxation because of the initial error of not performing the test at the same load level using different strain rate for each material tested. In order to remedy this error, it is therefore recommended this experiment should be conducted at the same load level for each material at different strain rates.

![Figure 3: E(t) Vs t for all specimen at 0.04 strain rate](image-url)
Figure 4: $E(t)$ Vs $t$ for all specimen at 0.05 strain rate

Figure 5: $E(t)$ Vs $t$ for all specimen at 0.06 strain rate
Figure 6: $E(t)$ Vs $t$ for PVC at all strain rate

Figure 7: $E(t)$ Vs $t$ for Polycarbonate at all strain rate
Figure 8: E(t) Vs t for HDPE at all strain rate

Figure 9: E(t) Vs t for UHMW at all strain rate
Conclusion

The yield strength of the four samples is as follows: Polycarbonate 66MPa, PVC 54MPa, HDPE 37MPa, and UHMW yielded at 20MPa. The change in stress from highest to lowest is as follows: HDPE 7.69MPa, PVC 7.65MPa, Polycarbonate 6.65MPa, and UHMW has the least change in stress with 5.63MPa. If these two factors are combined we would have the optimal material to use. The best material to use is Polycarbonate followed by PVC, UHMW, and lastly HDPE.

Acknowledgement

We would like to thank the Office of Research, at the University of Michigan- Flint for providing financial support through the Undergraduate Research Opportunity Program (UROP). Thanks also to Mechanical Engineering Program for providing the Zwick/Roell tensile testing machine and its software.

References


Microstructural Changes and Hardness Response of Hardenable Steels to Heat Treatment

Joseph Wilkinson

Faculty Advisor: Olanrewaju Aluko
Department of Computer Science, Engineering and Physics
University of Michigan Flint

Abstract
The effect of heat treatment on the microstructure and mechanical properties of hardness were investigated in this study. The metallographic analysis and hardness test was done in order to determine the correlation between type of heat treatment, microstructure, and hardness of the steels 1020 plain carbon steel, 1044 plain carbon steel, 6150 alloy steel, D2 alloy steel, respectively. In general, all of the steels tested by water quenching showed significant changes in microstructure and hardness. Alternatively the original state of the steel was harder than the air cooled steels, indicating that all air cooled specimens became softer among the steels tested. 1044 plain carbon steel had the largest change in the microstructure and thus the largest increase in hardness. The 6150 alloy steel was the hardest of all the steels tested but the change in the microstructure was not as large as 1044 plain carbon steel.

Introduction
One of the most important properties of steel, which is often used in loading structures, is its yield strength. The yield strength is the maximum stress an object can undergo without being permanently or plastically deformed. Steel, which can exist in different phases, has the ability to use these phase changes to become more beneficial. One of these benefits can be an increase in yield strength. Because loading in the elastic region is linear in nature, a direct relationship of yield strength and hardest can be established. This is important because measuring hardness is quicker, easier, and cheaper to perform than tensile testing. However in order to change the hardness property the structure of the steel must be altered first through heat treatment.

Introduction
Heat treatment is an effective way to alter the structure and thus properties of the steel. Many studies in the area of heat treatment have been done by ASM International [1-5], [7-8]. Steel, which is initially comprised of ferrite (α phase) and carbon, is heated until the ferrite enters the austenite (γ phase). The austenite has a much higher saturating point for carbon at about 2.14 weight percent (wt%) carbon compared to .022 wt% for the ferrite phase. After the austenizing temperature has been reached the steel can have its structure altered by subsequent cooling. The most common methods of cooling are; air cooling and water quenching. More rapid cooling rates will cause a greater change in the microstructure. The primary microstructures are ferrite, austenite, cementite (iron carbide), pearlite, bainite and martensite. Cementite will form if the amount of carbon is above the saturation point of the ferrite phase and is harder than ferrite. Pearlite is a laminar of cementite and ferrite and will vary in hardness depending on the density of the laminar. Bainite is a very hard needle like in structure which may form in the place of pearlite. The structure for bainite is exceptionally small and not visible without an electron microscope. The final phase from heat treatment is martensite. Martensite is the hardest and most brittle of all the phases. Rapid quenching is necessary in order to form this phase. The structure of martensite is smaller than bainite and also needle shaped. The present study is
carried out primarily to show the relationship between the microstructure and hardness of the steel by comparing the hardness and structure for each steel at the original state of the steel (bar), air cooled, and water quenched.

**Procedure**

Four metals were chosen for microscopic examination. Two of the metals were plain carbon, 1020 and 1044, and two were alloy, 6150 and D2. The metals which existed in the form of a bar had 3 sections cut from each bar yielding 12 total steel samples. Each sample was labeled using an engraving tool based on the type of steel and the type of heat treatment undergone. The first group of steels were not heat treated and the structure was left in the original bar state. The metals that were to be heat treated had their hardness tested using the Rockwell machine. The scale used for hardness testing was the C scale or HRC. This scale used a diamond indenter and 150 Kg load. Each sample had their hardness tested 3 times and the average calculated. The samples which were not heat treated had their hardness tested while the other samples were in the oven.

For the heat treatment of the other eight samples the Lindburg furnace was used. The temperature of the furnace was maintained at 950° C. The eight samples were placed in the furnace one at a time in order to prevent the temperature from dropping too low. The temperature of the furnace was lowered to the desired heat treating temperature of 850° C and held for 30 minutes. The samples that were to be water cooled were taken out first and were placed in two separate buckets with equal amounts of water in them. A thermometer was used to record the temperature increase in each bucket. The air cooled specimens were then placed on a ceramic blanket and allowed to cool. The cooled specimens were then sanded using Silicon Carbide paper of 240 grit on the Struers machine for 2 minutes with light hand pressure. The hardness of each specimen was tested 3 times and the average recorded.

For the metallographic preparation of steel the samples needed to be standardized in shape so that the grinding process can be automated. All of the samples were too small and inconsistent in size to fit it the grinding and polishing fixture. In order to standardize the size and shape the samples were enchased in a black polymer known as black phenolic, which is a thermosetting polymer. The enchasing was done on a Leco Pneumatic press. First the heating unit was allowed to reach the required temperature of 165° C. Then the specimen was placed on the bottom of the press and lowered into the unit. A small amount of black phenolic powder was added and the ram rod used to push the powder into shape. A pressure of 4200 psi was applied to the black phenolic so that the polymer could set and enchase the metal sample. After having the heat and pressure applied for 20 minutes the pressure was removed. The polymer enchased the sample in a standard 1.25 inch diameter cylinder.

Further, the plain grinding process was done on Struers grinder and polisher. Four samples were loaded into the grinding fixture. The grinding abrasive used was Silicon Carbide (SiC). The SiC paper was used in different grit sizes starting with 240 grit. In order to grind using the Struers machine a stream of water was used to lubricate as well as flush the dislodged bits of SiC. Both the grinding fixture and surface rotate in the same direction although the grinding surface was rotating at 300 RPM as opposed to 150 RPM for the grinding fixture. The maximum force of 240 N was used during the grinding process. The most important part of plain grinding was to achieve a true surface for polishing. For this reason the 240 grit SiC paper was used 3 times until the entire surface of the sample and polymer had even reflection patterns. When the next grit of SiC paper was used the samples were washed with a mild detergent and
rinsed with di-ionized water. Next SiC paper of grit 320 was used in order to remove the deformation caused by 240 grit paper and 400 grit to remove the deformation from 320 grit.

The second stage of metallographic preparation was Diamond Polishing. This stage was on the Struers grinder and polisher using the magnetic fixation disc system. The first magnetic disc, known as MD-Allegro was used as the polishing surface. The grinding material used was 9 µm diamond slurry. A 240 Newton force was applied to the steel surface and the rotational speed of the Struers machine was 150 rpm. Next the MD-Dac was used for the grinding surface. A 6 µm diamond slurry was used for the grinding material and a 240 Newton force was applied to the surface. The same procedure was carried out on separate MD-Dac cloths using 3 µm and 1 µm diamond slurry. The force used was 210 and 150 Newton respectively. Between grinding the samples were washed with de-ionized water and a mild detergent in order to prevent contamination.

The third stage of metallographic preparation was Oxide Polishing. Here, the grinding surface was MD-Chem. MD-Chem is somewhat absorbent so when pressure is applied the surface will excrete excess grinding fluid in order to polish the sample better. The first grinding fluid used was aluminum oxide (AlO₃) and a 150 Newton force was applied to the steel surface. Silicon Oxide (SiO₂), which has a superior grinding finish, was used for final polishing. A 150 Newton force was applied to the steel surface. Between each grinding stage the samples were washed with de-ionized water and a mild detergent in order to prevent contamination.

The final stage for metallographic preparation was to chemically etch the sample. For the etching Nital Acid, which is 5% Nitric acid (HNO₃) and 95% ethanol alcohol, was used. A small amount of the etchant was placed on the surface of the steel and swabbed with a cotton saw for 5 to 10 seconds. This process was completed when the entire surface of the steel was clouded evenly. After the surface was etched methanol alcohol was used to flush the surface of the acid and dried off using a cotton ball.

Finally each sample was viewed under the optical microscope. The microscope was used at the highest resolution of 400 times magnification. The picture was taken with a Nikon camera attached to the microscope.

Results

The average hardness for the specimens before heat treatment is shown in Figure 1. The average hardness is consistent for all of the specimens which meant the bar stock they were cut from had a uniform hardness and alloy consistency throughout the bar. The alloy steels are slightly harder than the plain carbon steels. 6150 is the hardest steel while 1020 steel is the least hard. This correlates with the amount of carbon present in each steel.
The hardness values after the specimens were treated are shown in Figure 2. The water quenched specimens are all harder than their air cooled counterparts. Rapid quenching caused harder phases such as martensite and cementite to form and thus a higher hardness. Higher hardness is still closely related with the amount of carbon however 1044 water quenched steel is almost as hard as 6150 water quenched.
Figure 3 shows the change in hardness from the initial state of the bar. The water quenched specimens had a significant increase in hardness except for D2 steel. All of the air cooled specimens lost hardness from the bar state. 1044 steel was the most hardenable steel.

![Hardenability of Steel](image)

Figure 3

The etched microstructure for 1020, 1044, 6150, and D2 are shown in Figures 4, 5, 6, 7 respectively. The air cooled state and the bar state are very similar for all of the steels. D2 steel has very little change in microstructure which explained why the hardness did not change with heat treatment. 1020 water quenched steel has a large increase in pearlite to go with the increase in hardness. The microstructure for 1044 water quenched steel had largest change as long as the highest increase in hardness. While at the current resolution only a high density of pearlite is visible but based on the hardness some martensite and bainite must have formed. Martensite must also have contributed to the high hardness for 6150 water quenched.

![Microstructure Images](image)

Figure 4
Conclusion

The study shows a firm relationship between hardness and the microstructure. For all of the steels tested rapid quenching causes the most significant change in microstructure as well as increasing hardness. D2 steel did not show much affect from the process of heat treatment because of the low amount of carbon. At a much higher temperature D2 steel should have better performance during heat treating.

All of the air cooled steels lost hardness from the bar state. This shows that air cooling provided a form of tempering that causes the materials used to be softer than the original form.
References

Displacements Caused by Eddy Currents Induced During Magnetic Resonance Imaging

Yuwen Mei and Bradley J. Roth

Faculty Advisor: Bradley Roth
Department of Physics
Oakland University

Abstract

“Lorentz effect imaging” has been proposed as a method to detect biocurrents using MRI. In the presence of a strong magnetic field, a biocurrent results in a Lorentz force that causes the nerve to move. If this displacement is large enough, an artifact results in the MRI signal. Truong and Song measured this effect when imaging the arm of someone whose median nerve was stimulated. However, their signal could be caused by a combination of fields and displacements due to biocurrents and eddy currents. Roth and Basser analyzed Lorentz effect imaging theoretically, and found the displacement of the median nerve due to biocurrents is 13 nm at most. Because MRI requires the use of rapidly changing gradient magnetic fields, eddy currents are induced in the tissue that also are subject to a Lorentz force. In this work, we find

\[
\frac{\sigma G B_0 R^4}{64 \mu}, \text{ where } G \text{ is the rate of change of the magnetic field gradient, } B_0 \text{ is the static magnetic field, } \sigma \text{ is the electrical conductivity, } R \text{ is the arm radius, and } \mu \text{ is the shear modulus.}
\]

With realistic parameters, the displacement is calculated to be 5.8 nm.

Introduction

Magnetic resonance imaging (MRI) has been used for more than 30 years, but only recently has it been explored as a way to detect neural currents. The technique is not the same as BOLD (Blood Oxygen Level Dependent) imaging during functional MRI. While BOLD images neural activity indirectly by detecting the hemodynamic response to the metabolic activity of neurons, it does not directly detect the neural current [1].

Recently, Truong and Song [2] proposed a technique, which they call “Lorentz effect imaging,” to detect neural currents. When exposed to a static magnetic field, biocurrents are subject to a Lorentz force that can cause the current-carrying nerve to move. Because of the gradient field used in this technique, the nerve is displaced into an adjacent region having a different magnetic field strength. Such a displacement can dephase the spins of the object in proportion to the amplitude of the gradient, which results in an artifact in the MR signal. Truong and Song [2] performed an experiment on a human median nerve using this technique, and found that with “a series of oscillating gradients (with positive and negative lobes and the same amplitude and duration) in synchrony with the neural stimulation”, they could detect neuroelectric activity in vivo by MRI with a high spatial and temporal resolution.

Roth and Basser [3] analyzed this experiment theoretically and estimated the displacement to be 13 nm at the most, which is too small to explain the MRI signal observed by Truong and Song [2]. One alternative explanation for their observation is that they were...
detecting displacements caused by eddy currents induced in the arm. Eddy currents are induced by the rapid change of the gradient magnetic field when it is turned on or off. In this work, our goal is determine whether the displacements due to eddy currents are larger or smaller than the displacements due to the neural biocurrents, and if they could make a significant contribution to the MR signal.

**Methods**

Consider a cylindrical conductor of radius of $R$ and conductivity $\sigma$ that models a human arm during MRI. We assume a homogeneous and isotropic conductivity for the arm, but a more accurate calculation would account for the heterogeneous conductivity including bones and anisotropic muscle. With the rapid change of the gradient magnetic field, eddy currents with current density $J$ are induced in the arm. In the presence of a static magnetic field $B_0$, these eddy currents are subjected to a Lorentz force $F = J \times B_0$. These forces then result in a mechanical displacement of the tissue. In addition to the Lorentz force, there are two more physical forces included in our model. One is the pressure $p$ that is caused by the incompressible fluid and the other is the shear force that is characterized by tissue’s shear modulus $\mu$.

![Diagram of eddy currents and forces](image.png)

*Fig. 1. Cross section of a cylindrical conductor with radius of $R$ that models a human arm. a) The gradient magnetic field. b) Eddy currents are induced with current density $J$ in the $z$ direction due to the gradient. Under the static magnetic field $B_0$ in the $y$ direction, the eddy currents are subjected to the Lorentz force $F$ in the $x$ direction.*
Assume that the static magnetic field $\mathbf{B}_0$ is in the $y$ direction (perpendicular to the arm, as in Truong and Song’s experiment), and the gradient magnetic field $\mathbf{B}$ is given by $B_y = G_y$, $B_x = G_x$, and $B_z = 0$ (Fig. 1a). When the gradient field changes with time ($\dot{G} = dG/dt$), an electric field $\mathbf{E}$ is induced in the arm by Faraday’s law of induction

$$E_z = \frac{\dot{G}}{2} (x^2 - y^2).$$

The current density $\mathbf{J}$ in the arm is given by Ohm’s law as $\mathbf{J} = \sigma \mathbf{E}$. The Lorentz force per unit volume, $\mathbf{F} = \mathbf{J} \times \mathbf{B}_0$, is then directed in the $x$ direction (Fig. 1b) with a magnitude of

$$F_x = -\frac{\sigma \dot{G} \mathbf{B}_0}{4} r^2 (\cos 3\theta + \cos \theta); \quad F_\theta = \frac{\sigma \dot{G} \mathbf{B}_0}{4} r^2 (\sin 3\theta - \sin \theta).$$

To obtain the displacement of the tissue, we must solve equations from the theory of elasticity [4]. We assume the net force per unit volume is zero (steady state). Thus, the divergence of the stress tensor,

$$\tau_{ij} = -p \delta_{ij} + 2\mu \varepsilon_{ij} + T_{ij},$$

gives Navier’s equation [3,4]

$$-\frac{\partial p}{\partial r} + 2\mu \left( \frac{\partial \varepsilon_{rr}}{\partial r} + \frac{1}{r} \frac{\partial \varepsilon_{r\theta}}{\partial \theta} + \frac{\varepsilon_{rr} - \varepsilon_{\theta\theta}}{r} \right) + F_r = 0,$$  

$$-\frac{1}{r} \frac{\partial p}{\partial \theta} + 2\mu \left( \frac{\partial \varepsilon_{r\theta}}{\partial r} + \frac{1}{r} \frac{\partial \varepsilon_{\theta\theta}}{\partial \theta} + \frac{2\varepsilon_{r\theta}}{r} \right) + F_\theta = 0.$$

Since the object of interest is cylindrical, all of the equations are expressed in cylindrical coordinates (independent of $z$, thus becoming polar coordinates). The displacement of the tissue, $\mathbf{u} = (u_r, u_\theta)$, is related to the strain tensor $\varepsilon_{ij}$ by [4]

$$\varepsilon_{rr} = \frac{\partial u_r}{\partial r}; \quad \varepsilon_{r\theta} = \frac{u_r}{r} + \frac{1}{r} \frac{\partial u_\theta}{\partial \theta}; \quad \varepsilon_{r\theta} = \frac{1}{2} \left( \frac{1}{r} \frac{\partial u_r}{\partial \theta} + \frac{\partial u_\theta}{\partial r} - \frac{u_\theta}{r} \right).$$

If the tissue is incompressible ($\nabla \cdot \mathbf{u} = 0$), then the radial and azimuthal components of the displacement can be represented by the spatial derivatives of a stream function $\psi$ [3]

$$u_r = -\frac{1}{r} \frac{\partial \psi}{\partial \theta}; \quad u_\theta = \frac{\partial \psi}{\partial r}.$$
If the surface of the cylinder is stress-free, then $\tau_r$ and $\tau_\theta$ are zero at $r = R$.

The solution of Navier’s equation subject to the boundary condition is

$$p = \frac{\sigma \dot{B} B_0 R^3}{24} \left[ -3 \left( \frac{r}{R} \right)^3 + \frac{4}{3} \left( \frac{r}{R} \right) \right] \cos \theta, \quad (8)$$

$$\psi = \frac{\sigma \dot{B} B_0 R^5}{192 \mu} \left[ \left( \frac{r}{R} \right)^5 - 4 \left( \frac{r}{R} \right)^3 + \frac{3}{5} \left( \frac{r}{R} \right) \right] \sin \theta - \left[ \left( \frac{r}{R} \right)^5 - 2 \left( \frac{r}{R} \right)^3 \right] \sin 3\theta \right\}. \quad (9)$$

The radial and azimuthal displacements are

$$u_r = \frac{\sigma \dot{B} B_0 R^4}{192 \mu} \left[ - \left( \frac{r}{R} \right)^4 + 4 \left( \frac{r}{R} \right)^2 - 3 \right] \cos \theta + \left[ 3 \left( \frac{r}{R} \right)^4 - 6 \left( \frac{r}{R} \right)^2 \right] \cos 3\theta \right\}, \quad (10)$$

$$u_\theta = \frac{\sigma \dot{B} B_0 R^4}{192 \mu} \left[ 5 \left( \frac{r}{R} \right)^4 - 12 \left( \frac{r}{R} \right)^2 + 3 \right] \sin \theta - \left[ 5 \left( \frac{r}{R} \right)^4 - 6 \left( \frac{r}{R} \right)^2 \right] \sin 3\theta \right\}. \quad (11)$$

The displacement at the center of the cylinder is

$$u_x = -\frac{\sigma \dot{B} B_0 R^4}{64 \mu}. \quad (12)$$

**Results**

The distribution of displacement is shown in Fig. 2. There are three parallel regions of displacements, with the top and bottom regions displaced in an opposite direction to the center region. We can estimate the magnitude of the displacement at the center of the arm, $\frac{\sigma \dot{B} B_0 R^4}{64 \mu}$, by using appropriate values of the parameters. Truong and Song [2] use a static magnetic field $B_0$ of 4 T, and a gradient $G$ with amplitude of 36 mT/m. The rise time of the gradient field is 240 $\mu$s, which results in $\dot{G} = 150$ T/m/s [5]. The shear modulus of soft tissue is about $10^4$ Pa, the conductivity is 1 S/m and the radius of the arm is 0.05 m [3]. With these values, the displacement due to eddy currents is 5.8 nm.
In addition, we have also analyzed the situation where the static magnetic field is applied along the z-axis, as might occur in many MRI experiments. The methods are similar to those presented earlier for the magnetic field perpendicular to the arm, and here we only present the results (Fig. 3)

\[
u_r = -\frac{\sigma \dot{G} B_0 R^4}{48 \mu} \left( r \left( \frac{z}{R} \right) \right),
\]

(13)

\[
u_z = \frac{\sigma \dot{G} B_0 R^4}{48 \mu} \left( \left( \frac{z}{R} \right)^2 + 2 \left( \frac{r}{R} \right)^2 - 3 \left( \frac{r}{R} \right)^4 \right).
\]

(14)

In this case, the displacement increases along the z direction and depend on r and z but not Θ. Determining the maximum displacement would require knowing the full distribution of the magnetic field gradient distribution. Using the same parameters as the previous case, we estimate the displacement at \( r = R, z = 0 \) to be

\[
u_z = \frac{5 \sigma \dot{G} B_0 R^4}{192 \mu}.
\]

(15)

This is nearly a factor of two larger than in the case analyzed earlier.
Discussion

Our calculation shows the displacement due to eddy currents is approximately 5.8 nm at the center of the cylinder. The maximum displacement is about 10 nm, which is located underneath the surface of the arm at $\theta = 90$ and 270 degrees. The values are extremely small. In comparison, Roth and Basser [3] found the displacement of neural action currents is less than 13 nm. Although the displacements are similar in these two cases, the phase shift induced in the MR signal ($\gamma G u \delta$, with $\gamma$ being the gyromagnetic ratio) is much less for the eddy currents, because they only exist during the brief time $\delta = 240 \mu s$ that the gradient turns on, rather than during the 1 ms duration of the action potential. This may explain why Truong and Song observed no signal when the electrical stimulus that excites the nerve was delayed by 50 ms relative to the magnetic field gradient, suggesting that the signal is associated with the neural activity and not the gradient.

Another possible source of artifact in an experiment to measure the Lorentz force from action currents is the magnetic field produced by the eddy currents. Using Ampere’s law, we find that the peak magnetic field produced by eddy currents is $\mu_0 \sigma G R^3 / 24$, where $\mu_0$ is the permeability of free space ($4\pi \times 10^{-7}$ T m/A). Using the parameters mentioned earlier, the magnetic field is 1.0 nT, and the phase shift ($\gamma B \delta$) is 0.0037°. A final source of artifact is the magnetic field produced by the nerve action currents. Roth and Basser [3] estimate this magnetic field to be on the order of 13 nT or less, resulting in a phase shift of 0.2°.

Roth and Basser (2009) may have overestimate the phase shift caused by the Lorentz force acting on action currents, because they used a duration $\delta$ of 5 ms (the duration of the gradient pulse) rather than 1 ms (the approximate duration of the action potential). In this paper, we use $\delta = 1$ ms for action current.

---

Fig. 3. The displacements produced by the Lorentz force while the static magnetic field is applied along the $z$ direction. The arrow length is exaggerated compared to the predicted displacements. A cross section in the $r$-$z$ plane is shown, with the center line being $r = 0$, the top edge $r = R$, and the left and right edges $z = \pm R$. 

---

15 Roth and Basser (2009) may have overestimate the phase shift caused by the Lorentz force acting on action currents, because they used a duration $\delta$ of 5 ms (the duration of the gradient pulse) rather than 1 ms (the approximate duration of the action potential). In this paper, we use $\delta = 1$ ms for action current.
In summary, four mechanisms may contribute to the signal in experiments such as that performed by Truong and Song [2]: 1) the magnetic field caused by action currents, 2) the magnetic field caused by eddy currents, 3) the Lorentz force caused by action currents, and 4) the Lorentz force caused by eddy currents. The displacements, magnetic fields, and phase shifts for these four mechanisms are listed in Table 1. The largest effect is the magnetic field of action currents, and the smallest is the Lorentz force on eddy currents. Perhaps the most important conclusion is that all these effects are very small, with phase shifts of less than a few tenths of a degree.

Table 1

<table>
<thead>
<tr>
<th></th>
<th>B (nT)</th>
<th>u (nm)</th>
<th>Phase shift (°)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Magnetic field of action currents</strong></td>
<td>13</td>
<td>—</td>
<td>0.20</td>
</tr>
<tr>
<td><strong>Lorentz force of action currents</strong></td>
<td>—</td>
<td>13</td>
<td>0.0072</td>
</tr>
<tr>
<td><strong>Magnetic field of eddy currents</strong></td>
<td>1.0</td>
<td>—</td>
<td>0.0037</td>
</tr>
<tr>
<td><strong>Lorentz force of eddy currents</strong></td>
<td>—</td>
<td>5.8</td>
<td>0.00078</td>
</tr>
</tbody>
</table>

We offer some notes of caution when interpreting these results. First, all four mechanisms listed in Table 1 may in fact overestimate the phase shift. For both action currents and eddy currents, the phase shift of one sign is followed promptly by a similar phase shift of the opposite sign. For action currents, these are the depolarization and repolarization phases of the action potential, and for eddy currents this is the turning on and turning off of magnetic field gradients. Second, Roth and Basser [3] stress that their analysis of action currents result in upper limits, because they consider a median nerve that is maximally activated (all the axons in the nerve are simultaneously active). However, Truong and Song stimulated below the motor threshold [2], and probably excited only a small fraction of the axons. Wijesinghe and Roth [6] estimated the phase shifts caused by the magnetic field of action currents using experimental data, and found phase shifts on the order of 0.01° or less, which is smaller than in Table 1 by a factor of 20. This could make the contributions of action currents and eddy currents similar. Third, the effects due to eddy currents are very sensitive to the arm radius, whereas the effects due to action currents are insensitive to that parameter. We used a radius of 5 cm, which would be appropriate for the upper arm but not for the thinner forearm. A smaller arm would result in a smaller eddy current contribution. Fourth, for eddy currents we consider the displacement at the center of the cylinder. The displacement at the edge of the cylinder is almost twice as large.
Acknowledgement

This research was supported by the National Institutes of Health, R01EB008421.

References


Muon Transmission Through Lead

Shawn Zaleski

Faculty Advisor: Chris Pearson
Department of Computer Science, Engineering and Physics
University of Michigan Flint

Abstract

A cosmic ray detector, that was originally constructed to study Forbush Decrease, was converted to study muon transmission through lead. Cosmic rays from outside the earth interact with molecules in the earth’s upper atmosphere, creating a nearly constant muon flux at the surface of the earth. The muons are detected via a scintillation device, which emits photons as the muons pass through. The photons then enter photomultiplier tubes to create electric signals for the counting circuitry. It is possible to scatter muons from their trajectory by passing them through lead. This experiment compares the muon flux between an unshielded detector, to that of a shielded detector with varying thicknesses of lead. The decrease in flux due to the lead shielding appears to depend linearly on the thickness of the shield.

Introduction

A large majority of the muons that reach the surface of the earth are generated in cosmic ray showers that occur in the upper atmosphere. These cosmic ray showers are triggered when a primary cosmic ray, typically a proton or alpha particle, collides with a molecule such as oxygen or nitrogen (Bettini 28-29). This collision causes a shower consisting of three components: nucleonic, electromagnetic, and mesonic. The nucleonic component is driven by nucleons, neutrons and protons, produced in the primary collision that collide with other molecules and continue producing other nucleons. The electromagnetic component, sometimes referred to as the “soft” component, is driven by neutral pion decays. The neutral pions are also produced in the primary collision, these pions decay into gamma rays which further decay into electron-positron pairs. This is termed soft because this component of the shower is absorbed easily by materials. The mesonic, also referred to as the “hard” component, is driven by the decay of charged pions that are produced in the primary collision as well. These charged pions decay via the weak nuclear force, into muons, anti-muons, and associated muon neutrinos and anti-neutrinos by the following interactions (Serway, Moses, Moyer 561 and Griffiths 28-29):

\[ \pi^- \rightarrow \mu^- + \bar{\nu}_\mu \]
\[ \pi^+ \rightarrow \mu^+ + \nu_\mu. \]

This component is known as the hard component as these particles typically travel through most materials, even higher Z materials such as lead.

The lifetime of the muon is approximately 2 microseconds while the lifetime of the pion is approximately 26 nanoseconds. In addition to this the particles are travelling at relativistic velocities leading to effects of time dilation which increase the mean lifetime of the particles. This leads to many more muons surviving the descent to earth before decaying than pions (Bettini 61). Thus the particles of interest are the muons and anti-muons produced in the above reactions. Some of these decay on their way to the earth’s surface by the weak nuclear force into
electrons, positrons, and associated electron neutrinos and anti-neutrinos given by the following reactions (Kane 146):

\[
\begin{align*}
\mu^- & \rightarrow e^- + \nu_\mu + \bar{\nu}_e \\
\mu^+ & \rightarrow e^+ + \nu_e + \bar{\nu}_\mu.
\end{align*}
\]

Figure 1 Shows a diagram of a typical cosmic ray shower (“Cosmic Ray Shower”).

**Experiment**

As stated previously, this experiment compares the muon flux through an unshielded detector to that of one shielded by lead. Lead bricks of dimensions 8” x 4” x 2” were placed vertically over the detector such that the surface outlined by the 4” x 2” face was placed over the detector thereby minimizing the amount of lead needed for the experiment. Lead was chosen as the medium which the muons would pass through for several reasons. Lead is dense and has a large atomic number thereby increasing the chances of a muon being deflected by the electric force from coming within close proximity of the electrons within the lead (Bettini 30). Also lead is common and more easily obtained than other heavy elements. A steel column was constructed to support the lead over the detector. The column was designed to provide a maximum height of 80 inches. The detector sits directly beneath the column which is supported by cinder blocks.

The detector consists of two scintillator panels, two photomultiplier tubes, a counting circuit, and a computer. The scintillator panels are organic materials which are doped with various other agents to polymerize them. As a muon strikes the panel, it scintillates, emits a photon. The panels are wrapped in aluminum foil and electrician tape around the foil to hold the panels up to the photomultiplier tubes. This also produces a “light tight” seal to prevent ambient light within the environment of the detector from producing false counts. The photon enters the photomultiplier tube and strikes the first of many photocathodes releasing electrons via the photoelectric effect. As the photon strikes subsequent photocathodes more and more electrons are released and when the electrons reach the end of the photomultiplier tubes an electrical signal is sent to the counting circuit which registers a muon count.
The counting circuit may be set to record single counts from only one panel and photomultiplier tube, or may be set on the coincidence setting when a count is registered from both photomultiplier tubes simultaneously. In this experiment the coincidence setting is preferable as it allows for the trajectories of the muons through the lead to be better known which will be discussed shortly. However the individual setting allows for troubleshooting of each photomultiplier tube separately. The counting circuit is connected to a computer via USB, which timestamps the event of the muon detection. One other advantage to using the computer besides the timestamp feature is that it allows for many more events to be counted. The counting circuit only has a 3 digit display this only allows for 999 counts to be counted before it starts over at 000. The computer allows up to 999,999 events to be counted, which is advantageous for experiments involving larger panels which will allow for many more possible trajectories of the muons.

The panels were cut to the dimensions of ¼” x ¼” x ¼” to minimize the amount of space needed to perform the experiment as well as to maximize the amount of lead in the trajectory of the muons. The panel separation plays an important role in the amount of muons that are detected as well. All of the muons that pass through the detector pass through a solid angle. The maximum solid angle occurs at the top of the brick that is at the top of the column of bricks. Thus in order to know where the maximum solid angle occurs it is important to know how many bricks will be used. The height of the bricks forms a leg of a right triangle that allows for an approximation for the panel separation. The equation that was used to determine the panel separation is:

$$d = \frac{8nx}{(1 - \frac{x}{2})}$$

where n is the number of bricks, x is the side length of the panel, and d is the separation of the panels. The number of bricks that was chosen was 4 bricks initially, giving a panel separation of approximately 9” after calculation.

Figure 2 shows the PMTs and the counting circuit underneath the base for the support tower for the lead.

The experiment proceeded as follows. The detector was placed under the steel column and one lead brick was added over the detector. Data was collected over a five day span. The counter was reset and another data collection over another five days was taken. The time period of collection is long to allow for enough muons to be detected such that the change in muons as lead is added over the detector is outside of the allowed error for a counting experiment. This continued until completion of the fourth brick. After the fourth brick collection was taken, a background collection was taken without any bricks shielding the detector. The reason that the background was collected last was that collections taken in a previous experiment involving this
detector were essentially constant, only fluctuated statistically by several percent even over longer collections. Unfortunately, as will be seen in the discussion of the results, the background data did not fit with the expected number of muon counts compared to the collection with one brick shielding the detector. The experiment was redesigned due to this and time constraints for further data collection.

The detector panels were adjusted to approximately 6.85” of separation to allow for more muon counts over a shorter time span as well as shielding for fewer bricks. In this case data was collected over approximately two days per collection and the maximum number of bricks to be used was three. Also background collections were taken in between shielded collections to attempt to better account for the change in background muon flux. The rest of the collection process for this stage of the experiment is exactly the same as the previous stage.

Results

Table 1 shows the results of the first set of data collections. It was found that for one, two and three bricks shielding the detector the change in muon flux between these is very reasonable and there is significant shielding. However, the flux through four bricks compared to the three brick trial increased. This could be due to an unusually large number of muons that would be statistically unlikely. It could also be that the equation used to calculate the panel separation may not be accounting for something resulting in the larger than expected muon a flux. Table 1 also shows that the background muon flux is less than the muon flux through the detector shielded by one lead brick. Possible explanations for this behavior is that there could have been a larger than normal muon flux during the first collection. It is also possible that the background muon flux changes more drastically than expected. Because the background collection did not match the general expected behavior the experiment was redesigned as stated above.

<table>
<thead>
<tr>
<th>Trial</th>
<th>Start Date</th>
<th>End Date</th>
<th>Counts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st brick</td>
<td>3/24/10</td>
<td>3/29/10</td>
<td>139</td>
</tr>
<tr>
<td>2nd brick</td>
<td>3/29/10</td>
<td>4/3/10</td>
<td>124</td>
</tr>
<tr>
<td>3rd brick</td>
<td>4/5/10</td>
<td>4/10/10</td>
<td>114</td>
</tr>
<tr>
<td>4th brick</td>
<td>4/12/10</td>
<td>4/17/10</td>
<td>120</td>
</tr>
<tr>
<td>Background</td>
<td>4/19/10</td>
<td>4/24/10</td>
<td>133</td>
</tr>
</tbody>
</table>

Table 1 shows data of first set of data collections for muon flux.

Table 2 and figure 3 show the results from the second set of data collections. It was found that there is approximately an 8% decrease in muon flux from the average background flux per each brick that is added to shield the detector. The first brick shows a flux of 114 muons where the mean background collected was 123 muons. The change in muon flux, 9 muons, is less than the standard deviation of approximately 11 muons. This does not suggest significant shielding by one brick, however the percentage change in flux was 7.3%. However the following two trials were well outside of the standard deviation from the mean, with relative changes in muon flux of 16.2% and 24.0% for 2 bricks and 3 bricks respectively.
<table>
<thead>
<tr>
<th>Trial</th>
<th>Counts</th>
<th>% change from mean background</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean background</td>
<td>123</td>
<td>-</td>
</tr>
<tr>
<td>1 Brick</td>
<td>114</td>
<td>7.3%</td>
</tr>
<tr>
<td>2 Bricks</td>
<td>103</td>
<td>16.2%</td>
</tr>
<tr>
<td>3 Bricks</td>
<td>93</td>
<td>24.0%</td>
</tr>
</tbody>
</table>

Table 2 shows the counts per muon trial and the respective change from average background flux.

![Count vs. Brick Number](chart.png)

Figure 3 displays a graph of the data from Table 2. The decrease in muon flux appears to be linear.

**Conclusion**

The second set of data would seem to suggest that lead does significantly shield the detector from muons. It would also suggest that the amount of lead could shield a detector from muons by a predictable amount. According to the data given in table 2, it would suggest that for every 8” of lead added over the detector that approximately 8% of the background muon flux should be deflected. However further experiments would be needed in order to confirm these notions. Firstly, the detector would need to be setup with sufficient space to allow for a panel separation that allows for more than four lead bricks to provide shielding for the detector. With more bricks used, the shape of the curve in figure 3 will be more accurately observed. Secondly, it would be ideal to have a second detector over the lead to have a better knowledge of how many muons are actually travelling into the lead. This would allow for simultaneous knowledge of the background muon flux and the muon flux through the shielded detector. Also it would greatly reduce the uncertainty in data by being able to compare what is entering the lead to what is exiting. This would give a better interpretation as to whether or not there is a predictable correlation between the amount of lead used to shield the detector and the percentage of background muons that are deflected.
References


Griffiths, David. *Introduction to Elementary Particle Physics*. Weinheim, Wiley-VCH Verlag GbmH & Co. KGaA.


Chaotic Pendulum

Eric Christopherson

Faculty Advisor: Chris Pearson
Department of Computer Science, Engineering and Physics
University of Michigan Flint

Abstract

Following the paper by DeSerio¹, a chaotic pendulum was built to study nonlinear dynamics, including the determination of Poincare’ sections, fractal dimensions, and Lyapunov exponents. The pendulum is driven by a 200 pulse per revolution stepper motor running at constant angular velocity. The pulses also trigger data acquisition, with the pendulum angle θ and the angular velocity ω read at each pulse. A plot of 50,000 (θ, ω) phase points corresponding to one phase of the drive system produces a Poincare´ section. Thus, Poincare´ sections are experimentally available, one for each drive step. Each illustrates the fractal geometry of the chaotic attractor. Viewed successively, they demonstrate the stretching of phase point space typical for chaotic motion. Results for several pendulum damping conditions are presented and compared.

Introduction

The essence of science is predictability. Scientific theories stand or fall according to whether predictions are found to agree with detailed, quantitative observations. Such successes are possible because most of the basic laws of nature are deterministic, meaning they allow us to determine exactly what will happen next from the knowledge of present conditions. One of the most predictable of all scientific theories is periodic motion, characterized as a pattern of movement that repeats itself over and over again.

There are many different forms of periodic motion, the simplest of which is called simple harmonic motion, or SHM. SHM can be described as periodic motion that exhibits two essential characteristics. The first characteristic is that the motion can be described by a second order, linear differential equation with constant coefficients. A result of this characteristic is the superposition principle holds, meaning that when any two solutions are added together, the result will also be a solution. The second characteristic is that the period of motion is independent of the displacement from equilibrium.

The two characteristics a linear oscillator obeys are only true if the displacements from equilibrium are “small.” When the displacements are “large,” the appearance of nonlinear terms in the differential equation of motion occurs, and the solutions no longer obey superposition or exhibit amplitude independent periods. In this case, the excursions from equilibrium can grow into regions where the nonlinearity becomes important. When this happens, the predictable pattern of repeating oscillations gives way to chaos, or non-repeating motion characterized by a particular kind of unpredictability.

Even though chaotic motion is non-repeating and unpredictable, it is still completely deterministic. The unpredictability arises not from any inherent randomness but rather from an extreme sensitivity to initial conditions. Harmonic oscillators ultimately settle on some well defined state of motion, meaning if you momentarily perturb them from “steady state” motion, it will return to the “steady-state” according to a predictable “transient.” In contrast, if a nonlinear
oscillator is perturbed, the difference between the perturbed and unperturbed states of motion can grow exponentially.

Because of the non-linear terms in the equation of motion, there are no closed form solutions for $\theta$ vs. $t$, so the motion cannot be analyzed using traditional techniques. To quantify the non-linear motion, the techniques of Poincare´ sections, fractional dimensions, Lyapunov exponents, and Savitsky-Golay filters can be used.

The Poincare-Bendixson theorem states at least three time dependent variables are required for a system to display chaotic behavior. For this system, the three variables are $\theta$, the angle of the pendulum, $\omega$, how fast and in what direction the pendulum is moving, and $\phi$, the angle of the drive shaft. The triplet of values $(\theta, \omega, \phi)$ can be considered a single point $u$ in a three dimensional coordinate system called phase space. As the three variables change continuously with time, the phase point describing the system moves continuously through phase space. The path through phase space is called a trajectory, and a plot of a trajectory is called a phase plot.

The ultimate fate of a trajectory through phase space is called an attractor, or the single invariant curve that represents the motion. For linear motion, the trajectory specifies a single closed curve in phase space. Since the phase points cycle around a close curve, the motion is called a limit cycle. For non-linear motion, the trajectory never repeats, but the system still has an attractor, which cannot be a limit cycle; it must be a curve with infinite length. This implies that the chaotic attractor must be a set of points with an infinite length, but with no volume. This is only possible if the dimension of the attractor is not an integer. These are called fractional dimensions, or fractals.

Since the complete attractor of this system has an infinite length, only a subset of the attractor can be measured. However, a long trajectory is difficult to display two-dimensionally. One such way to represent a very long trajectory is with a Poincare´ section, a cross section of the full three-dimensional trajectory. In a Poincare´ section, both $\theta$ and $\omega$ are recorded as a single point every time the trajectory cuts through the $\theta - \omega$ plane corresponding to a single value of the drive phase $\phi$. Thus, once per drive period, a new $(\theta, \omega)$ point is added to the plot as the trajectory repeatedly cuts through that plane.

Non-linear motion is extremely sensitive to initial conditions, which can be described by an exponential growth in the phase-space separation of two different trajectories that start out very close to each other. At each point $u$ on the attractor there are three different directions that characterize the three different exponential time dependencies that can occur. So, for any phase point $u'$ close to $u$ that is parallel to one of these directions, the separation evolves with a single exponential time dependence, characterized by one of the three Lyapunov exponents.

The Lyapunov exponents can be either positive negative or zero. A negative value corresponds to a direction in which the separation decays over time, a zero value corresponds to constant separation, and a positive value corresponds to a separation growth over time. For chaotic motion, at least one of the exponents must be positive, because any two initial conditions will always have a component along the expanding direction, so the trajectories must diverge. Also, one of the exponents must be zero, because it represents a propagation where the trajectories differ only in time, so the average separation is constant.

The Savitsky-Golay filters are used to calculate the angular acceleration at every point along the trajectory. The filters are equivalent to a least squares fit to a polynomial for each data
point with a symmetric region surrounding the point. Then, a linear regression can be used to determine the experimental parameters of the angular acceleration.

**Experimental**

A schematic diagram of the apparatus is shown in Figure 1. The apparatus consists of a physical pendulum connected to a drive motor by a pair of springs, with same spring constant, a pulley, and string. The physical pendulum itself consists of an aluminum disk, a removable mass, a pulley, and axle. Attached to the pulley is a damping magnet that can be adjusted to various different distances to create both high and low damping conditions. The drive system consists of a stepper motor, an adjustable shaft, and controller. The apparatus is connected to a computer that sends a uniform pulse to the controller which creates a single angular step of the motor. As the stepper motor rotates, the spring it is connected to oscillates, keeping the pendulum moving. The pendulum angle and drive angle are read with every step of the motor and saved into an array.

To conduct different trials, the damping magnet is set at the desired distance. Any damping distance of 5 millimeters or less is considered high damping, while any damping distance of more than 5 millimeters is considered low damping. For low damping, the drive shaft was set to 5 centimeters, but during high damping, the drive shaft must be set to 6 centimeters.

Since a very long subset of the infinite trajectory of each attractor is needed to analyze the motion, the trials must be run for a significant length of time. Thus, overnight runs of 50,000 counts, were used. For all trials, a drive frequency of $0.825 \text{Hz}$ was used.

In order to analyze the chaotic motion according to the methods mentioned prior, the equations of motion must be determined. This is done by carefully looking at the system.

The pendulum angle $\theta$ is measured with the vertical position defined $\theta = 0$, with the clockwise direction taken to be positive. The drive phase $\phi$ is measured as the angle of the motor shaft, again with the vertical position defined $\phi = 0$. Because the drive frequency of the system can be adjusted, the motor shaft will rotate at a constant angular velocity $\Omega$. Thus, $\phi = \Omega t$ where at time $t = 0$ the motor shaft is assumed to be vertical. Also, the displacement $d$ of the end of the driven spring is $d = A \cos(\Omega t)$, where $A$ is the drive amplitude.

The total inertia of the disk and mass system can be determined by the individual moments of inertia of both the disk and the mass, together with the parallel axis theorem, to give $I = I_0 + I_m + mL^2$, where $I_0$ is inertia of the disk, $I_m$ is the inertia of the disk, $m$ is the mass of the removable mass, and where $L$ is the pendulum mass offset distance. Both $I_0$ and $I_m$ can be found using standard tables.

The two springs attached on either side of the pulley stayed stretched at all times, so we can determine the potential energy of a point at the end of each spring:
\[ V_s = \frac{1}{2} k (r \theta)^2 + \frac{1}{2} k (r \theta - d)^2 \]  

where \( k \) is the spring constant, and \( r \) is the pulley radius.

The pendulum mass always has a potential energy which is due completely to gravity:

\[ V_{mass} = mgL \cos \theta \]  

Then, combining Equations (1) and (2) gives the total potential energy of the spring and pendulum system.

Since potential energy is conservative, we know that conservative torque can be obtained by taking the derivative of the potential, with respect to \( \theta \):

\[ N_c = -2kr^2 \dot{\theta} + krd + mgL \sin \theta \]  

There are also non-conservative torques due to eddy currents and axle friction. The eddy current torque, which changes by moving the damping magnet distance, can be modeled like a viscous torque, \(-b \omega\). The axle friction torque, which always has the same magnitude, and which opposes the angular velocity can be modeled \(-b' \frac{\omega}{|\omega|}\). Combining these gives the total non-conservative torque:

\[ N_f = -b \omega - b' \frac{\omega}{|\omega|} \]  

Then, combining Equations (3) and (4) gives the total torque of the system.

To determine the equations of motion, we take Newton’s Second Law, in its rotational form, \( N = I \ddot{\omega} \), and solve for \( \dot{\omega} \). Thus, we have:

\[ \dot{\theta} = \omega \]  

\[ \dot{\omega} = -\Gamma \omega - \Gamma' \frac{\omega}{|\omega|} - \kappa \theta + \mu \sin \theta + \varepsilon \cos \phi \]  

\[ \dot{\phi} = \Omega \]  

where

\[ \Gamma = \frac{b}{I} \quad \Gamma' = \frac{b'}{I} \quad \kappa = \frac{2kr^2}{I} \quad \mu = \frac{mgL}{I} \quad \varepsilon = \frac{Akr}{I}. \]

When the Savitsky-Golay filters are used to fit the angular acceleration, experimental values for \( \Gamma, \Gamma', \kappa, \mu \) and \( \varepsilon \) are computed, which can be compared to the theoretical values obtained by measuring.

To determine the Lyapunov exponents, the algorithm of Eckmann and Ruelle² is used. Any point in the phase space can be written as \( \mathbf{u} = (\theta, \omega, \phi) \). Thus, the equations of motion are \( \dot{\mathbf{u}} = G(\mathbf{u}) \), where \( G(\mathbf{u}) \) has components of Equations (5) – (7).
The sensitivity to initial conditions manifests itself as an exponential growth in the phase-space separation between two trajectories that start very close together. The time evolution of this deviation one time step into the future is modeled by a Taylor series expansion about the point $\mathbf{u}_i$:

$$\delta \mathbf{u} = \mathbf{D}G(\mathbf{u})\delta \mathbf{u}$$

(8)

where $\mathbf{D}G(\mathbf{u})$ is the Jacobian matrix of $G$. The main calculation is to determine the Jacobian matrices at sequential points along a specific trajectory. The algorithm first finds all phases $\mathbf{u}_j$ on a single Poincaré section within some fixed region centered on $\mathbf{u}_i$. It then determines the deviations $\delta \mathbf{u}_j$ and the corresponding values one time step later.

The product of $N$ sequential Jacobian matrices gives the evolution of the smallest $\delta \mathbf{u}$ through $N$ time periods. For large enough $N$, product is predicted to have eigenvalues $\exp(\lambda_1 N \tau)$ and $\exp(\lambda_2 N \tau)$, where $\lambda_1$ and $\lambda_2$ are the Lyapunov exponents, and $\tau$ is the period divided by 10. The eigenvalues of this product are experimentally determined by $Q-R$ decompositions of each Jacobian matrix along the trajectory. The decomposition expresses a given matrix as a product $\mathbf{QR}$, where $\mathbf{Q}$ is an orthonormal matrix and $\mathbf{R}$ is an upper diagonal matrix. During the algorithm, each of the Jacobian’s is first multiplied on the right by the prior $\mathbf{Q}$ before performing the decomposition. Since every $\mathbf{R}$ matrix is upper diagonal, the eigenvalues of the product of $\mathbf{R}$’s is simply the product of the diagonal elements. This product is then equated to the predicted eigenvalues, giving us:

$$\lambda_k = \lim_{N \to \infty} \frac{1}{N \tau} \sum_{i=1}^{N} \ln R_{ik}$$

(17)

The attractor of our system is dimensionally the same as a protruded Poincaré section, so its fractional dimension (fractal) is equal to one plus the fractional dimension of any Poincaré section. Thus, we must find the fractional dimension of a Poincaré section, which is done by finding the capacity dimension. The capacity dimension is found by the standard box-counting algorithm. The box-counting algorithm divides the $\theta - \omega$ plane into a rectangular grid of $M \times M$ boxes. The number of boxes $N$ that contain at least one phase point is then counted. This procedure is repeated over and over again as $M$ is increased, which makes the grid boxes smaller and smaller. The capacity dimension is then computed by taking the slope of the log $N$ vs. log $M$ graph, in limit as $M \to \infty$. 
Results

Table 1 shows the physical parameters measured for this system.

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pendulum mass, m</td>
<td>14.7 g</td>
</tr>
<tr>
<td>Pendulum mass offset, L</td>
<td>4.8 cm</td>
</tr>
<tr>
<td>Disk mass, M</td>
<td>119.1 g</td>
</tr>
<tr>
<td>Disk diameter</td>
<td>9.5 cm</td>
</tr>
<tr>
<td>Pulley radius, r</td>
<td>1.5 cm</td>
</tr>
<tr>
<td>Spring Constant, k</td>
<td>2576 dyne/cm</td>
</tr>
<tr>
<td>Moment of Inertia without m, $I_0$</td>
<td>1343.5969 g cm$^2$</td>
</tr>
<tr>
<td>Moment of inertia with m, $I$</td>
<td>1683.9432 g cm$^2$</td>
</tr>
</tbody>
</table>

Table 1 Physical Parameters

Graph 1 shows the data for the driven pendulum going through chaotic motion, with a damping distance of 5 mm.

![Theta vs. Time Graph]

Graph 1 $\theta$ vs. $t$ for high damping

Form this graph, we can clearly see that for this period of time, the motion of the pendulum is chaotic and does not have any repeating pattern. Graphs for different damping distances show this same result.
The trajectories for these systems are confined to complex regions known as attractors. These attractors are represented visually by experimental Poincaré sections. Figure 2 shows the Poincaré sections for 5 mm damping. This is a two dimensional slice of the full three dimensional attractor. Each Poincaré section is a plot of 50,000($\theta, \omega$) phase points, one per drive cycle as the drive phase passes through a particular value of $\phi$. The ten Poincaré sections are equally spaced in the drive phase, and the drive phase increases by $\frac{1}{10}$ of a rotation going down each column and then continuing from bottom left to top right. Thus, the drive is $180^\circ$ out of phase between each section in the same row. A point or feature in one section can be followed as it moves or changes position and shape from one section to the next, stretching and folding until it thins out and ceases to exist.

Table 2 shows the results of overnight trials for four different damping distances.

<table>
<thead>
<tr>
<th>D (mm)</th>
<th>A (cm)</th>
<th>$\Gamma$ (s$^{-1}$)</th>
<th>$\Gamma'$ (s$^{-1}$)</th>
<th>$\kappa$ (s$^{-2}$)</th>
<th>$\mu$ (s$^{-2}$)</th>
<th>$\varepsilon$ (s$^{-2}$)</th>
<th>$d_0$</th>
<th>$\lambda_1$ (s$^{-1}$)</th>
<th>$\lambda_2$ (s$^{-1}$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>5</td>
<td>0.10</td>
<td>1.88</td>
<td>6.93</td>
<td>40.33</td>
<td>14.20</td>
<td>1.08</td>
<td>0.944</td>
<td>-0.544</td>
</tr>
<tr>
<td>7</td>
<td>5</td>
<td>0.17</td>
<td>1.52</td>
<td>8.84</td>
<td>57.04</td>
<td>15.44</td>
<td>1.06</td>
<td>0.720</td>
<td>-0.791</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td>0.37</td>
<td>1.50</td>
<td>9.04</td>
<td>57.37</td>
<td>17.89</td>
<td>1.12</td>
<td>0.597</td>
<td>-0.821</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>0.77</td>
<td>1.74</td>
<td>8.98</td>
<td>57.17</td>
<td>18.38</td>
<td>1.08</td>
<td>0.596</td>
<td>-0.833</td>
</tr>
<tr>
<td>avg.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8.45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>s.d.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.01</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In Table 2, $d_0$ is the capacity dimension, $\lambda_i$ are the Lyapunov exponents, and the values of $\Gamma, \Gamma', \kappa, \mu$ and $\varepsilon$ were calculated by the Savitsky-Golay filters, which can be compared to the theoretical values using the parameters in Table 1 and Equations (11): $\kappa = 6.88 \text{ s}^{-2}, \mu = 41.06 \text{ s}^{-2}, \text{ and } \varepsilon = 11.47 \text{ s}^{-2}(13.77 \text{ s}^{-2})$ for the first (last) two rows.

The experimental and theoretical values for $\kappa$ and $\varepsilon$ are not exact, but can be explained. There is a significant amount of error present in the theoretical values, mostly from errors in measurement. Every constant used to calculate $\kappa$ and $\varepsilon$ was measured, and thus there is error present. The most significant error comes from the calculation of the moment of inertia and the spring constant. However, these errors were not estimated, because the experimental values are themselves estimates, occurring from the least-squares fit in the Savitsky-Golay filters. Because of these errors, the values for $\kappa$ and $\varepsilon$ can be accepted.

The experimental and theoretical values for $\mu$ do not match. Originally, the overnight trials were conducted using the outer pulley of the apparatus, with $r = 2.5 \text{ cm}$. When doing this, an average value of $\mu = 58 \text{ s}^{-2}$ was obtained. Since this value did not agree with the theoretical
value for $\mu$, the trials were conducted again, this time using the inner pulley, with $r = 1.5\, cm$. When this was done, the value obtained was $\mu = 57.19\, s^{-2}$, with the exception 18 mm damping. Since the average value obtained for $\mu$ using both the inner and outer pulleys was approximately the same, the value obtained for 18 mm damping would normally be labeled a statistical outlier. But, since the 18 mm damping value has only a 1.78% difference from the theoretical value, it must be kept. There is no explanation as to why an agreement between the experimental and theoretical values for $\mu$ cannot be reached.

The values in Table 2 for $\Gamma$ are expected. As the damping magnet is brought closer to the disk, the viscous torque must increase, as the increasing values show that it does. The values for $\Gamma$ are not unreasonable, because the eddy current is expected to remain mostly constant. The values for $d_0$ showcase the fractional dimension of the attractors, because the values are all non-integers, the definition of a fractal.

**Conclusion**

In this experiment, a chaotic pendulum was built to study non-linear motion. Since the displacements from equilibrium are no longer “small,” the differential equation of motion can no longer be solved analytically, and hence the standard techniques used to analyze harmonic motion can no longer be applied. Therefore, new techniques must be employed. The techniques used in this experiment include Poincare´ sections, fractional dimensions, Lyapunov exponents, and Savitsky-Golay filters.

There are two hallmark characteristics of chaotic motion. One is fractal attractors and the second is extreme sensitivity to initial conditions. The fractal attractors were analyzed by looking at Poincare´ sections and the capacity dimension. The Poincare´ sections were used to analyze the phase-space of attractors. Viewing the Poincare´ sections sequentially clearly demonstrates the phase space mixing that occurs during chaotic motion, and features of the trajectory can be traced as they fold, stretch, and thin out of existence. The Lyapunov exponents show how fast the features of the trajectories drift apart, and provided a way to quantify the folding and stretching of the individual points in the phase-space. The capacity dimension was determined by the box-counting algorithm, and since they are all non-integers, the fractal dimension is clearly illustrated.

The Savitsky-Golay filters are a type of linear regression that was used to help create a fit of the angular acceleration of the system. They also helped to verify the two-term dissipation model, due to torque, which was proposed. The filters provided experimental values that did not agree exactly with theory. A majority of the values differed slightly from theory, so those values can be accepted and used in further experimentation. However, the experimental value calculated for $\mu$ was not in agreement with the theoretical value. By changing pulleys on the apparatus, an attempt was made to correct this disagreement.

The majority of the calculations were performed using programs in the LabView programming language that were obtained from the DeSerio website4. This experiment provided an excellent introduction to the field of non-linear dynamics, and all of the results obtained agreed with the theory of non-linear dynamics and chaotic motion.
References


4 The University of Florida Advanced Physics Laboratory web site: <www.phys.ufl.edu/courses/phy4803L>.
How Cyberanthropology Relates To MMORPGS and METAVERSES

Tim Elliott

Computer Science Major
Faculty Advisor: Michael Farmer, Ph.D.
University of Michigan-Flint

*This manuscript is a continuation of the author’s original work published in the 2009 Meeting of Minds Journal of Undergraduate Research.

Introduction

This paper is about virtual anthropology: the study of human cultures in virtual worlds, such as MMORPGs (Massive Multiplayer Online Role-Playing Games) and metaverses. The purposes of this paper are to explore virtual worlds as human cultures and the technologies that enable them. Also, I will discuss how virtual worlds are similar to and different from human cultures in the actual/real world. Virtual anthropology can divide into two main fields: cultural anthropology that deals with cultural/human aspects of virtual worlds, and computer science (software engineering/programming) that deals with technical aspects of virtual worlds. The design and development of virtual worlds could benefit greatly from the skill and knowledge of a virtual anthropologist because he or she would be someone that understands the cultural and technical issues of virtual worlds. He or she also would have an understanding of how virtual worlds impact human culture in the real world.

MMORPG’s

Most people use computers for surfing the Internet, checking their email, and writing papers. Today, these are ordinary uses for computers that one would think of. But many people use computer as gateways to other worlds, metaphorically speaking. This application of computers is more intriguing to me than the applications above it and it is a new way to look at computers as gateways to other worlds. MMORPGs and metaverses are collections of virtual societies in virtual worlds. The word “metaverse” comes from the novel Snow Crash by Neal Stephenson. In Snow Crash there is only one metaverse. But in the world today, there are many metaverses. The difference between MMORPG’s and metaverses is that MMORPG’s have user constraints and themes whereas with metaverses a user can create his/her own content but there might be certain regions that specialize in a particular theme. So, MMORPGs have a prepackaged purpose associated with them, such as fulfilling a fantasy. Metaverses are multi-purpose virtual worlds like Second Life because their residents use them for various purposes and not just for gaming such as, to socialize, to perform scientific research, to get an education, to commerce, and etc. Users of metaverses especially the residents of Second Life don’t wait for Linden Lab to come out with an expansion pack to get some new content because Second Life’s residents create the majority of its content this is unlike a MMORPG where the majority of its contents are created by the certain developer. Also, Second Life’s residents aren’t constrained by thematic restraints in creating content in Second Life unlike a MMORPG like Star Wars Galaxies (Sony Online Entertainment, 2002-2008).
Significance of Anthropology in MMORPGS and Metaverses

The methodology of anthropology, particularly socio-cultural anthropology is ethnographic research to get information on a particular culture in a society. An anthropologist observes the culture and participates in the culture. Software engineers develop use cases for designing software and improving software. Software engineers generate use cases to figure out what users are going to use it for and how they use it. Could ethnography of a virtual world produce use cases for that virtual world?

A virtual anthropologist would be a combination of a socio-cultural anthropologist and a software engineer. At the very least, virtual anthropologists would be socio-cultural anthropologists that would collaborate with a team of software engineers to create virtual worlds or to improve virtual worlds. I am talking about virtual anthropologists working for a company like Linden Lab doing development of virtual worlds. There are not only technical challenges but cultural issues too. That’s why it is so important to have anthropologists as well as computer scientists working on a virtual world project together.

Metaverses

“This is in contrast with an MMORPG (Massively Multiplayer Online Role Play Game) which typically has some sort of a mission or goal.” (Kapp, 2007). The culture of metaverse, such as Second Life, are more complex because their cultures get set by a combination of its residents, Linden Lab which is the creator of Second Life, and cultural influences like Science Fiction.

Cultural Influences like Science Fiction Make Virtual Worlds like SL a Reality

A metaverse is developed by its residents by the company that created it and it is inspired by outside influences such as the novel “Snow Crash” by Neal Stephenson (1992), the movie “Tron” by Walt Disney (1982), and the Holodeck in Star Trek (Wikipedia.org “Holodeck” 2009). A holodeck is a room that projects holographic simulations which creates a simulated reality. (Wikipedia.org “Holodeck” 2009). There is a common language among Second Life residents and it made up with common terms rolling off the tongues of old timers in Second life. That’s what makes Second Life a culture because it is an learned behavior and the language of Second Life is how its culture is transmitted like languages in other cultures. What separates the old timers of Second Life from newbies is the ability to speak it. (Rymaszewski et al, “Ch. 11: Who are you? Identity in the Virtual World”, 2008). Many of these terms originated from the outside influences that I have mentioned above.

The concept of the metaverse or metaverses has its roots in Neal Stephenson’s novel called Snow Crash. It is the very genesis of the word “metaverse”. (Wikipedia.org “Metaverse” 2009). Also, I believe the word “avatar” originated from Snow Crash. Even, there is a recreation of the nightclub from Snow Crash called “The Black Sun” in Second Life. (Rymaszewski et al, “Ch. 3: A Tour of Second Life”, 2008).

The terms “primitive” and “rez” originated from the movie Tron. Of course, primitives or “prims” are basic 3D shapes that are used to build objects. Rez means to appear in a virtual world or to make something appear in a virtual world. For example, creating a new prim is considered to be rezzing it or whenever a resident drags something out of their inventory in-world. Avatars can rez in-world also. The matter of fact, the day someone joined SL or first rezzed in-world is called their rezday. “Many residents treat their rezday as a Second Life

The concept of the Holodeck has inspired a couple of terms in SL such as grid and simulator. Like a holodeck, a simulator in SL runs simulations such as training simulations, and acting out plays. (Linden Research Inc. “secondlife.com: work” 2009). Without a stimulation running a holodeck looks like a grid and SL shows three axises: a x-axis, a y-axis, and a z-axis anytime you touch a corner of a prim or an object.

There are a couple differences between a holodeck in Star Trek: The Next Generation on the Starship Enterprise-D and SL like the users in a holodeck didn’t have avatars and holodecks weren’t networked. Therefore, the users of a holodeck had to dress up before they came into that holodeck according to the role that they were going to. Also, every user was going to participate in the simulation needed to be in the same holodeck was running that particular simulation like acting out a play. For example, Lt Commander Data played Ebenezer Scrooge in front of Captain Picard and Data was dressed as Ebenezer Scrooge in his pajamas and wearing his stocking hat. In another episode, Lt.Commander Data plays Sherlock Homes and Lt. Georgey Ford plays Wason. Lt.Commander Data and Lt. Georgey Ford were in the same holodeck because holodecks weren’t networked together so they couldn’t be in two different holodecks and participate in the same simulation. Unlike the users of holodecks, the residents of SL access the SL Grid through a SL compatible client or viewer on their computers and they can be at different physical locations in the real world. A grid is a server network that Second Life or a SL-style virtual world like the OpenSim Grid consists of. SL residents can either use SL Viewer: the client made by Linden Lab or Hippo_OpenSim_Viewer made by the Electric Sheep Company. For further information, see section VI.

The term “in-world” reminds me of the term “off-word” use in the television series franchise “Star Gate” The term “off-world” is used whenever a military team goes through the star gate at SGC (Star Gate Command) on Earth or from another home base to another planet on a mission. In Section IV, I said “But many people use computer as gateways to other worlds, metaphorically speaking.” Well, I actually have a Gateway computer instead of taking me “off-world” to other planet; it takes me “in-world” to SL and other virtual worlds (parallel universes or alternative realities)! How cool is that? I think that the coolest and perhaps weirdest thing
about virtual worlds is that in the terms of virtual worlds especially metaverses, science fiction is becoming reality.

**The Essential Cultural Difference between Metaverses and MMORPGs**

There is more complex social interaction in a metaverse than MMORPGs because the users of a metaverse are who define its culture for the most part. “A Metaverse is an online world in which there are no specific goals or objectives. It is a virtual world in which you create an avatar and then explore the world as that avatar. You are able to chat with others in the world and interact with their avatars (Kapp, 2007).”

In metaverses, their residents don’t pick sides or play against one another except in gaming regions and where there is competition in marketing and creating content. A group of friends can play a game that involves trying to kill each other then turn around and go to a nightclub to hang out together; this isn’t something that you would see in MMORPG because this type of interaction isn’t just possible in a MMORPG.

Also metaverses do not typically have non-player characters (characters that are computer generated). In a metaverse all the characters are tied directly to an actual person.” (Kapp, 2007). I have met a scientologist in SL and he recognized my SL first name “ThetaBeing” (theta being) is the old name for a spiritual being before L. Ron Hubbard came up with the word “thetan”. Whenever I see him in-world, we talk about the concepts of Scientology and how SL captures the creativity of the human spirit. We couldn’t talk about Scientology in a MMORPG like we can in a metaverse such as SL and a MMORPG doesn’t capture the creativity of the human spirit like a metaverse from the standpoint of the user. Therefore, metaverses show great promise and they are going to have a real impact on our culture.

**The Real World Impact That Virtual Worlds Like SL Have On Our Culture**

There are some real world applications for SL like: making real money and conducting real world business; educating and getting an education; performing live music; broadcasting live TV shows from within Second Life and shooting movies in SL (machinima); and falling in love and dating.

In a metaverse such as Second Life, there is an economy in which goods are either bartered or paid for with virtual monies such as Linden dollars (Kapp, 2007). In that aspect metaverses’ economies are similar to MMORPG’s. Except metaverses’ currencies are exchangeable with real money and it is an exchange rate like other currencies such as the U.S Dollar and the Euro. For example, you can buy Linden dollars with U.S dollars or some other currency. (Kapp, 2007). “Typically an inhabitant can create buildings, clothes, habitats or any other items they can imagine. A metaverse usually has some type of economy in which goods are either bartered or paid for with virtual monies. Many times those virtual monies are tied to an exchange rate based on “real” currency (i.e. the US Dollar or the Euro.) (Kapp 2007) There are real world companies like IBM that hold meetings, conferences, training sessions and do marketing in metaverses such as SL.

“Hundreds of leading universities and school systems around the world use Second Life as a vibrant part of their educational programs. Linden Lab works enthusiastically with education organizations to familiarize them with the benefits of virtual worlds, connect them with educational peers active in Second Life, and showcase their in-world projects and communities. A large, active education community—with hundreds of K-12 and higher education members—is engaged in Second Life. The Open University, Harvard, Texas State, and Stanford are just a
few of the many universities that have set up virtual campuses where students can meet, attend classes, and create content together.

Second Life has also proven a valuable professional development medium for educators. Organizations such as the NMC have fostered shared learning among educators and are networking, running in-world seminars, conferences and symposia on learning and creativity related to virtual worlds.” (Linden Research “Virtual Environments Enable New Models of Learning” 2009) The University of Michigan-Flint should follow suite and get an in-world campus.

There is a talk show in-world that is about the business aspects and the economics aspects of virtual worlds as well as Second Life and the show is called Metanomics. Robert Bloomfield, a business management professor that does interviews with business CEOs and other people that take virtual world seriously to find out how they are using virtual worlds. Also, he interviews policy makers to find out how the policies that they make effects virtual worlds and the developers of virtual worlds to see how these new business platforms unfold.

Conclusions

Anthropologists and computer scientists have different challenges to face. First off, Anthropologists need to acknowledge the existence of human cultures in virtual worlds and that cultures of virtual worlds are worth studying. Anthropologists need to become more tech savvy in order to conduct a ethnographies in virtual worlds. Anthropology has been traditionally non-technical field. While Computer Scientists are not used to the idea of building communities; they mainly think of virtual worlds as a bunch of computer networked together and the software enables that. Hopefully, anthropologists and computer scientists will learn how to work together to better the design of virtual worlds. My hope by writing this paper is to bring Anthropology and Computer Science into the twenty-first century. Also someday hope soon, I will be able to contribute to the Metaverse Roadmap and it is about the future of the metaverse. It was conceived by the Acceleration Studies Foundation. I want to make the metaverse a reality and the Metaverse Roadmap is about how industries will go about doing that!

Future Research

“The true meaning of metaverse is more about what it will become than what it is today. The vision is of a 3D Web (or better termed 3D enhanced web) where all digital information can be accessed and experienced via an avatar. So, it is the virtual universe comprised of all virtual worlds and interfaces to all digital data. The metaverse will also have a services such as currency exchange, trading transactions, 2D Web gateways and inventory storage.” (RightAsRain Rimbaud, 2008). But for today, virtual worlds are not interconnected so someone cannot go to from one virtual world to another with the same virtual world viewer except for Second Life, the Opensim (Opensimulator) Grid, and other Opensim-based servers. But it is still a work in progress and the Opensimulator server software is still in alpha stages of development so it’s very buggy. (MediaWiki, 2009) But as it move along in its development, someone will be more able to teleport to another Opensim virtual world or Second Life without having to log out from the virtual world that they teleported from and they have access to their inventory. It will be as easy as clicking a link on website to get to another website. This is called hypergriding and it’s
done by grid/regions administers adding virtual world links their maps as regions like in the picture below. (Osgrid.org 2008):

In the paragraphs below from the Open Source Metaverse, it speaks of avatars being agents. Agents are intelligent pieces of software that perform the specific actions automatically based on the user’s specifications.

“In the hypergrid model, we consider the 2D map of the virtual world as the equivalent of a web page. As such, a VW hyperlink is simply a region on that map. The default model of opensim-based virtual worlds already supports this concept of hyperlink, to some extent. When you teleport from one region to another via the map, chances are you are migrating your agent into a different opensim server. This migration is a glorified "agent transfer" that also exists, in rudimentary form, on the web when hypertext links are followed. The default model, however, imposes two very strong constraints on these hyperlinks: The entire map of regions is controlled by a central service known as the grid service, whose job is to provide a uniform view of the world to all of its regions. The only agents that can be transferred are those pertaining to users known to another central service, the user service; if the incoming user is not on that service’s database, the agent transfer doesn't go through. The hypergrid simply removes these two constraints.” (OSGrid.Org 2008)

“First, it allows individual opensim instances to add "neighbors" to their local map, shifting the control of the map down from the grid server to individual opensim instances (although hyperlinks can also be served by grid servers if grid admins so wish). In doing so, the world becomes a lot more interesting and varied. The map that you see in one opensim instance may be completely different from the map that you see after you teleport via an hyperlink. As an opensim administrator, you are free to define what other opensims you want to see on your map.” (OSGrid.org 2008)

“Second, it allows the transfer of agents pertaining to foreigner users, i.e. users who are registered elsewhere. Instead of assuming one central user service, the hypergrid assumes an arbitrarily large number of such services distributed all over the world. As such, when agents are transferred among hypergrided opensims, a lot more information is passed about the corresponding user. That information includes the collection of servers that the transferring user needs. (OSGrid.org 2008)
Usages of Hypergridding

Topology A is where someone has an opensim standalone region on their computer and it has its own maps of the links to the user’s favorite virtual worlds. Each user has their own virtual world on their computer with its own map. Under Topology B, there could be a group of friends and each of them have a virtual world with a common map that have links to all of their virtual worlds with a link to a virtual world that they all share with each other like a little community. Topology C is similar to a web site where there is an area for new users and another area for registered users. (OSGrid.org 2008) Someday, the Internet might evolve into the Metaverse. It means that it will consist of all virtual worlds and web content accessible via avatars.

References


Meaning and Understanding of Messages Received  
In Face-To-Face and Computer-Mediated Communication  

Theresa M. Nutten and Aarre Laakso  
Faculty Advisor: Aarre Laakso  
Department of Behavioral Sciences  
University of Michigan – Dearborn  

Abstract  
This study examines the transmission of meaning in messages received through face-to-face (F2F) communication as compared to those received through computer-mediated communication (CMC). A previous study (Adrianson & Hjelmquist, 1993), suggested that F2F communication is more meaningful to receivers because they are able to recall more information about the conversation than in CMC. The purpose of this study was to further investigate the transmission of meaning in messages received through different modes of communication by measuring a recipient’s ability to recall information received through instant messaging and face-to-face conversation. The prediction was that recipients of F2F communications would be able to recall more correct information about the intended messages than recipients of CMCs. The results support the hypothesis for some messages and not for others, suggesting that the content of a message may determine whether it would be optimally conveyed through F2F or CMC communications. Based on these findings, it is recommended that future research should explore which aspects of message content determine the optimal mode for transmission.

Introduction  
With an increase in Internet capabilities, it is no surprise that more people are communicating using computer-mediated media such as emails, instant messages, social networking sites, and text messages. Networking via the Internet has been essential not only in the workplace, but also for social connection. With the increasing use of computer-mediated communication, there is a greater need for information on the effects that this form of communication has on the meaning of a message as perceived by the receiver.

While little research has been done on this topic, there is much debate between theorists on the meaning of messages received in face-to-face (F2F) communication as compared to computer-mediated communication (CMC). Some theorists suggest that CMC is not as meaningful as F2F communication because the reduced visibility of the participants depersonalizes the message (Derks, Fischer, & Bos 768). Others propose that CMC should be more meaningful than F2F communication because reading text allows the receiver to retain more detailed information regarding the message (Adrianson & Hjelmquist 122).

In a comparison study, Adrianson and Hjelmquist examined the transmission of information through either F2F communication or CMC. Participants were paired, and the first participant, or sender of the message, was instructed to read a current newspaper article and summarize the text to the second participant, either though F2F communication or through CMC. The second participant, or receiver of message, was then instructed to ask any questions or clarify and discuss points of interest about the article they heard. Finally, the receiver was instructed to recall, written by participant two on paper, as much as possible about the article (Adrianson & Hjelmquist 123-124). Participants who received the communication via F2F
communication were able to recall more ideas than the participants who received the communication via CMC. Additionally, more questions were asked and more topics were introduced in F2F communications than in CMC (Adrianson & Hjelmquist 133). These results suggest that it may be possible to transmit more information through F2F communication than through CMC.

Many studies have shown that the more meaningful a sentence or other stimulus is, the easier it is to recall the information from long-term memory. In 1940, Roy Brener discovered that people are able to recall twice as many words when they form a meaningful sentence than when they are presented words in nonsense order (Brener). Another study found that patients with semantic dementia are able to recall words they understand well better than words that had become less meaningful over the course of the disease (Jefferies, Lambon Ralph, & Baddeley 624). The above examples are just two of the many studies that support the proposition that the more meaningful something is, the more likely a person will be able to recall it.

The purpose of this study is to further investigate the difference between F2F communication and CMC by measuring the content of messages received through these modes of communication. This was accomplished by measuring a person’s ability to recall the main topics of a message received through either instant messaging (IM, a form of CMC) or F2F conversation. The prediction is that messages received through CMC (IM) are less meaningful to the recipient than the same message would be if received via face-to-face communication.

**Method**

This study was adapted from the Adrianson and Hjelmquist (1993) study on memory and communication of texts. In summary, 48 participants each read a news article and summarized it for their partner. After discussing the content of the article, the participant who did not read the article was asked to write as much information about the article. The communication was scored in terms of the proportion of topics from the original news source that appeared in the recipient’s recall. See Figure 1.

**Figure 3: Schematic depiction of the method.**
Participants

Twenty-four dyads (48 Introductory Psychology students) were recruited using the University of Michigan-Dearborn Behavioral Sciences Department Subject Pool. Participants received credit for a course requirement in exchange for participation. As in the Adrianson & Hjelmquist study, dyads included both same-sex pairs and opposite-sex pairs. Participants included 20 males and 28 females, age range 18 to 29.

Materials

CMC sessions were based on instant messaging via Yahoo! Messenger. There were two source articles used in the study, both from a daily newspaper. Because Adrianson and Hjelmquist (1993) found that recipients were able to recall more ideas from a news text than from an editorial, this study used only news texts. The first article, “For-profit colleges haul in government aid”, came from the Detroit News in November of 2009. The article discusses the allocation of government loan money in public and private colleges and universities (referred to as ‘For-Profit’ for the remainder of this paper). The second piece, “In Denmark, ambitious plan for electric cars”, is an article from the New York Times (December 2009), which discusses future plans for hybrid vehicles in Denmark (referred to as ‘Denmark’ for the remainder of this paper).

Procedure

The procedure and scoring methods were adapted from the Adrianson and Hjelmquist (1993) study. Participants were randomly assigned partners with whom they were to communicate using (again via random assignment) either F2F or CMC. Participants may have known each other prior to this study through Introductory to Psychology classes, but participants who were obviously acquainted upon arrival were paired with other people. In both conditions, the experimenter instructed participants and distributed materials.

CMC sessions took place in a computer lab. Participants were in the same room but not facing their partners and not allowed to speak to each other during CMC trials. Either four or five pairs participated simultaneously in each session in the CMC condition. F2F trials took place in a classroom at two facing desks. Due to constraints on available room space, audio recording devices and personnel, one pair was tested at a time in a quiet room.

In both the F2F and the CMC conditions, the first participant (Participant 1) was randomly assigned one of the two articles to read. This person was then asked to summarize the article to his or her partner (Participant 2), providing as much information as possible. When Participant 1 had completed the summary, Participant 2 was instructed to ask any questions and discuss points of interest from the article. Participant 2 was then instructed to write a detailed summary of the article from memory, based on the information presented by Participant 1. Once the trial was completed, participants switched roles for the second trial (such that participant 2 read an article and summarized it for participant 1). The design is shown in Figure 2 for both CMC and F2F communications.
Figure 2. Experimental Design

Scoring

The initial analysis of all Participant 2 summaries, the researcher identified topics that occurred commonly in participant recall. The For-Profit article had eight topics. The Denmark article had nine topics.

The second analysis of all Participant 2 summaries, the researcher and a trained assistant scored the summaries in terms of the number of topics recalled by the recipient as a proportion of the number of topics found in the original text. A statement in the recall summary was counted as a topic match if the statement was a paraphrase of a statement in the original article or an identical quote. (A paraphrase consists of stating the ideas of the original message but using the participant’s own wording.)

Results

Table 1 presents the mean proportions of topics recalled by Article and Mode of communication. A 2 (Mode: F2F or CMC) x 2 (Article: Denmark or For-Profit) between-subjects ANOVA with proportion of topics recalled as the dependent measure found no significant main effects of Mode, $F(1, 44) = .128, p = 0.723$, or Article, $F(1, 44) = 0.158, p=0.693$. There was, however, a significant interaction between Mode and Article, $F(1, 44) = 5.431, p = 0.024$. For the Denmark article, F2F communication was more effective than CMC, whereas for the For-Profit article, CMC was more effective than F2F (see Figure 2).

Table 1. Mean Proportion of Topics Recalled by Article and Mode

<table>
<thead>
<tr>
<th>Article</th>
<th>F2F</th>
<th>CMC</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>Denmark</td>
<td>10</td>
<td>0.4076</td>
<td>0.1372</td>
</tr>
<tr>
<td>For-Profit</td>
<td>11</td>
<td>0.3125</td>
<td>0.0927</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td>0.3578</td>
<td>0.1230</td>
</tr>
</tbody>
</table>
Discussion

For the Denmark article, F2F communication led to a higher proportion of topics recalled than CMC did. In other words, participants who heard about the Denmark article through F2F communication received more of the information in the article than those who heard about it through CMC. On the other hand, for the For-Profit article, CMC led to a higher proportion of topics recalled than F2F. That is, participants who heard about the For-Profit article through F2F communication received less of the information in the article than did those who heard about it through CMC. The results are consistent with the hypothesis that information received in F2F communication may be more meaningful to the receiver than information received by CMC, but with the proviso that the content of the communication (e.g., the content of the Denmark article as contrasted with the content of the For-Profit article) may influence the outcome.

To further this study, future research should determine what factors (e.g., topic, length, vocabulary, reading level, concreteness, and consequentiality) and whether F2F communication is superior to CMC in some conditions more than others. A logical first step would be to independently manipulate topic, length and so on in order to observe their effect upon the proportion of information transmitted.

By narrowing down which mode of communication is most effective for sending particular kinds of messages, this research may help us to provide better communication in both social and professional situations. These results may improve interpersonal communications through both CMC and F2F.

One notable application is in psychotherapy. The use of CMC is being explored as a way to provide psychological services such as diagnosing and treating patients. Most research shows that Internet-based therapies can be useful for specific problems such as posttraumatic stress disorder (Lange et al.). While Internet-based self-help groups and individual telepsychotherapy programs (remote therapy and communication between therapists and patient via Internet) are currently the most popular forms of Etherapy, some research suggests that using multimedia or hypermedia for therapy may be more beneficial. This includes programs such as instant messaging where video, emoticons, file sharing and other features to facilitate social interaction are all accessible through a single program (Castelnuovo et al. 38-39). However, this research suggests that Internet-based therapies should be used in combination with other forms of traditional therapy (Castelnuovo et al. 42).
While there is no direct evidence that Internet-based therapy is an ineffective form of therapy, there are many criticisms against it. (Barak et al. 6). Many critics feel that CMC in therapy cannot be as effective as F2F communication in therapy because of the lack of nonverbal cues between therapist and patient (American Psychological Association 458). On the other hand, this research could be one explanation as to why some disorders are more effective in using Internet-based therapies than others. For instance, people with posttraumatic stress disorder may be able to communicate information better through CMC communication because the content of the message is more difficult for them to express, whereas other disorders may have the opposite effects.

Another potential direction for future research would be to look at the meaningfulness of F2F communication in comparison to other forms of CMC communication such as email or video conferencing. For example, video conferencing could be an interesting way to look at nonverbal cues presented through CMC in comparison to F2F. By examining the facial expressions and body language of the senders and recipients, we could study the effects of message content through nonverbal cues.

In summary, the study reported in this paper indicates that there is a difference in the reliability with which messages are transmitted depending on mode of communication and content of the information. While further investigation on this subject is necessary, this study may provide the impetus for future research on the effects that mode of communication may have in diagnosing and treating patients. The research techniques developed here could also be used for future research on social and workplace communications.

Works Cited
Is the Patriot Act Terrorizing Our Right to Privacy?

Allegra Rowan

Faculty Advisor: Kellie Hay
Department of Communications
Oakland University

Abstract
A need for privacy is almost universally understood, however it did not receive governmental attention in the United States until the late 1800s. Yet, soon after the right to privacy was recognized it was again subordinated to other federal agendas. Healthcare is a vital site where privacy is at stake. Hippocrates, father of modern medicine, realized this in creating the Hippocratic Oath in the 4th Century B.C. and subsequent legislation, however faulty, has upheld this standard of confidentiality. Violations of the physician-patient relationship have far-reaching social, economic, and political repercussions. In light of the terrorist attacks of September 11, 2001, the government that once sought to preserve privacy implemented extreme measures to invade it, most notably with the Patriot Act. This paper reviews legislation and rights pre- and post- 9/11 and questions the implications of forsaking medical privacy for the alleged “greater good” of national security.

Introduction
Right on the heels of September 11th, Congress hastily passed a monster of legislation called the Uniting and Strengthening of America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism Act, better known as the USA PATRIOT Act. After the initial attacks, this was a welcome move as citizens turned to the government to provide them with safety from the alleged “terrorists,” but it is doubtful that many citizens suspected this national security effort would cause them to seek protection from the government they originally sought to provide protection. Though the more astute citizen may be aware of some of the government’s new-found potential for surveillance and searches of communications and homes, few would suspect that these privileges would in any way threaten their medical records, nor would they grasp the implications that this invasion of privacy could have. This paper explains some of the existing legislation that was intended to ensure the privacy of these records, illustrates how the Patriot Act revised these acts, and explores how government has attempted to expand the contents of medical records.

Defining Privacy
Given that complaints against the Patriot Act are on the basis of it allowing an unwarranted invasion of citizens’ privacy, it is interesting to note that in the Constitution and the Bill of Rights’ enumeration of the liberties of the American people, nowhere is the right to privacy so much as mentioned, let alone explained. Interestingly enough, the word “privacy” comes from the Latin “privates” which means “not belonging to the state” (Mitrano, 2003, p. 53). At the same time, Margulis notes that, “privacy provides opportunity for self-assessment and experimentations … [and therefore the] development of individuality” (2003, p. 246). Intrinsically then, “(p)rivacy is a constitutional principle because the nation’s founders believed it was a necessary ground for the development of responsible, autonomous citizens in a
democratic republic” (Mitrano, 2003, p. 61). Put another way, decisional autonomy is fundamentally an integral part of a democracy as it applies to the freedom of political expression and choice (Margulis, 2003, p. 246).

However, it was not until 1890 that privacy – outside of private property – got any governmental attention and not until 1928 that a court case spelled out privacy as a human right. In the case *Olmstead v. U.S.*, Supreme Court Justice Brandeis codified privacy as:

“The right to be left alone – the most comprehensive of our rights, and the right most valued by civilized men. To protect that right, every unjustifiable intrusion by the government upon the privacy of the individual, whatever the means employed, must be deemed a violation of the Fourth Amendment” (as cited in Abele, 2005, p. 11).

This definition has been upheld in subsequent Court decisions. Still, it in turn requires some understanding of the Fourth Amendment, which states:

“The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no Warrants shall issue, but upon probable cause, supported by Oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized” (p. 10).

Documentation of medical records would thereby fall under “papers.” However, the 1939 case of *United States v. Miller* ruled that the Fourth Amendment does not apply to documents and information voluntarily conveyed to third parties (as cited in Northouse, 2006). Significantly, information contained in medical records are voluntarily conveyed to third parties.

**Defining Medical Records**

Before continuing with the discussion concerning the right to privacy, let us take a moment to define what we are so adamant to protect. In the Privacy Rule of 2000, the Secretary of the Department of Health and Human Services (DHHS) defines medical records, or “protected health information,” as follows:

“Any information, whether written or oral or recorded in any form or medium that: (1) is created or received by a health care provider, health plan, public health authority, employer, life insurer, school or university, or health care clearinghouse; and (2) relates to the past, present, or future physical or mental health or condition of an individual; the provision of health care to an individual; or the past, present, or future payment for the provision of health care to an individual” (as cited in Wills, 2004, p. 279).

In short, medical records contain sensitive material on intimate matters in a person’s life, from demographics and personal identifiers to financial information and details concerning a patient’s treatment for their given physical and mental status.
Consequences of Computerized Medical Records

With the modern advancements of technology, all of this information is being centralized from written copies to an internet database, referred to as “e-health.” The intent is to create a more efficient, cost-effective, and standardized health care system. It is an attempt to streamline medical records to improve patient care and resolve administrative inefficiencies. It also aids in medical research and in quality assurance while at the same time reducing waste and fraud (Alpert, 2003; Harris, 1997; Wills, 2004).

On the flip side, it brings with it its own swarm of privacy and security concerns. E-health increases the potential for unauthorized access to medical records – including governmental access. The central database facilitates the compilation of lists of people based on their medical condition by searching a diagnosis instead of a name (Wills, 2004, p. 276) enabling the identified population to be targeted for economic gain (Alpert, 2003, p. 310). Additionally, without protection, an individual’s medical records could be used to deny employment, insurance, or credit (Harris, 1997; Stanley & Steinhardt, 2003). Publication of medical records could also lead to humiliation and stigmatization by friends, family, and strangers tarnishing the individual’s reputation and extinguishing his or her sense of dignity (Margulis, 2003; Wills, 2004).

Privacy and Self-Surveillance

As early as the 4th century B.C., Hippocrates understood the vitality of confidentiality in health care, as evidenced by the Hippocratic Oath: “All that may come to my knowledge in the exercise of my profession or outside of my profession or in daily commerce with men, which ought not to be spread abroad, I will keep secret and never reveal” (as cited in Wills, 2004, p. 275). Millennia later medical practitioners must still take this oath before licensure. The Hippocratic Oath acts as a promise to the patient and develops a basis of trust that is integral to the doctor-patient relationship. If this trust is perceived to be breached, it has the potential to adversely affect the quality of health care. The breach could be in the form of disclosing patient information without consent or not informing the patient that a disclosure has been made, both scenarios made possible under the Patriot Act.

When people believe that they are being watched, they will change their behavior to what they think the observer will find “acceptable” or “normal” (Alpert, 2003, p. 303). According to Schwartz, fear of the abovementioned negative consequences of unconseted disclosure may lead people to “either lie to their physicians or avoid seeking care that might lead to the creation of sensitive health care or genetic information” (as cited in Alpert, 2003, p. 304). Alpert cites a study done by the California Health care Foundation which found that “one of every six adults said he or she had done something ‘out of the ordinary’ to keep personal medial information confidential” (p. 305). Not only does this jeopardize the physician-patient relationship, it infringes on the First Amendment right to freedom of speech.

The “chilling effect,” produced by the lack of trust that the patient has for the physician, that keeps the patient from seeking medical attention or at least honestly reporting their condition, prevents the health care provider from supplying quality care (Alpert, 2003; Harris, 1997). This undermines health care at its very core. Preventative medicine is only effective when patients visit the doctor early and regularly. Alpert predicts that “as long as patients feel compelled to protect their own privacy by not sharing health information with their care providers, surely the health of the health care system itself will be at stake” (2003, p. 319).
In addition to the repercussions for existing health care, what about the future of medicine? For example, currently much research is being done on the human genome. To a limited extent, clinicians can analyze a DNA sample to test for present diseases and conditions and even genetic predispositions. However, this screening would traditionally be stored in an individual’s general medical record. In two studies cited by Margulis, “63% of respondents would not take a genetic test if employers and health insurers could get access to the test results” and “10% of respondents had avoided getting genetic screening for diseases, the early detection and treatment of which could have improved their lives, because they feared workplace discrimination” (2003, p. 252). In light of these real concerns and mistrust, scientific advancements may be stalled. President Clinton realized this when he announced the mapping of the human genome. After acknowledging the tremendous accomplishment, he gravely noted that “if we do not protect the right to privacy, we may actually impede the reach of these breakthroughs in the lives of ordinary people” (as cited in Alpert, 2003, p. 319).

Existing Health Care Privacy Policies

We are now in a position to discuss the existing legislation surrounding medical record privacy. With technological advancements over the years, several attempts at legislation have been enacted. The first step in the right direction was the Privacy Act of 1974. The purpose of this act was to check the governmental collection and use of personal information. Another governmental initiative in 1974 was the Family Educational Rights and Privacy Act (FERPA), complying with the United States Department of Education to protect student records from disclosure, especially since, if the student is an athlete or receives treatment at a school-affiliated medical clinic or hospital, the educational records also contain health information for the student. A third effort toward protecting medical records is the Privacy Rule, issued in 2000, under the Health Insurance Portability and Accountability Act (HIPAA) of 1996. The Privacy Rule, in essence, does for e-health records what the Privacy Act did for tangible medical documents.

However, even before passage of the Patriot Act, there was dissent among health care professionals regarding how much protection these initiatives actually offered. All three legislations provide exceptions to informed consent for record disclosure, not the least of which is public safety. FERPA allows disclosure “to appropriate parties in connection with an emergency if knowledge of the information is necessary to protect the health or safety of the student or other individuals” (Department of Education [Dpt of Ed], 2002, p. 3). Under the Privacy Rule, patient consent is not necessary for the transmission of protected health information among entities involved in treatment, payment, or health care operations in order to expedite the process (Department of Health and Human Services [DHHS], 2003, p.4). The Privacy Rule also allows for nonconsensual disclosure of medical records in the case of abuse, neglect, or domestic violence victims, communicable disease, research, health care administration, or governmental benefits (DHHS, 2003). Specifically, “a covered entity may disclose protected health information to authorized federal officials for the conduct of lawful intelligence, counter-intelligence, and other national security activities authorized by the National Security Act” (as cited in American Civil Liberties Union [ACLU], 2003), as well as provisions to protect the president, former presidents, the president-elect, and foreign dignitaries.

Patriot Act Modifications

In regards to medical record privacy, dissent centers primarily on section 215 of the Patriot Act which modifies FISA (the Foreign Intelligence Surveillance Act). In the mid-20th
century, it was believed that the Nixon administration was abusing its privileges for electronic surveillance domestically. Passed in 1978, FISA effectively created separate standards for use of surveillance for national security purposes and criminal investigations. This division served to protect the Fourth Amendment rights of U.S. citizens while still allowing the government to conduct meaningful and productive foreign intelligence investigations of noncitizens without such protection (Jaeger, 2003, p. 297). The Patriot Act now allows the FBI to demand the “production of any tangible things (including books, records, papers, documents, and other items) for an investigation to protect against international terrorism or clandestine intelligence activities.” Furthermore, it places a “gag order” on providers – prohibiting them from revealing to the individual concerned that their records have been searched or seized and protecting them from the usual disciplinary action called for under existing laws for such unconsented disclosure. The Patriot Act did clarify that such investigations were not to be “conducted solely upon the basis of activities protected by the first amendment to the Constitution.” However, at the same time, the Patriot Act replaced the “probable cause” required for search and seizure under the Fourth Amendment with what is in essence “reasonable suspicion.” The American Civil Liberties Union (ACLU) highlights that “probable cause requires that law enforcement officials know what they are looking for before they look for it” (2002, p. 3). Reasonable suspicion essentially means that national security need not be the reason for a search, only a significant reason among many (Jaeger, 2003, p. 299). Moreover, information gathered for national security purposes can now be turned over to any other law enforcement agency whereas previously each was forced to conduct their own investigation (Etzioni, 2004).

Similarly, Section 507 amended FERPA to allow governmental agents to cast a wide net to “collect educational records in the possession of the educational agency or institution that are relevant to an authorized investigation or prosecution of… an act of domestic or international terrorism” upon the premise of reasonable suspicions. Again, institutions that comply with governmental requests are placed under a “gag order” and do not suffer the consequences of unconsented disclosure (Dpt of Ed, 2002).

The Case for Governmental Access

This all leads one to wonder just what his or her medical records have to do with the government. For one, if the government knows an individual’s diagnosis they can track that person’s behavior based on the medical needs and resources he or she is likely to use. Congressman Lungren defended governmental access to medical records saying that “it might be important to know if, for example, someone connected to an international terrorist organization sought and anthrax vaccine” (as cited in Lenzer, 2006, p. 69).

As already noted, patients are withholding from health care professionals crucial information necessary for proper treatment, providing inaccurate information, and even avoiding care altogether (Wills, 2004). In the past it was not uncommon for a patient to withhold critical information regarding their condition, such as symptoms or behaviors, so as not to have the ensuing diagnosis affect future employment. Now patients are hesitant to simply report where they were when their injury occurred or demographic information such as race or religion, in which culture may play a large role in the individual’s health status but, at the same time, may pique unwarranted suspicions.
Government Data Surveillance

In spite of former governmental attempts to come alongside of the health care community and protect the privacy of medical records, 9/11 seems to have brought a radical change of allegiances. The government that once valued privacy as a human right instituted several new data surveillance programs. “Data surveillance is the collection of information about an identifiable individual, often from multiple sources, that can be assembled into a portrait of that person’s activities” (Stanley & Steinhardt, 2003, p. 3). E-health has enabled the fast and easy compilation of medical records for operational efficiency, but this now presents itself as a drawback for privacy. Alpert worries that “the very fact that computers can make the collection, dissemination, and analysis of this data relatively easy and inexpensive is, in itself, often an incentive to collect more data for even further analysis” (2003, p. 306). The ACLU voices similar concerns, noting that “databases created for one purpose are almost inevitably expanded to other uses” (Stanley & Steinhardt, 2003, p. 13), pointing to the use of Social Security numbers as a personal identifier.

TIA, LifeLog, and CAPS II

The first data surveillance program was called “Total Information Awareness” (TIA), also know as “Terrorist Information Awareness,” in keeping with the alleged goal of national security. The design of this program was to compile as much information as possible on each person residing in the United States, including medical and academic records, financial and credit records, political and religious associations, travel history, purchasing habits, et cetera. Its sister program, LifeLog, was aimed at cataloguing specific names and forms of media consumed by each person, their license plate numbers, and tracking their facial features and their personally identifiable movement patterns, such as gait (Abele, 2005). A third program, Computer Assisted Passenger Screening (CAPS II), aimed at increasing airline security, performed background checks on passengers and flagged them according to their potential threat. This prescreening included, but was not limited to travel history, living arrangements, demographics, personal associations, and credit card and telephone records (Stanley & Steinhardt, 2003, p. 12). Abele argues that such programs violate our foundational belief that people are “innocent until proven guilty;” “governmental data collecting is usually only justified, legally or ethically, where there is evidence of involvement in wrongdoing” (Abele, 2005, p. 84). Though such initiatives have not survived, it is greatly unnerving to know that our government has attempted these pursuits, and continues to evaluate proposals.

Biometrics

Not only has government attempted to aggregate everything that is currently recorded or known about people living in America, they also have entertained plans to add to these records by gathering personal biometrics. Biometrics – such as height, weight, eye color, and hair color – already exist to a small degree on common documents like driver’s licenses or passports. However, some argue that these identifiers can easily be changed or lied about and therefore favor expanding them to include such measures as fingerprinting, iris or retina scans, facial or hand recognition, and so on. These are more personalized to the individual and harder to fake or change. Theoretically, biometrics makes fraud and identity theft harder to commit and easier to catch (Etzioni, 2004, p. 125). It also provides a way to track fugitives or people with a criminal record and to avoid the current abuse of governmental assistance programs (p. 126). In spite of the apparent benefits to biometrics, regardless of the practicality of implementation, there

Meeting of Minds 2010
remains the question of ethics: what is too high a price to pay for security, even if that security is guaranteed? Perhaps it is as Benjamin Franklin said over two centuries ago: “They that can give up essential liberty to obtain a little temporary safety deserve neither liberty nor safety” (as cited in Wills, 2004, p. 281).

**Conclusion**

From the foundation of America we have treasured our autonomy. We have fought long and hard to protect that right, and we find that it is a daily struggle, against both outsiders who would seek to dominate us and ourselves who would value security over liberty. This paper set out to elucidate the terms and reach of existing policies defending the privacy of medical records and to demonstrate how the government has radically superseded these previous legislations through the passage of the Patriot Act. By now hopefully the reader can see how the Patriot Act has demolished the already feeble safeguards meant to ensure confidentiality, in addition to providing the government with unprecedented and largely unchecked capabilities for data aggregation. With these revelations let us uphold the Constitution and Bill of Rights over all subsequent legislation to keep our government one “of the people, by the people, and for the people.”

**Works Cited**


The Effects of Sarcasm: A Rhetorical Analysis of Ann Coulter’s “Godless: The Church of Liberalism”

Amanda Deschamps

Faculty Advisor: Dana L. Driscoll
Department of Writing and Rhetoric
Oakland University

Abstract

In “Godless: The Church of Liberalism” (2006) by Ann Coulter, the use of sarcasm and humor is a persuasive technique to influence the reader to overlook the holes in the arguments being presented. The use of fallacy is explored with an emphasis on ad hominem attacks and an appeal to ignorance. Though her argument is formatted logically with creditable sources cited throughout, the tactic of scrutinizing the opposing side of the case is analyzed. The use of ethics and logic used within her rhetorical argument is examined along with her abundant use of pathos, the appeal to emotions. With all techniques of rhetorical argument taken into account, a final conclusion on the strength of the arguments made by Ann Coulter is examined.

As modes of communication have expanded, the media has taken politics out of Washington D.C. and put it in the houses of regular citizens in the form of newspapers, radio programs and television shows. The fight for political dominance is not only among politicians but between talk show hosts, news reporters, authors, and bloggers. Anyone who can formulate an opinion is able to present what they believe through all sorts of media. In the case of Ann Coulter, she uses the power of the written word to present her conservative opinions in her book “Godless: The Church of Liberalism” (2006). Instead of attempting to persuade an audience that holds opposing opinions, she gears her writing towards people who already have similar beliefs and uses the tactic of humor to present her arguments. Her sarcasm and repartee weaken her rhetorical reasoning to a fallacious argument that holds little value in terms of proof but high value in terms of propaganda.

To engage her audience, Coulter uses kairos, or good timing, in choosing issues that were of importance in 2007 when the book was published. These topics include abortion, crime, the Iraq War, 9/11, AIDS, sexual education, stem cell research, and the most discussed of all, evolution. In the chapters on evolution and the creation of the universe (to which she devotes to nearly 1/3 of the book), she presents the evolutionist, or the “Darwiniacs” as she calls them, opinion and dissects the argument, claiming that it is all false and lies. She first presents the “theory” of evolution as “highly implausible,” “pointless tautology” and that it has “no evidence after 150 years of looking” (Coulter, p. 202-203). Coulter states that the evolutionists’ explanation of mutations resulting in a new species is something “we don’t understand but must accept on faith because it’s Holy Scripture” (Coulter, p. 203). Using the fallacy of appealing to ignorance, she claims that because evolutionists cannot prove everything, such as the beginnings of life, then it isn’t true. Without any scientific background, therefore not ethical credibility, she claims that evolution is a fraud and there is no proof of evolution; the proof given by scientists that evolution does exist, she believes, is actually proof that evolution does not exist. A case of this is Darwin’s famous Galapagos finches and how, she says, “the Galapagos finch population [has not changed] not one bit since Darwin first observed the finches more than 170 years ago”
Because evolution of species cannot be seen in real time, she says that it cannot be proven. She mentions intelligent design briefly and gives scant details as to how it fills in the gaps scientifically that she believes evolution leaves. By disproving the theory of evolution, the reader is to assume that intelligent design, the other major “theory” of the diversity in nature, will take its place, even if Coulter gives little to no proof on the subject of intelligent design. By damaging the credibility of an idea and of people who believe in the ideas discussed, Ann Coulter persuades her audience by making the other side look ridiculous.

By using humor and sarcasm, the argument Ann Coulter makes is weakened in rhetorical value, yet strengthened in entertainment value. Because most of the people who read her books are already believers in what she is arguing, it is easier for her to get away with fallacious argumentation. On the subject of the death penalty, she argues against the belief that the death penalty would weaken American society by saying “Unlike abortion and the president being serviced by a White House intern, which elevates us as a society” (Coulter, p. 27). She does not fully address the issue but simply uses the fallacy of ad hominem tu quoque, which is to accuse the opposing side of similar behavior in order to deflect their own offenses. In another example, she calls the liberal pro-choice party the “Hook-up Party” that is interested in protecting the rights for women to “have unprotected sex with men they don’t particularly like” who want “abortion on demand” and “partial birth abortion” which she deems as “Casual Friday’s” to liberals (Coulter, p. 79, 85). By degrading the real issue of choice with humor, she makes the pro-choice party look ridiculous to boost up the almost nonexistent argument in favor of the pro-life party. Humor is a staple of Ann Coulter’s books, taking her societal and political critique to a less technical level and to more of a ridiculing level that can be understood by all people, even those who are not politically savvy. By using humor and sarcasm, it covers up holes left behind by the serious arguments she makes in between witty statements, by distracting the audience. Underneath all of her repartee, however, is a serious argument, though not an unbiased and fair one. But it doesn’t have to be when the primary audience is purely interested in being entertained rather than informed when trying to sell her book.

Along with discrediting the argument, she discredits the arguer. In every chapter, at least one person is singled out that is a proponent for the issue which she is against. To further make the argument which she is attempting to disprove seem even more ridiculous, she makes those who believe in the issue seem unstable, immoral or unimportant. In the chapter on liberal spokespeople called “Liberals’ Doctrine of Infallibility: Sobbing Hystericals,” Coulter dissects various people who represent liberal beliefs such as pro-gun control, pro-stem cell research and anti-Iraqi War. Most memorably, Coulter shames “The Jersey Girls” who were four women who had lost their husbands in the attacks on the World Trade Center on 9/11. Coulter says: “These broads are millionaires, lionized on TV and in articles about them, reveling in their status as celebrities and stalked by grief-arazzis. I’ve never seen people enjoying their husbands’ deaths so much” (Coulter, p. 103). She also goes on to say “…how do we know their husbands weren’t planning to divorce these harpies? Now that their shelf life is dwindling, they’d better hurry up and appear in Playboy” (Coulter, p. 112). By implying that “The Jersey Girls” were using their husbands’ deaths to improve their social statuses, the message that these women were trying to convey on justice, be it right or wrong, is pushed far back in the minds of an impressionable audience by destroying the credibility of these women. She even sets up the question on whether or not the husbands of these women loved them to subtly say that it’s possible that the 9/11 widows who were fighting for justice over the deaths of their husbands have no right to because their husbands wouldn’t want them to anyways. None of these arguments can be fought against because they are not logical but rather pathetic arguments, or arguments that play on emotions, using
ad hominem, which is using attacks against the person, to damage the opposing arguments credibility without even mentioning the issues that are really being discussed. In another example of her use to discredit a person thus a belief, on the topic of the Iraq War, she discredits Joe Wilson who is a Former African ambassador who was involved in the claims that the Bush administration lied about Intelligence that said Saddam Hussein had or was trying to procure nuclear weapons. Coulter claims that Joe Wilson lied about his credibility in having any intelligence over any negotiations between Africa and Iraq In the dealings with nuclear weapons. She says that “he was sent by his wife” in a flippant statement that made his trip to Africa seem as if he were on vacation and not traveling for real government business. However, later we learn that his wife was part of the CIA and had suggested her husband, Wilson, for the mission. Coulter then claims that there was no intelligence from Wilson’s trip to Africa, therefore, he lied that the Bush Administration knew that Iraq was not an enemy to American security (Coulter, p. 145). By discrediting Joe Wilson, who she claims at a point isn’t smart enough to even clean toilets in the white house, she makes the inference that without Wilson’s claim of intelligence over Saddam Hussein not trying to procure nuclear weapons, that Saddam Hussein was attempting to get nuclear weapons thus it was appropriate to go war in Iraq (Coulter, p. 135). Though she does not fully address the issue, she uses the people who are proponents of issues she is against and damages them, thus damaging the opinions that they hold.

Even though “Godless: The Church of Liberalism” is considered a bestseller and is known as a book about politics, it is a humorous book over anything else, that has a weak rhetorical argument. There is an attempt to present a logical argument with many citations to other bodies of work that presumably have more credibility than Ann Coulter does, but the main issues are on the subjects that are not fairly represented with both sides discussed in full. Therefore, it cannot be trusted that the information collected is not constructed in a biased manner to convey a certain position. Because she does attempt to make a logical argument, the flow of the piece is excellent and can manipulate the audience to overlook the holes in her logic and the fallacies she has lingering even in her serious text. The main focus is on her use of the pathetic argument which is meant to be funny and convey her opinions and arguments in an entertaining way that increases the amount an impressionable audience believes her, making this book a good piece of propaganda. Ethically, she has little to no scientific background to make many of the arguments she makes, especially on evolution which accounts for a large portion of the book. Because of her minimal background on her subjects, her arguments which are often offensive, accusatory and fallacious, are also completely unethical as she damages the reputation of others in order to prove her argument, which at its core is weak.

In the fight for political dominance in America, liberals and conservatives use a multitude of tactics to sway the political climate. Now that politics is an issue that is important to people of all ages and backgrounds, all demographics are targeted to get involved. Ann Coulter’s “Godless: The Church of Liberalism” (2006) is geared towards an audience that already believes in her opinions and beliefs, and is more interested in being entertained than in being fairly informed about the issues. Ann Coulter can get away with having a weak argument that is backed up with biased logic, constructed to manipulate its meaning and fallacious repartee. When read with a keen eye for rhetorical argument, however, the major flaws within her arguments are blatant, with major issues in the rhetorical aspects of logic, credibility and use of emotion.

References

Psycholinguists have proposed several theories concerning language acquisition. Though at times these hypotheses seem separated only by subtle nuances, thus rendering them arguments of semantics, language acquisition remains as a staple discussion within the world of composition theory. Do we learn as we hear, as we read, or as we speak? Do we form our vernacular based on our environment or more so from what we are taught early on during developmental education? These are the questions that lack a definite answer but are necessary when trying to understand the reasons behind why we communicate the way we do. I am convinced that our environment plays the biggest part in our language acquisition, and as we aurally receive our language the subsequent dialect we gain ultimately affects both our speech and our writing. The argument supporting environmental influence has been called intuitive cognitive development. The following supports the above argument and reveals how we speak as we hear, and accordingly, we write as we speak.

The argument that written language is rooted in our comprehension of spoken language is not new, nor is it wanting for major proponents or evidence. The idea is mentioned in the article by Patricia Bizzell: “Cognition Convention and Certainty”. As defined by Bizzell, the inner directed model of the development of language and thought reveals a four tier system in which an individual’s innate capacity to learn language is the first level of the process. From there experience lends to formation of conceptual structures followed thirdly by the influence of society. Consequently the individual’s writing style is the product of the three aforementioned influences (Bizzell, 389). Though we understand that there are outside factors shaping our language the question remains: what is an example of an influential component? I’d like to take a moment to explore the effects society has on one’s writing; in doing so I am going to write from my own experience concerning language development.

I am a black American who was raised in the predominantly white city of Fenton, Michigan. Growing up I quickly grew tired of the statement “you talk proper” when visiting friends and family in my current home of Flint, Michigan. Obviously there was a noticeable difference not only in my pronunciation but also in my syntax and vocabulary. My rhetoric was different and what’s different is often that which children point out the most, thus revealing our innate ability to make outsiders of one another, an argument for another research paper. Although it was apparent to my peers that I spoke differently I was oblivious to it because it was all I knew. My mother was raised in the south and was especially particular about her English. She subsequently lost her accent after moving to Michigan as an adult but is to this day quite well spoken. She often reinforced proper grammar rules when my siblings and I were speaking and there were even certain words of slang that we were not permitted to speak such as calling one a “mug”. These reinforcements by way of my mother and environment were enough in quantity and frequency to consequently enable me to speak a dialect of English not common to lower income blacks (yet this dialect is present in those who make education a priority). I graduated from an inner city school and as a result I’ve developed a bidialectal vernacular that
incorporates several aspects of what I consider tangential societies, that is, neighboring towns that naturally share proximity but differ greatly in culture. From this dialect I have effectively merged different rhetorical verbiages into my own unique writing style. Ostensibly, just as my knowledge of correct grammar was gained through positive reinforcements of proper grammar rules there is evidence that suggests that when one is immersed in the improper use of a language they will also follow the example set before them and model their speech after what they know. This verbal basilect can find its way into written communication, and some in the pedagogy of writing find the effect detrimental to the art of composition.

In “Writing as a Mode of Learning” Janet Emig argues the differences between written and spoken language and how the two must be conveyed differently. The argument sets out to separate writing and speaking in order to encourage the writer to eschew employing grammatical features of spoken language in writing. Emig warns that a “blurring” of the two is hazardous considering how “writing is learned” and “talking is natural” (Emig, 9). Emig also mentions how “talking leans on the environment” whereas “writing must provide its own context” (Emig, 9). In direct opposition to Emig’s argument, there are those who encourage the writer to use their vernacular when writing. In “Teaching Writing as a Process not a Product” Donald M. Murray sets forth as an implication that “The student uses his own language” (Murray, 5). Murray asserts that in the process of writing if a student is given the opportunity to bring the language they have learned to the paper apart from that which is taught to them in an English class, which is often taught as if it were a foreign language, then they will have the opportunity to “exploit” their language which allows for the student to “embark on a serious search for their own truth” (Murray, 5). I am convinced that this exploitation of one’s language produces writing that gives insight to the connection between speech and prose. When considering this connection, it seems nearly impossible to keep one’s own acquired language from bleeding through some portion of a document even though spoken and written language are acquired differently.

Concerning the art of writing I will concede in support of Emig’s argument that there are elements used when writing that are not as often employed in verbal communication. Writing tends to include more descriptive elements for the sake of the reader who is not present or who is only in the conversation via reading and not responding in present time. Ellipses also happen more often in spoken language than in written language. In conversation you can afford to omit words and use pronouns more often for the sake of a shared environment or knowledge of circumstances when speaking with an individual. Although I have been a staunch supporter of the theory that well written prose comes from a type of “recorded talk” I realize that although it is obvious that one’s vernacular will affect their writing I am not entirely sure if the effect is as beneficial to one’s writing as much as it is detrimental. I have come to this conclusion taking my own experience into consideration. As described above I was raised in a household that encouraged “proper English” and later finished my Associates Degree in Communications not because it was some faux degree but rather because I sincerely desire to communicate well across all mediums whether it is in print or oration. This puts me in a position where my writing reflecting my speech is not detrimental to my prose. The unfortunate thing is when one who is less educated in Standard English is trying to convey their thoughts on paper. Often they will write a paper that is insufficient in the style needed to support a scholarly effort. Because of this observation of my own experience coupled with the argument presented by Emig I understand how writing and talking are set apart and how writing needs to still be taught for the purpose of a document that reads well and not like a muddled informal conversation. But, there is something lacking in Emig’s argument.
Though Emig does well to define the differences between written and spoken language, her article does not reveal why it is that one might write as they speak in the first place. Instead, the article merely acts as a caveat to avoid writing as one speaks. Because Emig’s argument lacks an explanation for the reason behind colloquial composition I must assert that an individual’s proficiency in written language mirrors their proficiency in spoken language. When writing, one is relegated to the same vocabulary they generally use in speech. Examples of such are as follows: for one, the words one knows are the words they’ll use. Indeed a thesaurus can virtually give a wordsmith quality to any individual lacking in their vocabulary, but it can only help as well as one can use it. Furthermore if one has no cognitive idea that in speech their subject verb agreement, adverb and participle use, and preposition usage are off a bit then the abovementioned follies will find their way into the individual’s writing. Though it’s viable to contest that the writer should write differently than the way they speak, it is not practical for the writer to do so if they are not educated in an effort to improve both their writing and their speech. The individual’s acquired language, be it by way of environment or by way of education, must be closely linked to a standard dialect in order to prove proficient in both the written and spoken communicative fields.

Acquired language influences several aspects of writing. Often in the discussion of composition theory the argument is raised that ideas in writing may in fact come from things previously read or received in our lifetime. In “Collaborative Learning and the “Conversation of Mankind”, Kenneth A. Bruffee defends the theory that writing is a displaced form of conversation. According to Bruffee this collaborative learning can come about within assigned groups and yet may also be the result of a type of ever present forum from which we gather ideas and begin new arguments based on the collective terms we’ve heard over the years (Bruffee, 415). Logically, if when writing a theme there is the chance that I may present an argument that is not entirely original yet in my mind the concept seems novel then there must be room for the possibility that not only my theme but also my writing style may be an amalgamated adaptation of several works and styles that I’ve incurred in my tenure as a writer. In summary, language is acquired via outside factors which subsequently influence writing.

Ultimately, concerning whether or not is it wise to consciously incorporate the way one speaks into writing is up to the discretion of the writer. Audience naturally comes into play when deciding on how a document should read. The objective set forth in this research effort was to bring to awareness the effect our environment has on our speech, and how the language acquired from our environment will noticeably affect our writing. It is apparent that although writing is a separate art that deserves to be taught separately we still at times even subconsciously bring our language to the table. Sometimes that language is sophisticated and appropriate within academia and at times it may be base and not fit for a paper. There is still an audience for prose that reads as speech, but it needs to be expressed at its appropriate time. Since our speech and society do affect our writing then perhaps our spoken language should be addressed in composition courses. Basic grammar rules and proper word usage may need to be revisited. Many secondary institutions take for granted that their students have learned these things from interactions at home or during primary education, yet, this assumption stifles several students who are entering college. Often the things one may find remedial may be a new concept to a student who has lacked formal training in the basics of the English language. In closing, just as Emig asserts how “writing is learned” and “talking is natural”, in order to proactively address the effect our environment has on our speech, proper education and positive reinforcements concerning spoken language must be implemented (Emig, 9). Our receiving of such “proper” English will
subsequently improve our ability to speak, and this, consequently, will improve our ability to write.

Works Cited


Abstract

The American Psychological Association defines addiction as a condition in which the body must have a drug to avoid physical and psychological withdrawal symptoms. The term addiction implies drug dependency in which a person develops psychiatric and/or physical dependence from the use of a substance on a continual basis. Recent studies suggest that under certain dietary circumstances there are similarities in the neurochemical effects produced by both sugar and drugs of abuse. Research has implied that sucrose travels an opiate mediated pathway, triggering the release of dopamine and can lead to substance dependence. I would like to propose that many companies that use excess amounts of sugar in their product should be held accountable for knowingly adding unnecessary quantities of an addictive substance.

Introduction

Addiction’s first stage is dependence, during which the search for a drug dominates an individual’s life. An addict eventually develops tolerance, which forces the person to consume larger and larger quantities of the drug to get the same effect. Some of the most addictive controlled substances, heroin and morphine (opiates) cause a user to develop a physical dependence, tolerance and withdrawal that later translates into both physical and behavioral addiction. Opiate mediated pathways are regulated by GPCR’s, which signal the release of dopamine to create an analgesic effect. Most drugs of abuse increase dopamine release in the nucleus accumbens, and do so every time as a pharmacological response. There are three main classes of opioid receptors, Mu (µ), delta (δ), and kappa (κ). Mu is the main class of receptors in leading site of expression, ligand dependency and responsible for analgesic effect. This class of receptors is made of 7 transmembrane proteins, in which the residues responsible for affinity are known while the residues responsible for selectivity are not pinpointed. The Mu class of receptors has also proven to have interaction with sugar, although the specific reaction mechanism unclear. There is a strong correlation in the brain biochemistry between opiates and sucrose, suggesting sugar to be a substance of psychological addiction.
The feeding analyses of Daily Intermittent Sucrose and Chow for 12 h and Ad Libitum Sucrose and Chow rats were charted for 21 days. Note that hours 0-4 are the dark phase and a 10% sucrose increase is defined as .1mL was delivered every lever press. At the 21st day of the experiment rats with feed patterns Intermittent Sucrose and Chow available for 12 h consumed a “binge” of sucrose followed by less, yet bigger meals The Sucrose and Chow Ad Libitum rats did not display the same feeding pattern, suggesting sugar-bingeing rats developed tolerance (9.)

<table>
<thead>
<tr>
<th>Day</th>
<th>Hour 1</th>
<th>Hour 2</th>
<th>Hour 3</th>
<th>Hour 12</th>
<th>1st 3 Hours</th>
<th>Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5 ±2</td>
<td>2 ±0.6</td>
<td>1 ±0.4</td>
<td>30 ±9</td>
<td>2.7 ±0.6</td>
<td>387</td>
</tr>
<tr>
<td>4</td>
<td>12 ±2</td>
<td>2 ±0.5</td>
<td>2 ±0.5</td>
<td>46 ±9</td>
<td>6.9 ±0.7</td>
<td>378</td>
</tr>
<tr>
<td>8</td>
<td>16 ±1*</td>
<td>8 ±0.2*</td>
<td>6 ±0.4</td>
<td>79 ±1*</td>
<td>10.5 ±0.8*</td>
<td>395</td>
</tr>
</tbody>
</table>

* p < 0.05 (6.)
Figure 3

*Note Y-axis is minutes spent in open maze

After maintaining the respective feeding pattern for one month’s time, the rats were injected with Naloxone (3 mg/kg), and placed in a maze. The Daily Intermittent Glucose and Chow variable spent far less time in the open area of the maze (*p<0.05) in comparison to the Ad Libitum Chow control group and other variable groups (9.)

Figure 4

After maintaining the respective feed pattern a forced swim test was administered after a Naloxone induced withdrawal. Daily Intermittent Sucrose and Chow rats displayed far more immobility than the other control groups. *p<0.05 (9.)
After a month of respective feed pattern, rats underwent a 14-day diet without sugar. After the abstinence period rats with sugar available daily for 12-h increased lever pressing (123%) to release sugar. Rats with sugar available daily for .5 hours showed no increase in lever pressing after forced sugar abstinence. **p<0.01 (9.)

Figure 6
A decrease of 81% from baseline DA (upper graph) was viewed in rats with feed pattern of Daily Intermittent Sucrose and Chow following an induced withdrawal (Naloxone injection 3 mg/kg.) A 157% increase from baseline Ach was viewed in the Intermitted Sugar and Chow fed rats following withdrawal. There were no effects seen in the Ad Libitum Chow fed control group following induced withdrawal. *p<0.05, **p<0.01 (6.)

Discussion
Dopamine in the NAc is the reward part of the brain which tells the brain to “do it again” starting the dependency of addiction (6.) Sugar stimulates DA release through the same pathway opiates trigger increased amounts of DA in the NAc. Glucose also produced similar feeding patterns and implications of physical tolerance as seen in Figure 2. Tolerance was observed on a neurochemical level translating to substance dependence through opiate mediated pathway (2.) It is clear that signs of tolerance and withdraw are a direct effects of sucrose consumption. Figure 1 indicated tolerance due to the increased amounts of sucrose needed to satisfy feedings. Increased motivation to seek out sugar after a period of abstinence (fig 5.), lack of survival motives (fig 4.), and signs of anxiety and depression (fig. 3) are indicative of substance dependency.

Withdrawal involves two neurotransmitters in the NAc, dopamine and acetylcholine. During an induced withdrawal, NAc extracellular Ach levels increased while DA levels decreased. When DA levels are high Ach acts as a post-synaptic agonist on mu-1 opiate receptors (9.) Intermitted Sugar and Chow fed rats were producing more dopamine then Ad libitum chow rats after a month on respective diets. (Fig. 6) Rats with intermittent access to chow and sugar demonstrate a neurochemical imbalance in DA/Ach identical to the neurochemical balance during morphine withdrawal.

When an opiate such a heroin or morphine binds to an opiate receptor, the release of dopamine is ultimately achieved. The opiate transmembrane protein is composed of 7 helices with an extracellular N terminus and intracellular C terminus. In this case the opiate acts as an agonist, which triggers a secondary messenger to stimulate the release of dopamine. Studies have suggested the Mu opiate receptors are the main players in addiction and have a high affinity for opiods agonists. Every opioid ligand consists of an amine, phenol and C ring functional group. The amine and phenol group form a tyramine functional group representing ligand binding affinity, while the hydrophobic region(C ring) represents ligand binding selectivity. Opiate antagonist, such as naltrexone, consists of an amine and phenol function group that lacks a hydrophobic region to initiate the signal transduction pathway. In X-ray studies, the C ring takes on a boat conformation, shifting the 6 alpha-hydroxyl group into equatorial position. When the same functional group was inverted to its 6-Beta diastereomer hydroxyl, only minor changes were noted. It is suggested that the hydroxyl group plays a major role in the selectivity in the opiate GPCR. Site directed mutogenesis verified receptor affinity at residue Asp III: 08 as a salt bridge and at His VI:17 as hydrogen bonding with the phenol group.

It is evident that sugar has the power to mimic opiate drugs of abuse. If the effect of sugar on the brain is analyzed in a neurochemical aspect, it is evident that physical dependence and tolerance evolve from the excessive intake of sugar. In one trial study in humans it was found that participants would choose unhealthy snack consumption high in sucrose over healthier alternatives available. When the work to obtain the unhealthy snack increased, participants at a healthy weight chose the healthy alternative low in sugar while participants at an obese weight engaged in harder work in order to acquire the unhealthy choice high in sugar(9.)
Conclusion

There is indication that sugar travels an opiate mediated pathway and produces a neurochemical imbalance similar to that seen in opiate drug abusers. Sugar provokes a strong physical and behavioral dependence that leads to tolerance, withdrawal, and ultimately addiction. The United States Department of Agriculture recommends 12 teaspoons (40g) of added sugar in a normal American’s daily diet. Fast food companies continue to load their products with unnecessary amounts of sugar causing the consumer to exceed the daily-recommended amount of sugar in a single meal. Companies that use excess amounts of sugar in their product should be held accountable for knowingly adding unnecessary quantities of an addictive substance. Companies who knowingly add excessive amounts of sugar to their product should be held negligible for their actions.

*NOTE TO READER: This is an article review, the use of figures and information can be credited to its respective reference.

References


Soils Analysis and Species Distribution in the University of Michigan-Dearborn Floodplain Forest

Tristen B. Roberts

Faculty Advisor: Orin Gelderloos
Department of Natural Sciences
University of Michigan-Dearborn

Abstract

An area of the Rouge River flood plain on the campus of the University of Michigan – Dearborn has canopy vegetation but no herbaceous, sapling, or shrub vegetation. This barren area is flooded annually. By comparison of the physical and chemical factors of the soil of the barren area with other ephemeral ponds that collect water due to rain and snow melt, the reason for the lack of herbaceous, sapling, and shrub vegetation could be determined. Samples of soil from four (4) sites which were inundated at some time during the year and their surrounding areas where vegetation was growing were analyzed for soil pH, mechanical analysis of soil, organic matter content, percolation rate, soil compaction, water holding capacity, and analysis of heavy metals. The concentrations of heavy metals were not above background level for the geographic area. The high level of compaction and low infiltration rate of the soil seems to be a cause of the barrenness on the flood plain site.

Introduction

The floodplain of a forest holds many clues to the health of the overall ecosystem of the forest and the adjacent river. Analysis of the vegetation patterns and soil characteristics will lead to a better understanding of effects of annual flooding. This will in turn provide insight on the health of the river and its effects on the life in the forest. The Natural Area of the University of Michigan Dearborn is surrounded by a highly urbanized suburban landscape which modifies the water quality of the Rouge River which floods annually and the air quality which impacts the vegetation.

A small portion of the lower floodplain of the Rouge River in the Natural Areas of the University of Michigan – Dearborn is unique in that it has canopy vegetation up to 25 meters but no herbaceous, sapling, or shrub vegetation. The area, Site A, is an oval shaped depression of 600 square meters. The canopy trees include Silver Maple (Acer saccharum), American Elm (Ulmus americana), Sycamore (Platanus occidentalis), Eastern Cottonwood (Populus deltoides), and Green Ash (Fraxinus pennsylvanica) are standing in this area. The area has standing water from snow melt in the spring and one or more inundations per year of flood water from the Rouge River.

The purpose of this investigation is to determine the factor or factors that prevent understory and herbaceous vegetation in this area.

Methods

Description of Study Area

Several sites in the floodplain of the Rouge River have vernal ponds due to snow melt and spring rains. If no standing water is present later in the growing season, these ponds will retain moisture throughout the year and may have some, sapling, and shrub vegetation in them.
In addition to Site A (42°18’51.9”N, 83°14’5.5”W), four vegetated areas around the site and three occasionally flooded sites (B, C, and D) located throughout the forested Natural Areas were used as controls. The sites B (along with three nearby vegetated sites) and C are vernal ponds at slightly higher elevations and flood from the Rouge River only every 5-10 years. Site D is an open pond with no canopy vegetation and often has standing water later into the season than the other sites.

**Soil Analysis**

**Heavy Metals Analysis**

Analysis of heavy metals were determined by drying and grinding the samples, which were collected with a plastic shovel to avoid metal contamination, pulverized with a mortar and pestle, and sieved with a no. 80 brass sieve. The samples were weighed to around .1 grams each and dissolved using 6 mL HCL and 1 mL HNO₃. The samples were digested using a Multiwave 3000 Microwave Digester. The samples were then diluted by a 1:100 dilution factor with Millipore water. They were analyzed using an Inductively Coupled Plasma Mass Spectrometer (ICP-MS).

**Mechanical Analysis**

Mechanical analysis of cored soil samples by the Bouyoucos method determined the percent of sand, silt and clay in each sample.

**pH**

A HB-2 Soil pH and Moisture Meter was used in the field to determine pH and moisture of each of the sites.

**Organic Matter**

Organic matter content was determined by drying a sample at 20 degrees Celsius, weighing it in a porcelain weighing dish, and incinerating the organic content in a muffle furnace. The sample was weighed again to calculate the organic matter.

**Water Holding Capacity**

Water holding capacity was determined by extracting a core sample and inserting it into a glass tube of similar size to retain the characteristics of the soil at each site. The samples were submerged in water and the soil was held in the tube by securing cheese cloth to the bottom of the glass tube. Once the soil had been submerged and the tubes were drained of excess water and weighed. They were dried at 30° Celsius to constant mass and reweighed and the percent water holding capacity calculated.

**Percolation Rate**

The percolation analysis was performed using a Turf-Tec Infiltrometer. Water was poured into the infiltrometer and the level of the water was recorded in millimeters every 30 seconds until the rate had leveled off.
Soil Compaction

Soil density was determined using a pocket penetrometer. A soil pit 30 cm x 30 cm x 30 cm was dug and multiple samples were taken every three (3) centimeters, to a depth of 30 centimeters. Site D was omitted from this analysis due to the high moisture of the site, the penetrometer would not take readings.

Results

Heavy Metals Analysis

Of the 16 metals analyzed in the soil samples none of them were higher than the expected background levels for the urban area of Southeast Michigan (K. Murray, pers comm.) Fig. 1 demonstrates that the levels of lead and chromium were not higher in Site A than in other sites, and that the lack of vegetation is not due to heavy metals.

![Fig. 1. PPM of Lead and Chromium in the Rouge River floodplain sample sites.](image)

Mechanical Analysis

Upon taking core soil samples at Site A, I found that I could not take a sample deeper than 10 cm due to the compaction of the soil. Thus, I divided the soil samples at Site A into the topsoil and substrate samples.

The mechanical analysis revealed that all the sites sampled were classified as sandy loam. The Sites Levee, C, and D had the highest sand content. The level of clay in the Substrate A site was higher than any of the other sites (Fig. 2.) In contrast, the substrate in sites B, C, and D had a lower amount of clay than the topsoil.

![Fig. 2. Soil composition (sand, slit, and clay) of all sites.](image)
Organic Matter

The organic matter content of the inundated sites A, B, C, and D did not vary more than 2.5%. The average organic matter content was 11.03% by weight. The lowest value was the Levee site, which had 5.03% organic matter. The highest value was PA South site which had 16.06% organic matter (Fig 3.)

![Percent Organic Matter Chart](image)

![Soil pH Chart](image)

Fig. 3. Percent organic matter of all sites

Fig. 4. Soil pH of all sites

Soil pH

The soil pH in Site A Substrate was 5.6 while Site A Topsoil was 6.8 and Site PA East (18 meters from Site A) was 7.0. Site A Substrate and Site C had similar pH readings 5.6 and 5.8, respectively. The average of the sites was a pH of 6.3.

Water Holding Capacity

The water holding capacity varied greatly between the sites. Site A had the lowest water holding capacity of only 29.2% of its dry mass. The highest water holding capacity was site D which held 126.3% of its dry mass. Sites B, C, and D held at least 20% more water per dry mass than sites A Topsoil and A Substrate (Fig. 5.).

![Water Holding Capacity Chart](image)

Fig. 5. Water holding capacity of all sites

Percolation Rate

The Percolation Rate Analysis was only performed on sites A Topsoil, A Substrate, B and C. In site A Topsoil, the average rate of percolation over 7.5 minutes was 12.29 mm/min. In site A Substrate, the average rate over 15 minutes was 4 mm/min. In site B the average rate over 20.5 minutes was 4.15 mm/min. In site C the average rate of percolation over 12.5 minutes was 6.8 mm/min (Figs. 6 – 9).
Soil Compaction

The soil density at all of the sites, except for site PB North, increased in density with depth. The majority of the sites in and around site A, excluding the Levee site, had the highest density readings. Site A density increased more quickly with depth than the surrounding sites. The readings around 15 centimeters in depth were between 3.0 and 3.5 kg/cm², which is more dense than any of the other sites with the exception of PA East.
**Discussion**

The reason for the lack of herbaceous, sapling, and shrub vegetation over the relatively large area at site A, is not entirely clear. Distinguishable factors at Site A, compared to Sites B, C, and D seem to be amount of clay in the substrate, the degree of soil compaction, the difference in pH between the topsoil layer and the substrate layer, the difference in the percolation rate between the topsoil layer and the substrate layer, and the low water holding capacity of the substrate soil at Site A.

The cause of compacted soil is likely due to the greater quantity of clay than in the other sites, which in turn may be the cause of the slow percolation rate, and the low water-holding capacity. A similar layer of compaction was not found at the other sample sites.

Because the area is flooded and sediment is deposited annually, according to Sheldon (1974), the fine soil particles may percolate through the pores of the surface soil. Kozlowski (1999) attributed inhibition of seed germination, seedling mortality, and seedling growth to soil compaction in forest stands which in turn resulted in high soil strength, decreased infiltration of water and poor soil aeration. Under these circumstances the meristematic tissues of plants had limited supplies of their physiological growth requirements.

Other factors which prevent vegetation growth in this depression may be the length of time that water stays on the site. Flooding can inhibit root formation and branching and the growth of mycorrhizae. Flooding alternates the structure of soils, reduces oxygen, increases carbon dioxide, starts the process of anaerobic decomposition of organic matter, and reduces iron and manganese (Kozlowski, 1997).

Seed germination of wetland species of *Acer rubrum*, *A. saccharinum*, *Platanus occidentalis*, and *Ulmus Americana*, all of which are found on this site do not germinate while soaking in water (Kozlowski, 1997).

**Works Cited**


PBB Contamination of Cattle Feed in Michigan, 1973

Susan Dykstra
Faculty Advisor: Marlos Scrimger
Department of Earth Resources and Science
University of Michigan-Flint

Introduction

In 1973, Michigan suffered the worst chemical and agricultural disaster in the United States. It was through the diligence of one farmer, Frederic Halbert, who experimented and confronted the government for answers. Frederic Halbert earned a Master of Science degree in Chemical Engineering and had obtained a job with Dow Chemical Corporation (Enswiller, 1974). He decided after working at Dow Chemical that his first love was the farm. He decided to move his family to the farm that he owned along with his father, Frederic Sr., and his brother Mark. Frederick Jr. was married and had two young daughters at the time of the contamination. This document will show the effects of the contamination and how those affected have endured.

Background

Between April 1973 and May 1974, Michigan suffered the worst chemical and agricultural disaster in the history of the United States (Reich, 1983). This disaster will forever be known as the PBB Contamination of Cattle Feed in Michigan. In the end over 33,000 cattle had to be destroyed and the dairy industry was never the same (Reich, 1983). It began in 1973 when Frederic Halbert a Battle Creek, Michigan farmer began noticing his herd was becoming lethargic (Enswiller, 1974). As the days progressed, the herd became more ill. His first inclination was that maybe there was something wrong with the newly purchased feed (Enswiller, 1974). Mr. Hilbert called his regular veterinarian, who determined that there was something definitely wrong with the herd, but he could not tell what it was caused from (Enswiller, 1974).

His first inclination was the same Mr. Halbert’s; it must be the feed because the herd was healthy prior to the new shipment. Both Mr. Halbert and the veterinarian called Michigan Farm Services, the distributor of the feed and were told immediately that there was not a problem with the feed (Reich).

Halbert’s Experiment

Mr. Halbert, having a background in chemical engineering decided to do an experiment with the calves in his herd (Reich). He quarantined the calves from the rest of the herd and fed them only the newly purchase cattle feed (Enswiller, 1974). Within days, the calves were sick and eventually all fourteen of them died (Enswiller, 1974). This experiment confirmed Mr. Halbert’s suspicion that the cause of the herd’s illness was in fact the feed (Enswiller, 1974). After the first experiment, Mr. Halbert contacted Michigan Farm Services and informed of them of his results (Johnston, 1981). At this point, Michigan Farm Services refused to issue a recall and did not contact the Michigan Department of Agriculture to notify them of the concern (Johnston, 1981).

Mr. Halbert immediately contacted the United States Department of Agriculture in Ames, Iowa and had that laboratory test the feed. (Enswiller, 1974). It was at this point Mr. Halbert was
contacted by Frank Mullens and was informed that the federal government could not afford to do the testing for a “private one person problem.” (Enswiller, 1974) Mr. Mullens stated “His work was beyond my authority to use funds. I know this sounds a little bureaucratic, but we only have certain authority” (Enswiller, 1974). Mr. Halbert then began making phone calls and found a few private research facilities that could do the testing at Mr. Hilbert’s expense (Enswiller, 1974). After several months, a break finally came when the Wisconsin Alumni Research Foundation found that indeed there was a foreign substance in the feed, but they could not tell what it was (Enswiller, 1974).

Mr. Halbert took that information and informed another USDA lab technician that was not connected or under the authority of the Ames, Iowa laboratory. By mistake, the lab technician had left some type of chemical on the feed for too long of a time period and thus the answer was found (Enswiller, 1974). The prolonged use of the chemical resulted in the findings that the cattle feed contained Polybrominated Biphenyls (PBB) (Enswiller, 1974). The lab technician had noticed that this chemical was the same type that he had tested earlier for Michigan Chemical Corporation when they initially introduced the chemical (Enswiller, 1974). By this time, his herd was becoming increasingly sicker and was developing these symptoms; loss of hair and noticeable sores on the skin, deformed hooves on adult cattle that were curling up, loss of milk production as much as 40%, loss of appetite, difficulty conceiving, still births and actual live births with deformed calves (everything2.com).

How the Disaster Occurred

It was in April 1973, when a worker mistook a bag of Polybrominated Biphenyl for the feed supplement magnesium oxide (Reich). The Polybrominated Biphenyl was known as FireMaster, which is a fire retardant that is used in children’s clothing (Reich). The feed supplement went by the brand name Nutrimaster. The mistake Michigan Chemical Corporation in St. Louis, Michigan and Michigan Farm Services in Lansing later swore to in court documents was that both had employed workers who could not read. (Reich) Michigan Chemical Corporation also claimed that there was a work stoppage and the economy of the country was in a deep recession. It was the intention of Michigan Chemical Corporation to cut back on costs and they did. One cutback was to buy the same color of bags with the same colored lettering for both chemicals. This was a problem because Michigan Chemical Corporation also employed workers who could not read and relied on the colors of the bags to tell the difference. There were also different names being used for Nutrimaster and when several of the workers who could read notified their supervisor that a new product came in the warehouse called FireMaster, they were told that this was just another name for the nutrient. Thus, FireMaster was added to the cattle feed and shipped statewide. Michigan Farm Services’ response was that there may be a problem with the feed and they contracted a lab to test the feed. Michigan Chemical Corporation denied that there was anything wrong with the feed. It was at this time that Mr. Halbert contacted the Federal Drug Agency and they sent an inspector immediately to the site of the packing plant, Michigan Farm Services. It was here that the inspector found a half bag of opened PBB and thus the cause of the herd’s illnesses and deformities were finally identified. This was only the start of the problems for most of the citizens of the State of Michigan and the farmers. By the time this problem was discovered, 15 farms had been contaminated and 98% of the citizens of the State of Michigan had been contaminated with PBB through the ingestion of beef, milk and dairy products, along with other animals and their products. The PBB contamination was not only
confined to the dairy herds. Other animal feed went through the same process and machinery as the cattle and theirs was also contaminated.

**Political Climate of the United States In 1973**

The year 1973 saw many drastic changes in the way the citizens of the United States viewed their political leaders. Much was discussed on the political corruption of our leaders. Any comments and ideas the politicians made and suggested were met with skepticism. This was the beginning of Watergate and the subsequent resignation of the President of the United States, Richard Nixon. So, when it was stated that there was nothing wrong with the feed, it was most likely met with skepticism. Two months after the discovery of the PBB in the feed and the knowledge that the citizens of Michigan were contaminated with PBB, the federal government sent a crew of bureaucrats to Michigan to meet with the citizens. The bureaucrat’s goal was to inform the citizens that there were no ill effects of PBB exposure and it would definitely not cause cancer. This was met with hysteria as most people knew that there was no scientific data to back these statements up because fire retardant was a relatively new chemical.

**Aspects**

Many tests have been conducted by scientists that have concluded the following:

- Early onset of menstruation in girls in Michigan at the age of 11 compared to 12.88 nationally (www.Salon.com).

- Early onset of menopause in women in Michigan, typically at age 45-50, whereas, nationally the age is 50-55. (www.obgyn.net)

A federal research laboratory found that the chemical PBB may have a wide range of harmful health effects of humans, in addition to the finding that the chemical causes cancer in humans (Magnusson, 1981). The form of liver cancer found among the laboratory animals that ate the PBB is fairly rare in the United States and is considered untreatable (Magnusson, 1981).

Six hundred rats and mice were fed normally but given varying doses of a solution of corn oil and PBB through a tube in their stomach for six months, then allowed to live out their average life span of eighteen months. (Magnusson, 1981). Then their organs and blood were tested for the effects of PBB. (Magnusson, 1981). Scientists at the research lab were hesitant to say that a substance will cause cancer in humans if it causes cancer in lab animals (Magnusson, 1981). However, the researchers say that this is true in 18 out of 19 cases studied (Magnusson, 1981). Because of the incidence of liver cancer increased among the mice and rats according to the amount of PBB ingested, Michigan farmers are more likely to be the most threatened (Magnusson, 1981).

A state study that discounted possible human illness caused by a fire retardant mixed in cattle feed is completely invalid (Johnston, 1981). Dr. Walter Meester of Blodgett Memorial Hospital in Grand Rapids said he came to that conclusion because some persons in a control group who were thought not to have been exposed to the chemical actually had the substance in their blood. (Magnusson, 1981). One of the study’s directors stated, “This does muddy the waters a bit” (Magnusson, 1981). The Public Health Department (state) maintains on the basis of its study, that it can find “no pattern of illness” attributable to PBBs (Johnston, 1981). In the state study, all but three of the 110 exposed persons in all had measurable levels of PBBs in their
blood (Johnston, 1981). In the control group 83 of the 104 people tested had PBBs in their blood. The control group had 30 children all of whom had PBB in their blood. (Johnston, 1981).

A U.S. Food and Drug Administration official said Michigan farms are so contaminated with PBB that it is now impossible to eliminate traces of the fire retardant from all foods produced on them (Haradine, 1976). The guidelines in 1976 banned foods with more than 3 parts per million of PBB (Haradine, 1976). A panel named by then Governor William Milliken had recommended that the level be lowered to the lowest amount that can be accurately measured, which in effect would ban foods with even traces of the chemical (Haradine, 1976).

**Disposal Sites**

The Michigan Department of Environmental Quality stated that there were only two sites in Michigan chosen as burial pits, Mio and Kalkaska (mdeq.gov). Further investigation at the Calhoun County Health Department in Battle Creek, Michigan revealed more burial sites of animal carcasses and feed. Those sites are: Pennfield Landfill in Calhoun County, Michigan, Smiths Creek Landfill in Kimball Township, St. Clair County, Forest Waste Disposal, Otisville, Genesee County, three sites in Sanilac County and the State of Nevada.

All health departments in the state were contacted and only two responded. In the burial pits: 33,000 cattle, 1.5 million chickens 1,470 sheep, 5,920 hogs, 865 tons of feed, 17,900 pounds of cheese, 2,630 pounds of butter, 34,000 pounds of dry milk and 5 million eggs were buried.

**Kalkaska County: Kalkaska Michigan**

Michigan decided to locate an environmentally safe site for burial of carcasses (Shah, 1978). After reviewing several locations and existing landfills in Michigan, the site in Kalkaska County was chosen and test drilled in order to determine the long range protection to ground waters of the area (Shah, 1978). The 25 acre site is located on the state-owned land in E ½. SE ¼. Section 10, T25N, R5W, Garfield Township, Kalkaska County, Michigan (Shah, 1978).

Prior to hydrology and topography selecting the below location (see Figure 1) the preliminary factors considered were geology, hydrology and topography, isolation from nearest inhabitants and surface water bodies, availability of access roads and natural openings, wildlife habitat, and forest management (Shah, 1978). The site in Kalkaska County satisfied all of the above factors; further, a few test bores were obtained, and four groundwater observation wells were installed at three locations (Figures 2 and 3) for the accurate determination of subsurface geology and groundwater conditions (Shah, 1978).

The surface and near surface sediments in major parts of Michigan are of glacial origin and the topography of the area is gently rolling with an average elevation of 1271 feet above the sea level at the site (Shah, 1978).

The subsurface test hole and well data show that the glacial sediments underneath and adjacent areas are predominantly sandy with some interbedded silts and clays (Figure 3) (Shah, 1978). Boring logs further indicate that at the depth of about three to five feet thick there is sandy silt and clay layer which continues throughout the disposal area (Shah, 1978). In some areas, traces of silt intermixed with sand are encountered below 40 feet and all the way down to the water table (Shah, 1978). Subsurface data from monitoring wells to the west and northwest indicate silt and clay material slowly disappears in that direction (Shah, 1978). Initially, observations wells were installed at three locations as shown in Figure 2 in order to determine the accurate depth of water table and the direction of groundwater flow (Shah, 1978). The static
water levels in these wells indicate that water table is about 95 feet below the ground surface and the direction of flow is N40°W with the rate of less than 1ft/day (Shah, 1978). Data from additional monitoring wells (indicated by triangle and letter M in figure 2) located in the northwesterly direction have confirmed groundwater flow direction and also provided more subsurface information regarding the composition of glacial materials and aquifer thickness (Shah, 1978). Two monitoring wells (M-4d and M-9d) extend to the depth of about 150 feet, indicating an aquifer thickness of at least 50 to 60 feet (Shah, 1978).

Further investigation at the Calhoun County Health Department in Battle Creek, Michigan revealed more burial sites of animal carcasses and feed. Those sites are: Pennfield Landfill in Calhoun County, Michigan, Smiths Creek Landfill in Kimball Township, St. Clair County, Oscoda Dump in Oscoda County, Forest Waste Disposal, Otisville, Genesee County and to the State of Nevada.

**Pennfield Landfill, Calhoun County**

Pennfield Landfill was licensed by Michigan Department of Natural Resources on October 6, 1969. The property is the North ten acres of the northwest one-quarter of the northwest one-quarter of Section 26 and the south five acres of the north fifteen acres of the northwest one-quarter of Section 26, Town 1, South, Range 7, Pennfield Township, Calhoun County. The site for the disposal was 10’ wide, 9’ deep and 30’ long. Burial was 15-20’ deep.

Pennfield Landfill was owned by Wes Carter of Battle Creek. It had been cited several times by the Calhoun County Health Department for poor maintenance and exposure of contaminated bags of grain. Residential well testing near the landfill had been done 29 times between 1975 and 1988. The results of each test indicated no detection of PBB. The tests were done by Laboratory and Epidemiological Services of the Michigan Department of Public Health. A temporary injunction was ordered on July 29, 1974 until August 14, 1974 by the Township of Pennfield to halt the delivery of contaminated grain to the Pennfield Landfill. The amount of contaminated grain dumped at the landfill was 1,530 tons (wbck.com). In health department reports, it is noted Carl Okar dumped 80 head of cattle at this landfill.

Apparently, Farm Bureau balked at or delayed payments to Calhoun County. In a letter to Michigan Farm Bureau, the Health Department stated “All of the feed was not from Calhoun County and Calhoun County taxpayers should not have to bear the supervision costs for burying out of county contaminated feed.” According to Calhoun County Health Department reports for Pennfield Landfill, it received contaminated grain from Elkton Cooperative (Huron County), Remus, Kent City, and Ithaca.

A letter dated August 14, 1975 was sent by Calhoun County Health Department to inform the Michigan Department of Natural Resources that effective October 15, 1975 it will no longer accept hazardous waste. A final cover for the landfill was ordered October 13, 1975. A letter dated April 29, 1977 from the Calhoun County Health Department to Wes Carter, stated “the final cover was not in compliance with the required cover on the agreed date”. It was recommended that a hearing be held with the Resource Recovery Commission to make a determination on violation of Act 87, P.A. 1965, Solid Waste Management Systems, Rule 23, Final cover (8).

The landfill is now officially closed.
Forest Waste Disposal, Genesee County, Michigan

There was very little information that could be found regarding this site other than the county of Genesee cooperated fully with the Michigan Department of Natural Resources and the Environmental Protection Agency. The site is now officially closed.

According to memos to Calhoun County from then Attorney General Frank Kelley, there was a landfill located in Genesee County, Michigan named; Forest Waste Disposal, 8359 E. Farrand, Otisville, Michigan. Kelley noted Smiths Creek Landfill located in Kimball Township, St. Clair County.

Oscoda County, Mio Michigan

Burial of cattle were in three clay lined pits (ludingtonnews.com). Judge Alan Miller awarded $20,000 to the Oscoda PBB Action Committee (www.ludingtonnews.com). Judge Miller stated “the group had performed a service even though they did not prevent the burial of cattle in one of three clay lined pits.” (www.ludingtonnews.com).

Michigan Department of Natural Resources buried 1500 cattle here before Attorney General Frank Kelley intervened and suggested that the cattle should be incinerated (www.ludingtonnews.com).

Smiths Creek Landfill, Kimball Township, St. Clair County, Michigan

This landfill is located at Griswold Road, Kimball Township, and St. Clair County. There is no information on what was buried, the amount or the disposal method.

Sanilac County, Michigan

The health department director at the time of the incident, who is now retired, will not return calls. Locations of the sites are only speculative at this time, as residents have given me the location. Two of the sites are in the Brown City area and one site is in the Argyle area.

Nevada

In January 1980, the Michigan Department of Natural Resources announced that 2,000 additional cattle will be shipped to Nevada for disposal (www.ludingtonnews.com). There is no additional information available on this site.

Regulations

Michigan Department of Natural Resources regulations for landfills accepting feed:

- Require at least a twelve foot separation between the trench bottom and the water table
- Require an immediate two foot earth cover after deposition
- Utilize the “Hazardous Waste Land Disposal Report form dated 10/73
- Maintain 500 feet isolation from any surface water, water well or building

Method of Disposal

In most cases, PBB-contaminated animals were brought alive to the Kalkaska and Mio sites and then killed in a humane fashion in the stockade area under the supervision of veterinarians from the Michigan Department of Agriculture (Shah, 1978). Afterwards dead animal carcasses were deposited side by side to form one layer in a 15 ft deep trench excavated in dry, sandy material a shown in Figure 3 (Shah, 1978).
Body cavities of animal carcasses were cut open for the escape of gases prior to placing 2ft. of sand immediately over them followed up by complete filling of trenches with at least 10 ft of sand within 24 to 48 hrs (Shah, 1978). After all the trenches in designated disposal area (Figures 2 and 3) were filled, the whole area was graded in order to provide adequate slopes for surface water runoff (Shah, 1978). Then the polymer bentonite soil sealant (Dowell M-179 product) was evenly spread at a rate of 35 tons per acre and blended in with 4 to 6 inches of sand (Shah, 1978). This seal was installed to prevent surface water infiltration into disposal trenches and provide increased run-off towards sealed drains along the perimeter of the disposal areas (Shah, 1978). Perimeter drains discharge surface water into shallow seepage basins, located away from the disposal areas (Shah, 1978).

Further, on the top of the soil sealant layer, sand cover 2 ft thick was placed and the final surface was seeded with mixture of grasses in order to restore the landscape in its natural state which provides an excellent wildlife opening in a heavily forested area (Shah, 1978). Rainfall in this part of the state averages 32 inches per year (Shah, 1978). It is estimated that two-thirds of the rainwater is lost in the form of evapotranspiration and one third of the rainwater is partly lost as runoff from the site above soil sealant layer and partly absorbed by the root system developed by the vegetation, thus reducing infiltration potential into carcasses containing PBBs and increasing protection to the groundwater of the area (Shah, 1978).

The Phase I disposal area first received approximately 10,000 to 11,000 animal carcasses, most of which had PBB levels above 1ppm in fat (Shah, 1978). The Phase II disposal area received close to 20,000 animal carcasses, mostly having PBB levels above 0.3ppm but in general less than 1ppm in fat. The Phase I area appears to be larger than Phase II but it received almost half the number of animals received by Phase II area (Shah, 1978). This happened because in the initial stages of disposal operation lot of space between trenches was not utilized due to lack of proper planning of trench locations, but the trench depths were still maintained at 15 ft below ground level (Shah, 1978).

**Groundwater Monitoring**

In addition, to the initially installed four observation wells, 12 more wells have been installed in the direction of groundwater flow to provide a complete groundwater monitoring system (Shah, 1978). This system will be used to monitor water table fluctuations and quality of groundwater (Shah, 1978). Out of a total of 16, wells M-4d and M-9d provided monitoring points 45 to 55 ft. below the water table (Shah, 1978). Monitoring data from 1974 to 1978 shows that water table elevation in this area fluctuates to 1ft and there has been no degradation in groundwater quality from PBBs or any other contaminants from the disposal area (Shah, 1978).

**Gratiot County, St. Louis, Michigan**

Michigan Chemical Corporation was purchased by Velsicol Chemical Company shortly after the disaster and operations were moved to Chicago. Velsicol was the subject of a manager buyout in 1986 and then was acquired by private equity firm Arsenal Capital in 2000. Three years later, Arsenal split the business and created a new company called Genovique Specialties. (www.bizyahoo.com). Three sites in the county have been linked back to the company and are listed on the National Priorities List (NPL) as Superfund Site (www.epa.gov). They are the Factory Site, Gratiot County Golf Course and the Gratiot County Land Fill (www.epa.gov). Michigan Chemical Corporation dumped their hazardous waste at these sites and was required to
clean the sites (www.epa.gov). The county golf course was the result of the cleanup efforts. (mdeq.gov).

The Pine River ran adjacent to Michigan Chemical Corporation and is the subject of a massive cleanup effort. This cleanup effort has been coordinated by The Pine River Superfund Cleanup Task Force, a citizens’ advisory group. This cleanup has cost over 100 million dollars and has included installation of sheet piling, dewatering and dredging operations. (www.stlouismi.com).

**Gratiot County Landfill, St. Louis, Michigan**

The 40 acres landfill is located in SW1/4, SE 1/4, Section 30, T12N, R2W, Bethany Township, Gratiot County, Michigan (See Figure 1) (Shah, 1978). The landfill is owned by the County and is situated southeast of the City of St. Louis (See Figure 4) (Shah, 1978). After learning about the presence of 269,000 pounds of waste containing 161,40 to 188,300 pounds (60 to 70%) of polybrominated biphenyls in the landfill, in March of 1977 the Michigan Department of Natural Resources started preliminary (Phase I) hydrogeological investigation of the site (Shah, 1978). The investigation was conducted by locating PBB wastes in the landfill and determining possible contamination of the ground and surface waters of the area. The Phase I study was completed in July of 1977 (Shah, 1978).

The landfill is located on a rather narrow northwest-southeast trending (See Figure 4) Gladwin recessional moraine of the Saginaw ice lobe of the middle Wisconsinan age (Shah, 1978). The thickness of the glacial drift in the site area is approximately 400 feet underlain sandstone and stable bedrock which is part of the Grand River formation of Late Pennsylvanian Period (Shah, 1978). Well records in the area indicate that upper part of the glacial drift is composed predominantly of clay and silt tills which are interbedded with stratified and sorted sand and gravel deposits (Shah, 1978).

**Outcome**

Since the “incident” as Farm Bureau calls it, Michigan Farm Services had over one thousand claims filed by farmers seeking damages in addition to clean up expenses and legal fees, which severely impacted the company financially. (www.michfb.com)

Finally adverse economic conditions, high interest rates and lost sales cost Michigan Farm Services to sustain significant bottom line losses from 1974-1981 (www.michfb.com) Michigan Farm Services filed for reorganization Chapter 11 Bankruptcy in 1982. They emerged from bankruptcy protection in 1984 with a new name, AgraLand Incorporated. This business has failed. (www.michfb.com)

**Mitigation**

Since the disaster, many new laws were enacted to protect the citizens, the environment and to offer remediation to contaminated sites. Those laws are the Clean Water Act of 1973, the Comprehensive Environmental Response Compensation and Liability Act of 1980 (CERCLA), the Resource Conservation Recovery Act of 1977 , the Safe Drinking Water Act of 1974, Superfund Reauthorization Recovery Act of 1986 (SARA) and the Toxic Substance Control Act of 1976 (TOSCA) (Repic) The best known is the CERCLA and SARA. Both require a remediation plan and cleanup of a contaminated site. CERCLA requires notification of any release of a reportable release of a hazardous material. (Repic) It also established a trust fund. SARA amplified CERCLA requirements. (Repic) It requires certain businesses to prepare
inventory reports listing hazardous materials in their possession, (Repic). It assists in the development of community emergency response plans and the reporting immediately of hazardous releases. (Repic) CERCLA also provides a federal “superfund” to clean up controlled or abandoned hazardous waste sites as well as accidents, spills and other emergency releases. (Repic) SARA also created a tax on the chemical and petroleum industries for the cleanup of a site. (Repic). None of the environmental laws compensate humans for their illnesses associated with chemical disasters. (www.aliciapatterson.org)

The other area that is not covered is the moral and financial responsibility of the chemical companies and their stockholders, owners and officers. Some countries hold these individuals responsible, not only financially but criminally for anything that occurs at a site. Maybe if someone could be held responsible for the outcome of their company, they will be extra diligent in keeping the citizens and the environment safe.

Acknowledgements

This author would like to thank the Michigan Milk Producers for access to their archives and sending articles relating to the disaster. I would like to thank the Calhoun County Health Department and their staff for allowing me direct access to their files and providing me with an office. Marlos Scrimger, M.S., Lecturer, University of Michigan-Flint for sparking my interest in environmental hazards, mitigation and the history of the environmental movement. To Dr Edwin Chow, former Professor at the University of Michigan-Flint and now teaching at Texas State University for convincing me to switch majors from Business Management to Environmental Sciences. To my daughter, Melissa Dykstra, who is always asking questions about the environment and for giving me support to continue with this report. May she never forget and always appreciate the environment and become a good steward. Finally, appreciation and admiration to the Nick S and Sharon G. George Research Fund, which enabled me to investigate this environmental tragedy. Research funds such as these will forever guarantee that the environment will be safe for future generations.

Bibliography


Emshwiller, John, “How a Dairy Farmer Battled Bureaucracy in His Search for a Cattle Killing Chemical”, Wall Street Journal, June 20, 1974

Haradine, Jane, “Officials Told Elimination of PBB Impossible in Food from Michigan, Grand Rapids Press, June 11, 1976


Magnusson, Paul, “Toxic Effects of PBB Extensive, Study Finds”, Detroit Free Press,
June 24, 1981.


Repic, Randall, Class notes, Fall 2008, University of Michigan-Flint.


www.epa.gov, (Region 5 Superfund sites), retrieved November 25, 2008


www.michfb.com, website and emails

The Remediator, MDEQ Volume 1 No. 2 “New Criteria for pCBSA Developed After Discovery at St. Louis Superfund Site

Michigan Environmental Council, History Project, retrieved September 8, 2008


Repic, Randall, PhD. Class Notes, Fall 2008, RPL 486, Site Assessment, University of Michigan-Flint

www.aliciapaterson.org

www.mmpa.com

www.mdeq.gov

www.msu.edu

www.stlouismich.com
Correlations Among Psychosocial Factors and Do Not Resuscitate Order Decisions in a Sample of Independent Elderly

Donya Sorensen

Faculty Advisors: Thomas Wrobel and Eric Freedman
Department of Psychology
University of Michigan, Flint

Abstract

The present study examined the relationship between psychosocial factors such as physical health, depression, social support, in predicting Do Not Resuscitate (DNR) order preferences in a sample of elderly individuals living in an independent senior center. Eight male and 16 female (M = 77.4) years old were administered a demographic measure, the Self-rated Health Scale (SRHS), the Geriatric Depression Scale (GDS), the UCLA Loneliness Scale, and were presented with ten scenarios describing different end of life situations, along with two DNR order decisions. Results indicated significant correlations between the SRHS, GDS, and UCLA Loneliness Scale. Significant correlations were also found between the three scales and the demographic measures. No significant effects were found between the different scenario outcomes and the demographics measures and scales. These findings add greater reliability to the SRHS, GDS, and UCLA Loneliness Scale in predicting adaptation in the elderly.

With the emergence of advanced medical technologies the issue of patient autonomy has become more apparent in American society. The most basic definition of a Do Not Resuscitate (DNR) order is the refusal of Cardiopulmonary Resuscitation (CPR), which is the attempt to restart breathing and the heart in patients who experience cardiac arrest (Cantor et al., 2003). This order is open to interpretation and, therefore, some medical institutions require separate orders for different elements of CPR (Cantor et al.). The issue of DNR orders presents an emotional challenge for those in the medical field, the patients, and their families. It is important to understand why a patient might wish to die instead of being artificially resuscitated or kept alive by artificial means like ventilation, feeding tubes, etc. It is also important to understand why a patient might decide to maintain life against all odds. What are the factors that aid in this decision? The goal of the present research is to examine the relationship between DNR order preferences and a number of demographic measures such as age, religion, marital status, etc., along with physical health, depression, and social support. This study will attempt to answer the question of whether these factors have an influence on DNR order decisions in an elderly population (60 and older). This study also aims to examine the correlations between demographic measures and physical health, depression, and social support.

Physical Health and Depression

There is substantial evidence that reveals that physical health has an effect on one’s quality of life (e.g., Smith, Jennings, & Cimino, 2010; Kostka, & Jachimowicz, 2010; Aichberger et al., 2010). It has been found that physical activity plays an important role in cognitive functioning (Aichberger et al.). Specifically, Aichberger and colleagues found that physical inactivity is a predictor of cognitive decline over a 2.5 year period in adults aged 50 or older. Physical health also has an effect on depression (Unsar & Sut, 2010). Unsar and Sut
examined the relationship between depression and health in the elderly and showed that patients who had higher rates of depression were ill longer than those who did not have depression. The elderly who had depression reported more pain, discomfort, and less mobility than those without depression (Unsar & Sut). These findings revealed a negative correlation between depression and the measures used to assess physical health (Unsar & Sut). This suggests that participants with higher depression scores may also report an overall lower quality of life than those who are not depressed in the present study. It has also been discovered that those with lower health related quality of life (HRQL) have significantly higher mortality rates (Otero-Rodriguez, 2010). The present study will attempt to examine the relationship between these findings and DNR order preference by observing the relationship between scores on a Self-Rated Health Scale (SRHS), number of medications, mobility, and answers to DNR order scenarios and options.

Collins, Goldman, and Glei (2009) revealed that depression significantly predicts higher rates of mortality. They also found that higher life satisfaction significantly decreased mortality rates and that life satisfaction decreased with age, therefore, increasing mortality rates (Collins et al.). These findings reveal an overall lower quality of life as a result of depression and old age.

Bai, Chiou, Chang, and Lam (2008) further examined the correlations between depression and physical health. They found that depression has a positive relationship with the amount of diabetic complications, and that depression has a negative influence on exercise and health improvements (Bai et al.). These results indicate that depression negatively influences one’s health. The relationship between these variables suggests that as people age and health deteriorates the risk of depression increases. This finding highlights the importance of examining this variable in the present study. Since depression correlates with physical health and overall life satisfaction, it may play an important role in end of life preferences in the elderly.

Social Support

Previous studies reveal a connection between social support and overall quality of life in the elderly population (e.g., Avlund et al., 2004; Tiikainen, Leskinen, & Heikkinen, 2008; Lennartsson, 1999; Golden et al., 2009). Avlund and colleagues found that social activity plays an important role in the overall physical and mental health, and on the mortality of old adults. Conversely, loneliness is associated with poor mental and physical health (Tiikainen et al.). Lennartsson discovered that social contacts with friends have an effect on health, rather than health status having an effect on social contacts. Close friends have been shown to have a positive effect on the overall well being of old adults (Lennartsson). Furthermore, Bai, Chiou, Chang, and Lam (2008) found that there is a significant negative correlation between social support and depression. Since there is overwhelming evidence that social support effects both mental and physical health, the present study aims to examine how levels of social support relate to other dimensions such as depression, health, and DNR order preferences.

Predictors of DNR Orders

Messinger-Rapport and Kamel (2005) examined the predictors of DNR orders. They discovered that subjects that were 85 years and older were more likely to have DNR orders. DNR orders varied as a function of race in the elderly, with 49% of whites requesting DNR orders as opposed to only 13% of African Americans (Messinger-Rapport & Kamel). There was also a higher number of people who had been diagnosed with depression and/or a greater number of medical conditions who had DNR orders (Messinger-Rapport & Kamel). There were no differences in subjects who were wheelchair or bed bound as compared with those who had
greater mobility (Messinger-Rapport & Kamel). This study provides evidence that the variables in the present study may significantly correlate with each other, with the exception of mobility. Messinger-Rapport and Kamel used archival and observational data in this study, and the present study will use survey data in order to add more depth to this type of research.

Previous research has revealed that physical health, depression, and social support correlate with one another. Research also suggests that there is a negative correlation between these factors and overall life satisfaction. This could play an important role in the decision to sign a DNR order. The present study will use the SRHS along with number of medications and mobility to assess physical health. The Geriatric Depression Scale (GDS) will measure the level of depression, and the UCLA Loneliness Scale will be used to assess social support. Answers to 10 end-of-life scenarios and 2 different DNR order choices will be used to reveal participants’ preferences in end of life decisions. These answers along with demographic measures will be correlated with the three psychosocial measures to reveal possible relationships. Based on previous findings, many outcomes are predicted. Firstly, it is predicted that the decline of physical health will increase depression. Secondly, lack of social support will reveal a negative correlation to physical decline and depression. Thirdly, age will have an effect on the psychosocial variables measured. Lastly, older age, depression, loneliness, and medical complications, will increase the likelihood that a participant will advocate DNR orders.

Methods
Participants
Eight men and 16 women age 60 and older (M = 77.4) were recruited from an independent senior living community in an upper mid-western suburb. All participants were fairly independent and did not need assistance with everyday tasks like bathing, cooking, and cleaning. The participants’ race was primarily white, with one being black and one identifying as other. Twenty-five percent were married, 8.3% were single, 20.8% were divorced/separated, and 45.8% were widowed. Most of the participants (75%) identified as religious, which meant that they actively participated in church and/or held beliefs consistent with their identified religion. The Each subject was given a Visa gift card for their participation. All participants were tested individually and were treated in accordance with American Psychological Association’s (APA) ethical guidelines.

Measures
A demographics sheet was administered that included race, gender, marital status (i.e. married, single, divorced/separated, or widowed), age, religion, number of medications, and level of mobility. The latter was assessed by participants’ self-rating on a 7-point Likert scale with 1 representing the least mobile and 7 representing the most mobile.

The SRHS was used to assess participants’ physical health. This scale consists of one item that asks participants to rate their current health from 1 (poor) to 4 (excellent). This scale has been shown to be a reliable and valid measure in women aged 70 and older (O’Brien Cousins, 1996). O’Brien Cousins suggests that this measure can be a useful tool in the elderly population at large.

The 15-item (short) version of the GDS was used to assess depression. This asks participants to respond by circling ‘yes’ or ‘no’ for each item. A score of 5 and above indicates that a participant may be depressed. This measure has been used in a number of studies and research on the measure’s validity found that it is reliable and valid in determining depression in
old adults (Herrmann et al., 1996). Pomeroy, Clark, and Philp (2001) found that the short version of the GDS performed as well as the long version (30-item), indicating that the 15 item version of the GDS should be as effective in the present study as the 30-item version.

The UCLA Loneliness Scale (version 3) was used in the present study to assess participants’ level of social support. This scale consists of 20 statements, with 11 being negatively structured and 9 positively phrased in which each statement begins with “How often do you feel…” (Russell, 1996) and participants are asked to respond as either 1 (never), 2 (rarely), 3 (sometimes), and 4 (always). This scale has been used with a variety of populations (e.g., college students, hospital nurses, school teachers, and the elderly) and has been shown to be a reliable and valid measure in each population (Russell).

In order to assess participants’ views on DNR orders, 10 end-of-life scenarios were modified from 17 end of life decision situations created by Cicirelli (1997). The scenarios described fictitious people with illnesses varying in degrees of severity and outcome as shown in Table 1. In the present study, participants were asked to respond to each scenario by indicating whether the person should sign a DNR order or not. Another assessment of DNR order preferences was modified from a Designation of Patient Advocate Form by the Michigan State Medical Society (2005). This legal document contains 3 different DNR order options. The first specifies that the patient wishes to discontinue life sustaining treatment if they are in a coma, persistent vegetative state, or have any other medical condition in which the burdens and cost of treatment would outweigh the benefits. The second choice was omitted because it included elements of the first and third choices, which may lead to participant confusion. The third choice indicates that the patient wishes to receive life sustaining procedures no matter what the cost or outcome of the treatment. The participants responded to each statement by either agreeing or disagreeing.

**Procedure**

Data was collected from an independent-senior living apartment complex in an upper-Mid-west suburban community. Recruitment occurred during recreational activities in the main hall at the facility. Appointments were scheduled using a signup sheet and via telephone calls. Meeting times varied depending on the schedule of the participant and experimenter. The location of the interview also varied, with most being in the facilities library and some being in the participant’s home.

Before beginning the interview, the experimenter asked the participant if they would like to read the consent form and scales themselves, or if they would like the experimenter to read them aloud. The purpose of this accommodation was to allow those with impaired eyesight or insufficient reading abilities to accurately understand the information. The consent form informed the participant that the subject of death would be discussed and that the length of time for participation was estimated to be about one hour. Participants were told that they could leave any question blank if they did not want to answer it and that they were free to discontinue the interview at any time. The experimenter then administered the consent form and answered any questions the participant may have had before beginning the interview.

The first measure administered was the demographics sheet, which included race, gender, marital status, age, religion, number of medications, and mobility. Religion was assessed by asking the participant to elaborate on whether they were affiliated with a specific religion or not, if they held religious beliefs, and if they participated in religious activities. The number of medications was assessed by asking the participant to write the number (not type) of different
medications they were currently taking. Participants were asked to self-rate their mobility by circling a number on a 7-point Likert scale with 1 representing the least mobile and 7 representing the most. Next, the SRHS was administered, followed by the GDS and UCLA Loneliness Scale. These scales were administered in two different ways: The experimenter read the items aloud and wrote the participant’s response, or the participant read and wrote the answers to the items on their own.

During the second part of the interview, the experimenter read the end of life decision situations aloud and asked participants to respond that either this person should sign a DNR order or that this person should not sign a DNR order. After administering the end of life scenarios, the experimenter then read the DNR order choices. The experimenter asked the participant to respond by either agreeing or disagreeing with each item. If the participant expressed that they agreed or disagreed with parts of both choices, the experimenter asked them to choose the one that they felt strongest about. After all data was collected, the experimenter thanked the participant for their involvement and gave them a gift card for their participation.

Results

Descriptive Statistics

As shown in Table 2, the scores for the UCLA Loneliness Scales range from 19 to 63 ($M = 35.08$) indicating that loneliness in this sample is slightly higher than in the study conducted by Russell (1996; p. 29; $M = 31.51$). GDS scores indicate that, overall, the sample is not depressed ($M = 2.09$). Scores on the SRHS show that the sample population self-rated as having good health ($M = 2.92$).

Correlates

Table 3 shows a significantly large negative correlation between the UCLA Loneliness Scale and mobility, $r(22) = -0.50$, $p < .05$. Results also indicate a significant negative correlation between loneliness and health, as measured by the SRHS, such that, $r(22) = -0.61$, $p < .05$. These findings show that lower mobility and health may have negative effects on social interaction. Mobility is also significantly negatively correlated to age, $r(21) = -0.71$, $p < .05$, showing that age leads to less mobility. There is also a significant negative correlation between mobility and medication $r(21) = -0.42$, $p < .05$, which indicates that those who are less mobile tend to require more medications. A significant negative correlation between mobility and health is also apparent $r(22) = -0.64$, $p < .05$. These correlations indicate that loneliness, age, and overall health significantly influence mobility.

A large significant negative correlation exists between the GDS and UCLA Loneliness Scale, $r(22) = -0.76$, $p < .05$, indicating that depression and loneliness have a negative relationship with one another. The GDS is also significantly negatively correlated to mobility, $r(22) = -0.60$, $p < .05$, and the SRHS, $r(22) = -0.62$, $p < .05$. These results support the hypothesis that declining health negatively correlates with depression and that both depression and health negatively correlate with lack of social support. The only significant correlation found regarding DNR order preferences and psychosocial variables (depression, social support, and declining health) was found between End of Life Decision Scenario 6, shown on Table 1, and age, $r(22) = -0.48$, $p < .05$. No other significant correlations between measures related to DNR orders and psychosocial variables, which does not support the hypothesis that older age, depression, loneliness, and medical complications, will increase the likelihood that a participant will advocate DNR orders. Results also indicate that an overwhelming majority (91.7%) agreed with choice 1 as opposed to
choice 2 (8.3%) on the DNR order preferences, indicating that most participants agreed with the discontinuation of life sustaining procedures in the event that treatment and cost would outweigh expected benefits.

Discussion

While the initial intent was in predicting DNR order preferences in a sample of independent elderly, results did not show significant relationships between the psychosocial variables and DNR order preferences or the end-of-life scenarios. Results were greatly skewed, with most of the sample (91.7%) preferring choice 1 on the DNR order preferences, and together with the small sample size ($n = 24$), results failed to reach significance in prediction that psychosocial variables would affect the likelihood that a participant would advocate DNR orders. Relationships between the psychosocial variables, the GDS, SRHS, and UCLA Loneliness Scale were found.

Results show that mobility and health negatively correlated with the UCLA Loneliness Scale, which supports the second prediction. The finding that self-rated health has a negative relationship with the UCLA Loneliness Scale is consistent with that of Russell (1996). Unlike Russell, the present study also found that mobility is correlated to the UCLA Loneliness Scale. Mobility in the study by Russell, which is described as “functional status” (p. 30), was measured objectively with the Physical Functioning subscale of the Duke-UNC Health Profile, whereas in the present study, mobility was self-rated. Russell also found significant correlations between the UCLA Loneliness Scale and self reports of chronic illness and self-ratings of health. The UCLA Loneliness Scale is a self-report measure and these findings indicate that this scale may be more compatible with other subjective, self-rated scales rather than objective scales.

Mobility was also found to be related to age, health, and number of medications. As age increases mobility decreases and number of medications increase. Declining health seems to be a function of the increase of age. The finding that number of medications increases with the decline of mobility may also be a function of old age.

Results from the GDS support the first and second predictions in showing that depression is negatively correlated with loneliness, self-rated health, and mobility. The finding that depression negatively affects social support is consistent with that of Bai and colleagues (2008), suggesting that as one’s social network deteriorates, depression increases. During interviews most participants indicated that many of their friends had died. Previous findings show that the social support of friends may be more important than family in maintaining overall well-being in old adults (Lennartsson, 1999). This shows that the absence of friends may have had a negative effect on the loneliness and depression scores in the present sample. The finding that depression negatively affects one’s health is consistent with previous findings (e.g., Unsar & Sut, 2010; Collins et al., 2009). Unsar and Sut found that participants with higher rates of depression tended to suffer from longer duration of illnesses and more medical complications. Collins and colleagues found that depression predicts higher mortality rates. These findings suggest that the results from the GDS are reliable and valid in the present study.

Limitations

As previously noted, the small sample size may have played an important role in the present findings. With a larger sample size, significant relationships between the psychosocial variables and answers to DNR order preferences and end-of-life scenarios may have been found. Messinger-Rapport and Kamel (2005) found that subjects with a DNR order were more likely to
have been diagnosed with depression than those who did not have one. They also found that those who signed a DNR order had suffered from a greater number of medical conditions than those who did not (Messinger-Rapport and Kamel). This study was conducted with a much larger sample size (n = 177) than the present study (n = 24), indicating that a larger sample size may have yielded significant results between the psychosocial variables measured and answers to DNR order preferences and end-of-life scenarios.

Another limitation in the present study is a lack of ethnic diversity. With only one black participant and one identifying as other, no significant differences in race could be determined. Messinger-Rapport and Kamel (2005) found that there was a significantly larger percentage of whites (49%) who requested DNR orders compared to African Americans (13%). This shows that a more diverse sample in the present study may have yielded significant differences between races. Replication of the present study with a larger, more diverse sample may yield more significant findings.

Implications

Correlations between the SRHS, GDS, and UCLA Loneliness Scale and psychosocial variables show that these may be reliable measures in predicting adaptation in the elderly. Findings also reveal significant inter-correlations between these measures, indicating that each of them may be useful in measuring health, depression, and loneliness. Results from the present study provide evidence that the maintenance of psychological health, through increased social interaction and treatment of depression, can lead to better physical health and overall quality of life in the elderly.

References


**Table 1. End of Life Decision Scenarios**

1. Person with diabetes who has had both legs amputated as a result of gangrene, is alone and getting weaker, and is finding wheelchair mobility difficult. Prognosis: Gangrene is likely to recur and prove fatal.

2. Widow with terminal bone cancer for whom chemotherapy has been unsuccessful; side effects are difficult, and her condition is worsening, with only partial relief of pain.

3. Person who has had several heart attacks and needed cardiopulmonary resuscitation (CPR) each time and is very weak and bedridden. Prognosis: Chance of recovery after months of bed rest.

4. Person with incurable disease who is not experiencing any pain now. Prognosis: One year to live.

5. Person who is unable to get relief from unbearable pain.

6. Person with total immobility of arms and legs after a stroke or accident. Prognosis: Chance of regained mobility after years of physical therapy.

7. Person with incurable illness who is totally dependent on others for feeding, bathing, toileting, and so on.


9. Seriously ill person who has been terribly disfigured by treatment and feels rejected by others. Prognosis: Chance of improved self-worth with therapy.

10. Seriously ill person who is anxious, upset, depressed, and in great despair and feels unable to cope. Prognosis: Chance of recovery with medication and therapy.

Adapted from Cicirelli (1997).
Table 2. Descriptive statistics for measures of health, depression, social support, and responses to end of life situations in a sample of independent elderly participants ($n = 24$)

<table>
<thead>
<tr>
<th>Measure</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Rated Health Scale</td>
<td>24</td>
<td>2</td>
<td>4</td>
<td>2.92</td>
<td>.584</td>
</tr>
<tr>
<td>Geriatric Depression Scale</td>
<td>24</td>
<td>0</td>
<td>11</td>
<td>2.08</td>
<td>3.006</td>
</tr>
<tr>
<td>UCLA Loneliness Scale</td>
<td>24</td>
<td>19</td>
<td>63</td>
<td>35.08</td>
<td>10.620</td>
</tr>
<tr>
<td>End of Life Scenario 1</td>
<td>24</td>
<td>1</td>
<td>2</td>
<td>1.21</td>
<td>.415</td>
</tr>
<tr>
<td>End of Life Scenario 2</td>
<td>24</td>
<td>1</td>
<td>2</td>
<td>1.04</td>
<td>.204</td>
</tr>
<tr>
<td>End of Life Scenario 3</td>
<td>24</td>
<td>1</td>
<td>2</td>
<td>1.42</td>
<td>.504</td>
</tr>
<tr>
<td>End of Life Scenario 4</td>
<td>23</td>
<td>1</td>
<td>2</td>
<td>1.61</td>
<td>.499</td>
</tr>
<tr>
<td>End of Life Scenario 5</td>
<td>22</td>
<td>1</td>
<td>2</td>
<td>1.41</td>
<td>.503</td>
</tr>
<tr>
<td>End of Life Scenario 6</td>
<td>23</td>
<td>1</td>
<td>2</td>
<td>1.61</td>
<td>.499</td>
</tr>
<tr>
<td>End of Life Scenario 7</td>
<td>24</td>
<td>1</td>
<td>2</td>
<td>1.17</td>
<td>.381</td>
</tr>
<tr>
<td>End of Life Scenario 8</td>
<td>24</td>
<td>1</td>
<td>2</td>
<td>1.50</td>
<td>.511</td>
</tr>
<tr>
<td>End of Life Scenario 9</td>
<td>23</td>
<td>1</td>
<td>2</td>
<td>1.70</td>
<td>.470</td>
</tr>
<tr>
<td>End of Life Scenario 10</td>
<td>24</td>
<td>1</td>
<td>2</td>
<td>1.83</td>
<td>.381</td>
</tr>
<tr>
<td>DNR Preference 1</td>
<td>24</td>
<td>1</td>
<td>2</td>
<td>1.08</td>
<td>.282</td>
</tr>
<tr>
<td>DNR Preference 2</td>
<td>24</td>
<td>1</td>
<td>2</td>
<td>1.96</td>
<td>.204</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>19</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 3. Correlations among loneliness scores, participant age, number of medications taken, rated mobility, self-rated health and Geriatric Depression Scale scores in a sample of independent elderly ($n = 24$)

<table>
<thead>
<tr>
<th></th>
<th>Loneliness</th>
<th>Meds</th>
<th>Age</th>
<th>Mobility</th>
<th>Health</th>
<th>GDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>UCLA Loneliness Scale</td>
<td>Pearson Correlation</td>
<td>1</td>
<td>.231</td>
<td>.280</td>
<td>-.498*</td>
<td>-.609**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.290</td>
<td>.196</td>
<td>.013</td>
<td>.002</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>24</td>
<td>23</td>
<td>23</td>
<td>24</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Number of Medications Taken</td>
<td>Pearson Correlation</td>
<td>.231</td>
<td>1</td>
<td>.379</td>
<td>-.420*</td>
<td>-.259</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.290</td>
<td>.074</td>
<td>.046</td>
<td>.233</td>
<td>.479</td>
</tr>
<tr>
<td>N</td>
<td>23</td>
<td>23</td>
<td>23</td>
<td>23</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Age</td>
<td>Pearson Correlation</td>
<td>.280</td>
<td>.379</td>
<td>1</td>
<td>-.711**</td>
<td>-.368</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.196</td>
<td>.074</td>
<td>.000</td>
<td>.084</td>
<td>.149</td>
</tr>
<tr>
<td>N</td>
<td>23</td>
<td>23</td>
<td>23</td>
<td>23</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Mobility</td>
<td>Pearson Correlation</td>
<td>-.498*</td>
<td>.420*</td>
<td>-.711**</td>
<td>1</td>
<td>.639**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.013</td>
<td>.046</td>
<td>.000</td>
<td>.001</td>
<td>.002</td>
</tr>
<tr>
<td>N</td>
<td>24</td>
<td>23</td>
<td>23</td>
<td>24</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Self-Rated Health Scale</td>
<td>Pearson Correlation</td>
<td>-.609**</td>
<td>.259</td>
<td>-.368</td>
<td>.639**</td>
<td>1</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.002</td>
<td>.233</td>
<td>.084</td>
<td>.001</td>
<td>.001</td>
</tr>
<tr>
<td>N</td>
<td>24</td>
<td>23</td>
<td>23</td>
<td>24</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Geriatric Depression Scale</td>
<td>Pearson Correlation</td>
<td>.762**</td>
<td>.155</td>
<td>.311</td>
<td>-.599**</td>
<td>-.615**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.000</td>
<td>.479</td>
<td>.149</td>
<td>.002</td>
<td>.001</td>
</tr>
<tr>
<td>N</td>
<td>24</td>
<td>23</td>
<td>23</td>
<td>24</td>
<td>24</td>
<td>24</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).
Particular Gender Differences within Appearance Accuracy

Carl Bastien

Faculty Advisor: Terrence Horgan
Department of Psychology
University of Michigan – Flint

Abstract

Undergraduate students from a Midwestern University (N=130) were tested for their accurate recall of the appearance of a male and a female target. Previous studies indicated that females have an advantage over males in accurately remembering other people but they have been unable to determine specific aspects of appearance that contribute to this advantage. It was predicted that female participants would be able to recall dress-related items but not physical characteristics of the targets better than males, as previous studies suggest that dress-related items are stereotypically female-relevant. The findings did show that men were as accurate as women at remembering the target’s physical features but less accurate than women at recalling what the female target was wearing. Implications of these advantages for eyewitness testimony are discussed.

Previous studies indicated that females have an advantage over males in accurately remembering other people’s appearance (Horgan, Schmid Mast, Hall, & Carter, 2004; Schmid Mast & Hall, 2006). However, studies have not fully assessed specific aspects of appearance that contribute to this advantage. Horgan and colleagues (2004) did not examine the sex differences in the memory for dress-related items versus physical characteristics. The purpose of this experiment was to further explore the differences between males and females in the accurate recall of others’ appearance. The goal was to determine what specific aspects of an individual target do female participants remember better than males: physical features, like height and body shape, clothing and accessories, like glasses and pants, or both? Based on the previous research, it was hypothesized that women would have better memory for the appearance of targets’ clothing and accessories and that there would not be a female advantage in memory for physical features, given that clothing and fashion are stereotypically female-relevant (Hall & Schmid Mast, 2008; Kwon, 1997).

Interpersonal Sensitivity

Interpersonal sensitivity is the appropriate perceptions, judgments and responses between people (Hall & Bernieri, 2001). Thus, interpersonal sensitivity is inherent within human interaction. Although there is considerable research on the general question of whether people can accurately perceive others’ personality traits from their physical qualities (Zebrowitz & Collins, 1997), the research lacks in explaining what particular physical qualities influence interpersonal sensitivity and how this relates to appearance accuracy.

The ability to remember and recall appearance cues (dress, physical features, posture, etc.) about another person is referred to as appearance accuracy. The greater interpersonal sensitivity of women was predicted to give women an advantage over men in appearance accuracy research conducted by Horgan et. al., (2004). Along with overall appearance, women have separately been found to outperform men on recognition of faces, specifically in the
recognition of female faces (Rehnman & Herlitz 2006). When looking at just faces or when looking at a whole person, women more accurately recalled information concerning the appearance of their social targets than did men, but even these recent studies have been unable to determine specific aspects of appearance that contribute to this female advantage. The current study is aimed at determining where females have an advantage over males in appearance accuracy, whether it is physical features (like height and body shape), clothing and accessories (things that people wear on their bodies, and things people adorn like jewelry, glasses, and hair ties) or both?

Accurately assessing members of a group and understanding their emotional states and their personal characteristics can be important when navigating social settings (Carter & Hall 2007). The way men and women respond to and use the information gained from the perceived internal states of other people through verbal, as well as nonverbal cues, is exercising interpersonal sensitivity. Previous studies have investigated accurate recall and interpersonal sensitivity, yet even more research has investigated the gender differences in the accurate recall of the appearance of others (Horgan, et. al., 2004), and how this is important in day-to-day living. The social complexities of everyday life make it important to be able to gather and assess information about people who you encounter. People are constantly giving away information about their social characteristics, even if they are not even speaking. This telling information comes in the form of body gestures, facial expressions, even types of clothes that they are wearing (Lennon, 1986). Sometimes it may be easy for an individual to express himself/herself without saying a word; for instance, it may be easy to tell if a person is angry if they are gazing, their brow is low, and their fists are clenched. Other times these appearance cues are much more subtle, such as the case in a very conservative social setting where people are reserved. Whether it be obvious or subtle, appearance cues are present all the time; successfully and accurately maintaining interpersonal sensitivity may lead to more successful social interactions and relationships (Carter & Hall, 2007). The superior performance of women on tests of interpersonal sensitivity (including, facial expressions, body movements and postures, and tones of voice) is well documented (Hall & Schmid Mast, 2008).

Ecological Sensitivity

Ecological sensitivity can also play a role in interpersonal sensitivity. Whether interactions happen in a professional or a leisurely setting, the environment (including other people in the environment) can impact how people present themselves. A person’s role can be determined by the way in which interactions take place with others in a given environment (Schmid Mast & Hall, 2004). Females have regularly been shown to outperform males at accurately perceiving and interpreting how individuals, groups, and the environment interact and influence one another, in what is defined as ecological sensitivity (Carter & Hall, 2007). To elaborate, ecological sensitivity is the ability to identify and use detected behavior and/or appearance cues of people and the environment they are in. Being aware of your surroundings, including the people in it can be advantageous for many reasons, from using people’s appearance to infer their status and personality, which might be critical to relationship building, or to potentially giving a police statement of a witnessed crime. Hall and Bernieri (2001) go as far as to claim accuracy and/or appropriateness of perceptions, judgments, and responses that individuals have are relevant to nearly all aspects of social relations.
Gender and Memory

Gender stereotypes have been found to exist within everyday memory performance (Herrmann, Crawford, & Holdsworth, 1992). Herrmann et al. (1992) investigated whether gender stereotypes affected everyday memory performance by asking participants to recall a stereotypical masculine task (learning directions to go to a particular place) and a stereotypical feminine task (learning a shopping list). The results were consistent with the gender stereotypes, in that females were relatively better at remembering the shopping list and male were relatively better at remembering the directions. Because clothing and fashion are stereotypically female-relevant (Hall & Schmid Mast, 2008; Kwon, 1997), this may be the reason why females have been shown to have an advantage over males in remembering things about other people (Horgan, et. al., 2004). It was predicted that women would have better memory for the appearance of clothing and accessories and that there would not be any advantage for women over men in remembering physical features, given the former is stereotypically feminine relevant.

In summary, there is evidence supporting a female advantage over men in general appearance accuracy (Horgan et al., 2004). The following study was set up to determine whether there are specific aspects of an individual target that female participants remember better than male participants (namely physical features, like height and body shape, or clothing and accessories, like glasses and pants, or both?). It was predicted that female participants would demonstrate better recall for dress-related items but not for physical characteristics of the targets than male participants, given that clothing and fashion are stereotypically female-relevant (Hall & Schmid Mast, 2008; Kwon, 1997).

Method

Participants

One hundred thirty-eight undergraduate students from a Midwestern U. S. University (71 women and 67 men, all under the age of 35) participated in the study. The participants were recruited from introductory psychology courses and they participated in return for partial course credit. The majority of the participants were freshmen and Caucasian although no specific demographics were recorded. Data were discarded from 7 of the participants because they knew one or both of the targets in the video and another participant’s data was discarded because he inadvertently received an incomplete questionnaire. The analyses were performed on the remaining 130 participants, who were tested individually or in groups of 2-3. All participants were treated in accordance with APA ethical guidelines.

Materials

Two videos were created for this research. One of the two videos was a 6.21 minute long clip of a college-aged Caucasian male (the male was wearing just shorts) and the other video was a 4.54 minutes long clip of a college-aged Caucasian female (the female was wearing shorts and a tank top). Most of the targets’ physical features were visible so that participants’ memory for the target’s physical features could be tested. The targets were in what was referred to as ‘workout attire.’ They spoke of their health and workout routines and they stretched on a mat in order to give the participants a normal scenario as to why they were not fully dressed in casual clothing. Along with the above-mentioned clothing articles, the male was also accessorized with two earrings in his left ear The female wore earrings in both ears, her hair was in a ponytail, she was wearing a chain necklace, and she had on white fingernail polish.
Questionnaires were created to assess participants’ appearance accuracy. The questionnaires for the male and female targets consisted of 36 questions with categories that included items pertaining to the target’s physical features (27) and the target’s clothing and accessories (9). The questionnaires were created by compiling questions about each of the targets physical features, the clothing and accessories that each was wearing. Fewer questions addressed what the targets were wearing due to the limited amount of clothing each of the targets had on his or her body. The questionnaire included three formats of questions: true/false, multiple choice, and drawings of the physical characteristics (e.g., pictures of the targets’ nose and eyes). Each of the questions had only one objectively correct answer and the format for the picture questions included the one objectively correct drawing and 2 distracter pictures.

Pre-testing
The questionnaires went through pretesting that included two phases. First, the targets themselves were given the questionnaires to select the drawings that they believed accurately depicted of their own physical characteristics. The female target agreed with the artists’ drawing of 8 of the 9 pictures of her features (hairstyle, nose, eyes, eyebrows, upper body, teeth, ears, and face when smiling). The picture that she reported did not represent her was the picture of her lips. It was later realized that the correct drawing of her lips were accidentally turned upside-down when making the questionnaire, consequently the picture of her lips was dropped from the questionnaire. The male target agreed that all 9 of the drawings of his physical features (hairstyle, nose, eyes, eyebrows, upper body, teeth, ears, lips, and chin) were accurate, and thus they were all included on the final questionnaire.

The second phase of the questionnaire pretesting included 38 undergraduate psychology students (26 females and 12 males) from the same Midwestern University as the research participants. Only the questions in which there was an element of subjectivity were pretested; for example, pretest participants read the question, “His lower legs (calf region) are: a) not very hairy b)very hairy” on the male questionnaire. The pretesting participants were asked to read each of the questions and the answer alternatives while they watched the video. The videos of the targets were played and then paused when the appropriate physical feature was clearly visible, and as much time as needed was given to the pretesters to answer each of the questions. Only questions in which 95% of pretest participants agreed on the same answer were included on the final questionnaire. This resulted in 3 of the questions being dropped from the questionnaire for the male target, and 3 of the questions being dropped from the questionnaire for the female target. Examples of dropped items include identifying the body type (thin/lean, large, muscular, average build, heavy) and identifying the eye spacing (closely, normally, or widely spaced apart). The final questionnaire consisted of 36 questions for the male target and 36 questions female target.

Procedure
Once the participants arrived for the research, they were brought into a classroom where the experimenter introduced himself. Participants were instructed that they were going to watch a short video of a person and that they would be answering questions about the person in the video, which would be either male or female. Instructions were intentionally vague to avoid any potential motivational advantage for female participants, as previous research suggests that memory for what others look like could be a female-relevant task (Herrmann, Crawford, & Holdsworth, 1992). Participants were then asked to read and sign the informed consent to be a
part of the research. All of the students agreed to participate. Participants were randomly assigned to watch either the male or female target video. When the video was over, the experimenter turned the video off and handed out the memory questionnaires for the target person that the participants had just seen. When they were finished with the questionnaire the experimenter debriefed them, thanked them, asked them not to share any information about the experiment with other students, and then excused them.

Results

The current study looked at 4 dependent variables of participants’ memory for the target’s appearance: an overall appearance accuracy score, and appearance accuracy scores for the target’s physical features, appearance accuracy for the head only, and appearance accuracy for the target’s dress. To come up with the appearance accuracy score, participants received a 1 if they had selected the correct answer and a 0 if they had selected any of the other answer alternatives. Participants received 4 appearance accuracy scores, which was the sum of the items on the questionnaire that they had answered correctly: an overall total; a physical-features-only total; a head-only total; and a dress total. Each total score was then divided by the total number of relevant items on the questionnaire, resulting in proportion correct scores, or simply participants’ appearance-accuracy scores, for the target overall and for the target’s physical features, head, and dress.

Participants’ overall appearance-accuracy scores for the target were entered into a 2 (participant gender: men vs. women) X 2 (target gender: male vs. female) ANOVA that had participant gender and target gender as the between-participants factors. There was a marginally significant main effect of gender, F (1, 126) = 3.45, p < .07; women had somewhat better memory for the overall appearance of the targets (M = .75) than did men (M = .71). There also was an unexpected main effect of target gender, F (1, 126) = 12.10, p = .001, showing that participants remembered the male target’s overall appearance (M = .77) more accurately than the female target’s (M = .70). However, participant gender did not interact with target gender, F (1, 126) = .46, p > .49.

Dress totals revealed a gender main effect for the female target, F (1, 61) = 4.20, p < .05, showing that women (M = .88) had superior memory for the female target’s dress relative to men (M = .78). No gender main effect was found for the male target’s dress, however, F (1, 65) = 1.55, p > .21 (Female M = 1.29; Male M = 1.19). As predicted, there was no main effect of gender either for the male target physical features, F (1, 65) = .19, p < .66, or the female target physical features, F (1, 61) = 1.27, p < .27. There was no evidence that women had superior memory for the appearance of targets’ physical features (Male target: Female M = .71; Male M = .69. Female target: Female M = .66; Male M = .63).

Discussion

Main finding

Previous studies indicate that females have an advantage over males in accurately remembering other people (Horgan, et al., 2004; Schmid Mast & Hall, 2006), however, specific aspects of appearance that contribute to this advantage have not been examined. Because clothing and fashion are stereotypically feminine-relevant (Hall & Schmid Mast, 2008; Kwon, 1997), it was predicted that female participants would be able to recall dress-related items but not physical characteristics of the targets better than males. The findings did show that men were as accurate as women at remembering the target’s physical features but less accurate than women at
recalling what the female target was wearing. There was no gender difference found in the memory for what the male target was wearing. These findings are likely due to the fact that he was only wearing shorts and his only dress-related articles were two earrings worn in his left ear. Thus, there was an unavoidable ceiling effect of correctly answered male target dress-related questions. This ceiling effect is not thought to have influenced the overall results of the current study because previous research has already found that women do have an advantage in dress-related memory recall, (Horgan et al., 2004; Schmid Mast & Hall, 2006).

The purpose of the current study was to examine men’s and women’s memory for targets’ physical features, therefore, targets wore very little dress items in order to make features available that included more specific physical characteristics than that of previous research (Horgan, et. al., 2004; Schmid Mast & Hall, 2006). Past research has shown a female advantage over men in general appearance accuracy (Horgan, et. al., 2004), but the advantage was probably restricted to what the target was wearing (clothes and personal artifacts). The current findings were consistent with the hypothesis, that because clothing and fashion are stereotypically female-relevant (Hall & Schmid Mast, 2008; Kwon, 1997), women would have an advantage over men in remembering clothing and accessories (of the female target), and there would not be any female advantage in memory for physical features of the targets.

**Related findings**

Whether they are aware of it or not, people are using interpersonal sensitivity throughout their life to navigate a variety of social settings. From judgments made based on the way another person looks, to using the appearance of another’s neatness to accurately or inaccurately assess their status, accurately assessing people’s status has many advantages (Schmid Mast & Hall 2004).

Studies have found that females have a general advantage over men in appearance accuracy (Horgan, et. al., 2004). The current study provided evidence of the specific domain where women do not have an advantage over men in appearance accuracy, namely the physical features of others. Drawings included in the questionnaires for analysis has built upon previous research on gender differences in appearance accuracy by helping to define the specific aspects of appearance cues that females were and were not better than males at remembering.

The findings from the current study could have implications when it comes to eyewitness accuracy of crimes. Mistaken eyewitness identification is the single most common precursor to the conviction of innocent people (Cutler & Wells, 2009). Lindsay, Wallbridge, and Drennan (1987) found that a witness who identified a suspect but not his or her clothing was less likely to have made an accurate identification than a witness who also selected the appropriate clothing. A better understanding of the differences in the way people recall specific information about others can add to greater reliability in eyewitness testimony (Berger & Herringer, 1991).

**Methodological considerations**

The current study is part of a continuing line of research that investigates the implications of gender differences in memory for other people. In the past, research has given attention to the overall appearance of other people (Schmid Mast, & Hall 2004; 2006), and even attention just to the faces of other people (Berry, Finch & Wero, 1993). None of the previous studies had investigated the particular aspects of another’s appearance the way that the current study categorized physical characteristics as well as the things that people wear. The current study still has its limitations. Even though this study uses more questions based on specific physical
features of the target, there are differences in what physical features were available for each of the targets in the videos. The male in the target video was wearing only a pair of shorts, which left a large portion of his body and physical features available to be observed and asked about. The female in the target video, although wearing far less clothing than when casually dressed, was wearing shorts and a tank top. The tank top that the female was wearing automatically reduced the amount of physical features that were available to be observed. Therefore, the male target in this experiment had more of his physical body features available for observation than the female target.

The current study could have limited generalization due to the demographics of the participants and the targets which they are observing. The entire sample of participants (along with the male and female targets) consisted of undergraduate students at a Midwestern U. S. University under the age of 35. This sample therefore does not reflect all people potentially asked to recall information about others’ appearance in a given situation. In a field study conducted using varying-aged individuals, Daniel Yarmey (1993) showed that young adults (aging from 18-29) were superior to middle-aged and older adults (aging from 30-65) in recall accuracy for the physical appearance of a young female target. Beyond the greater recall memory that younger adults may possess, a same-age effect could have occurred due to the targets and participants relative age similarity in our study. A future study might examine whether the same pattern of results would be seen with older participants.

Targets in the experimental videos had a ‘typical appearance’ based on the demographics of a Midwestern University in the United States. The videos of the targets included one Caucasian male who was in his early twenties and one Caucasian female who was in her early twenties. Neither target had distinctive physical features or wore distinctive clothing (for example, neither the male or female target had any sort of disproportional body features such as a large nose or ears, or wore neon-colored shorts). This is noted because Shapiro and Penrod (1986) concluded that distinctive target characteristics improved recall accuracy.

Like many studies on gender differences in eyewitness memory, the places in which the video and the questionnaire were conducted/administered were both laboratory settings. The methodology of the laboratory setting in many research experiments is common because it permits the investigator to control variables and try to establish causal relationships. A possible limitation of the current study is whether the results would generalize to a real-world setting in which a real-life event required a person’s accurate recall of another person’s appearance (dress, physical features). Studies that investigate eyewitness identification in a field setting and eyewitness accuracy have been conducted (Yarmey 1993), but the gender differences and the specifics in regard to physical body features versus clothing have yet to be tested. Compared to a crime scenario, there is no stress in the laboratory setting, and stress effects memory and reduces accuracy (Deffenbacher et al., 2004). Future studies should experiment with different scenarios that seek to determine accuracy of eyewitness testimony of a real-world event; more realistic settings that include testing the gender difference of accurate recall of others could provide stronger evidence of a female advantage.

Two of the factors considered necessary for admissibility of eyewitness testimony by the Supreme Court (Manson v. Brathwaite, 1977; Neil v. Biggers, 1972, as cited in Cutler and Wells, 2009) are the length of time between the crime and the identification, and the level of certainty of the eyewitness. These variables were not measured during this study. All of the participants in the current study watched the same video, so exposure time to the video for each of the participants was equal (male target video 6.21; female target video 4.54). Shapiro and Penrod
(1986) concluded that longer viewing times increased recall accuracy; therefore, if the videos were longer, then there is the possibility that participants could have answered more questions accurately. The time between viewing the targets and answering the questionnaire was not uniform. It is not known what the time frame would be for optimal memory recall, identified as the event-identification interval. Although it is believed that forgetting increases with time (Wells & Murray 1983), Berger and Herringer found no significant main effect or interaction when they tested time delays in eyewitness recall accuracy. It is also unknown if participants guessed on a question and got it right, or if they thought they had the question right and it was in fact wrong. The certainty participants felt about their answers was not recorded in our study. Although certainty of participants’ responses was not recorded, Wells and Murray (1983) did reach the conclusion that courts should not rely on certainty to infer accuracy of eyewitness testimony.

Women’s advantage over men in appearance accuracy seems to be limited to what people wear on their bodies. This may be because clothing and fashion are stereotypically female-relevant (Hall & Schmid Mast, 2008; Kwon, 1997). Memory recall in eyewitness identification is far from examining all of the factors that are found in actual crimes (Cutler & Wells, 2009). The implications for the female advantage over males for eyewitness accuracy in the real-world should be the focus of future research on this topic.

References


Posttraumatic Growth, Perceived Directness of Traumatic Events, and Religious Strength Among Students

Lynn Jarrell
Faculty Sponsor: Kanako Taku
Department of Psychology
Oakland University

Abstract
Posttraumatic growth (PTG) is described as positive change after trauma. This study was done to examine PTG in participants who reported different levels of religious strength and the perceived directness of a traumatic event. PTG is measured using the PTG Inventory, which has five subscales. The subscales include Appreciation of Life, New Possibilities, Relating to Others, Personal Strength, and Spiritual Change. Participants reported religious strength as: Not Religious At All, A Little Religious, Religious, or Strongly Religious and appraised traumatic events as direct or indirect. Participants included 656 American and Japanese undergraduate students. A series of t-test were performed to evaluate the differences in PTG among participants who reported differences in perceived directness among different levels of religious strength. There were significant differences in “Appreciation of Life” for every level of religious strength, showing those who perceived traumatic events as happening indirectly had a higher score. “New Possibilities” for participants who reported not being religious at all (n = 230), and “Relating to others” and “Spiritual Change” for participants who reported being religious (n = 183) also showed significant differences. Results showed that PTG differs among participants according to directness of trauma and religious strength. Limitations and future directions of the current research will be discussed.

Introduction
Posttraumatic growth (PTG) includes the positive changes that occur as a result of a traumatic event (Tedeschi & Calhoun, 1996). Tedeschi and Calhoun (1996) designed the PTG Inventory to measure positive changes that occur in trauma victims and grouped these changes into five categories: Spiritual Change, Appreciation of Life, Personal Strength, Relating to Others, and New Possibilities. The traumatic events that are experienced can include death of a loved one, accidents, serious academic problems and relationship problems among others events and can be identified as direct or indirect occurrences. Religiosity can be defined as the amount of religious strength a person reports. There is a growing body of literature on PTG but there has been limited research done to examine the relationships that may exist between this variable and perceived directness of traumatic events among those who report different levels of religious strength. These two concepts are important in relation to PTG because religion has been found to be used as a coping mechanism when handling traumatic events and perceived directness can affect how individuals react to traumatic events (Pargament et al., 2000). Focusing on these two variables can help psychologists design specialized treatment plans based on the perceived directness of an event and the religiosity of an individual to enhance the PTG that individuals in each of these categories experience.

The relationship between PTG and many aspects of religion and spirituality have been explored. A literature review on posttraumatic growth, religion, and spirituality showed that the
experience of traumatic events can lead to the deepening of religion or spirituality and that positive religious coping, religious openness, and religious participation are associated with posttraumatic growth (Shaw, Joseph, & Linley, 2005). Prati and Pietrantoni (2009) conducted a meta-analysis of factors that affect posttraumatic growth and found that spirituality has been shown to be moderately correlated with posttraumatic growth. Krumrei, Mahoney, and Pargament (2009) also found that the use of adaptive spiritual coping to deal with trauma, such as divorce, is positively correlated with PTG. There has been research done to examine religious involvement and coping, which may be outcomes of religiousness, in relation to PTG but there has been little research done to examine religious strength directly. The significance of religion to an individual may be an important predictor in how individuals react to traumatic events and experience PTG.

There has been little research done on the perceived attribution of traumatic events and the effect this has on posttraumatic growth. A literature review done by Linley and Joseph (2004) suggest that posttraumatic growth scores are affected by the subjective experience of a traumatic event and not just the event itself. This shows a relationship between perceived attribution and PTG but doesn’t explain if these two concepts are negatively or positively related. There has also been little research done to examine the effect of direct and indirect attributions among different populations of religiosity. It may be possible that among the population of individuals who report high religiosity, that those who experience direct traumatic events will report higher levels of PTG than those who report indirect traumatic events. The attribution of a traumatic event as direct or indirect is important when determining the growth that can occur from this experience and lacks exploration. The perceived directness of an event is a factor that can possibly be used to determine not only its relation to PTG but what categories of PTG indirect and direct events foster among different populations. This knowledge would allow mental health workers to better tailor treatment plans to patients and find out what areas of PTG lack growth. This could allow for treatment of areas that don’t improve in individuals who perceive events as direct or indirect.

This study was done to examine PTG in participants who reported different levels of religious strength and perceived directness of their most traumatic event.

Methods
Participants
The participants in this study included 656 American and Japanese undergraduate students. American students were recruited from Introduction to Psychology courses and Japanese students were Teaching majors who volunteered. Among participants who reported being “Strongly Religious” there were 30 (62.5%) who reported direct traumatic events, 16 (33.3%) who reported indirect traumatic events, and 2 (4.2%) who did not respond. Among participants who reported being “Religious” there were 124 (67.4%) who reported direct traumatic events, 59 (32.1%) who reported indirect traumatic events, and 1 (0.5%) who did not respond. Among participants who reported being “A Little Religious” there were 135 (66.5%) who reported direct traumatic events, 62 (30.5%) who reported indirect traumatic events, and 6 (3.0%) who did not respond. Among participants who reported being “Not Religious At All” there were 162 (69.5%) who reported direct traumatic events, 68 (29.2%) who reported indirect traumatic events, and 3 (1.3%) who did not respond. The average age of the participants was 19.8 years old and the standard deviation was 2.7 years. The participants consisted of 193 (29.4%) males and 463 (70.6%) females. The participants were 52.3% Caucasian, 5.5% African American, 2.4% Asian or Pacific Islander, 2.3% Arabic or Middle-Eastern, 1.1% Hispanic, 0.3%
Native American, 4.7% reported other, and 0.3% did not respond. Most students were in their second year of undergraduate school.

**Measures**

The Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996) is a 21 item instrument used to assess the positive changes that occur as a result of a traumatic event. American participants were asked to rate each item on a scale ranging from 0 (I did not experience this change as a result of a traumatic event) to 5 (I experienced this change to a great degree as a result of my traumatic event). The PTGI is comprised of five subscales: Appreciation of Life, New Possibilities, Personal Strength, Relating to Others, and Spiritual Change. Appreciation of Life consists of two items, New Possibilities consists of five items, Personal Strength consists of four items, Relating to Others consists of seven items, and Spiritual Change consists of two items.

The Japanese Version of the Posttraumatic Growth Inventory (PTGI-J) was used to assess the positive changes, in Japanese speaking individuals, that occur as a result of a traumatic event. The PTGI-J was developed by back translating the PTGI from English into Japanese. The scale used in the PTGI was also used in the PTGI-J and the subscales were the same except that spiritual change and appreciation of life were combined.

Participants were asked to list the most stressful event that occurred within the past five years. The perceived directness was assessed by asking participants to appraise the traumatic event as direct or indirect. Participants were also asked to rate their religiousness as: Strongly Religious, Religious, A Little Religious, or Not Religious At All.

**Results**

There were significant differences in PTGI scores for most subscales among participants who reported being religious, suggesting that this moderate level of religiousness may foster growth in those who report indirect traumatic events (Table 1). A series of t-test were performed and revealed significant differences in Appreciation of Life for every level of religious strength: Strongly Religious $t(46) = -2.33, p<.05$, Religious $t(183) = -2.91, p<.01$, A Little Religious $t(197) = -3.65, p<.001$, and Not Religious at all $t(230) = -6.21, p<.001$. Participants who perceived traumatic events as indirect reported higher levels of Appreciation of life among each level of religious strength. Relating to others $t(183) = -3.34, p < .001$ and Spiritual Change $t(183) = -2.84, p < .01$ for participants who reported being religious also showed significant differences, with participants who reported indirect events having higher scores. Participants who reported being Religious experienced significant differences in PTGI total score $t(183) = -2.29, p < .05$, with those who perceived traumatic events as occurring indirectly scoring higher. Participants who reported being Not Religious At All showed significant differences on New Possibilities $t(230) = 3.41, p < .001$. Those who perceived traumatic events as happening directly had a higher score.

**Discussion**

Posttraumatic growth differs among participants according to directness of trauma and religious strength. Among all levels of religious strength greater appreciation of life was reported when a traumatic event was reported as indirect. This may suggest that, regardless of religious significance, individuals who report indirect trauma reflect on their lives and give their lives greater meaning. This could lead to the reduced practice of risky and harmful behaviors.
Participants who were not religious at all and reported direct traumatic events produced higher scores on new possibilities. The experience and survival of traumatic events may be attributed to personal coping skills and not religious significance. The lack of religious importance may also encourage the belief that life is unpredictable and lead to a new outlook on how the individual views themselves and their environment.

Being religious is associated with higher scores on spiritual change and relating to others for those who report indirect occurrences of traumatic events. This may be due to a belief that faith in a higher being will reduce the chance that trauma will occur directly in the future. Additionally, individuals may better relate to others because of the increased need to cherish and foster relationships due to religious beliefs.

The results of this study suggest that moderate levels of religious strength bolster PTG in individuals who report indirect occurrences of traumatic events. This is important because it could lead to the encouragement of participation in religion by health care workers to foster PTG. The incorporation of religion into healthcare, as a type of treatment, to increase posttraumatic growth would be very controversial but it could bolster growth in trauma victims and is a topic worth exploring.

Among all levels of religious strength participants who reported indirect occurrences of traumatic events typically scored higher on Appreciation of Life, Relating to Others, and Spiritual Change. These participants also had higher PTGI total scores across religiousness. The subscales new possibilities and personal strength produced higher scores among religiousness for participants who reported direct occurrences of traumatic events. The differences in the scores on the subscales may be due to participants who report indirect occurrences looking at the experiences of others and building off of those experiences by bettering their life in regards to interpersonal relations, religion, and cherishing life. These individuals may see others go through pain and observe the consequences these individuals endure and cause others. This could cause individuals to take steps to avoid these problems by bolstering their relationships with others, growing spiritually, and developing personally through learning how to better appreciate life. The differences in new possibilities and personal strength may occur more in those who report direct occurrences because they have endured a conflict directly and feel that personal strength is the cause of their survival. The experience of a traumatic event may allow these individuals to have a new outlook on life and themselves in regards to living life to the fullest.

This study was unique in addressing the relationship between perceived directness and posttraumatic growth among those who report different levels of religiousness. The limitations of this research include the use of perceived and not objective directness and the use of a sample with varying demographics among each of the categories of religiousness. The sample of “Strongly Religious” participants was very small compared to the other groups of religious strength used in this study and the sample varied on characteristics such as religion and ethnicity. The use of college students and a sample that consisted of only American and Japanese college students was also a limitation. The small sample of strongly religious participants may have been the result of a cohort effect or the outcome of adolescents and young adults minor interest in strong religion. The age and culture of the samples may have also influenced the type of traumatic events that were experienced, the perceived directness of traumatic events, and the amount of posttraumatic growth that occurred following a traumatic event. Participants should have been asked if they considered themselves to be from individualistic or collectivist cultures. This is also a factor that could influence religious strength and perceived directness.
In the future researchers should look into how different religions classify the perceived directness of traumatic events and how posttraumatic growth differs among these events. Also perceived and objective directness should be compared to determine the factors that influence the relationship between these two variables. The relationship between religious strength, directness, and posttraumatic growth should also be explored to determine if there are negative, positive, or curvilinear relationships between these variables. A sample that includes participants that range from adolescents to adults should be used. This would control for and reveal any cohort affects that may exist among the sample. Participants should be asked if they consider themselves to be a part of collectivist and individualistic cultures. This would help control for confounding variables and may also help explain any differences that occur among religious strength and perceived directness.

References


Table 1. Directness and Posttraumatic Growth Mean Scores and Standard Deviations by Religious Strength

<table>
<thead>
<tr>
<th></th>
<th>Strongly Religious (n = 46)</th>
<th>Religious (n = 183)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Direct</td>
<td>Indirect</td>
</tr>
<tr>
<td>Total</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td></td>
<td>54.4</td>
<td>23.3</td>
</tr>
<tr>
<td>Relating to Others</td>
<td>2.1</td>
<td>1.1</td>
</tr>
<tr>
<td>New Possibilities</td>
<td>2.4</td>
<td>1.4</td>
</tr>
<tr>
<td>Personal Strength</td>
<td>3.1</td>
<td>1.3</td>
</tr>
<tr>
<td>Spiritual Change</td>
<td>3.5</td>
<td>1.8</td>
</tr>
<tr>
<td>Appreciation of Life</td>
<td>2.7</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A Little Religious (n = 197)</td>
<td>Direct</td>
<td>Indirect</td>
</tr>
<tr>
<td>Not Religious At All (n = 230)</td>
<td>Direct</td>
<td>Indirect</td>
</tr>
<tr>
<td>Total</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td></td>
<td>49.3</td>
<td>19.7</td>
</tr>
<tr>
<td>Relating to Others</td>
<td>2.4</td>
<td>1.2</td>
</tr>
<tr>
<td>New Possibilities</td>
<td>2.4</td>
<td>1.2</td>
</tr>
<tr>
<td>Personal Strength</td>
<td>2.6</td>
<td>1.2</td>
</tr>
<tr>
<td>Spiritual Change</td>
<td>1.3</td>
<td>1.3</td>
</tr>
<tr>
<td>Appreciation of Life</td>
<td>2.6</td>
<td>1.3</td>
</tr>
</tbody>
</table>

* p<.05
**p<.01
***p<.001
n.s. = Not Significant
The Effects of Living Arrangement and Nation on Posttraumatic Growth

Lauren Rogers, Sean Callan, and Melanie Phillips

Faculty Sponsor: Kanako Taku
Department of Psychology
Oakland University

Abstract

The purpose of this study is to examine the effects of living arrangement and nation on Posttraumatic Growth (PTG). PTG is defined as positive psychological change after a stressful event. The Posttraumatic Growth Inventory (PTGI) is a 21 item scale with 5 subscales that assesses PTG. Participants included 757 college students, from the U. S. and Japan. To determine the interaction effects of the living arrangement (with family, by myself, in the dorm, and other) and nation (U. S. and Japan) on the five PTGI subscales, a factorial ANOVA was performed. There were significant interaction effects (p < .05) for the following three subscales: Relating to Others, F (3, 678) = 3.17, New Possibilities, F (3, 677) = 2.74, and Personal Strength, F (3, 677) = 2.86. These results reveal that a combination of a person’s living arrangement and their culture has an effect on PTG.

Posttraumatic Growth (PTG) is defined as a positive psychological change resulting from a traumatic life event. These traumatic events may range from major world crises, such as a natural disaster, or a more personal issue such as a divorce or a bad relationship (Calhoun & Tedeschi, 1999, pp. 3-4). The Posttraumatic Growth Inventory (PTGI) is the scale commonly used to evaluate a person’s PTG (Tedeschi, Park, & Calhoun, 1998, pp. 5). In this inventory, five subscales of PTG are identified: relating to others, new possibilities, personal strength, spiritual change, and appreciation of life. Participants are asked to rate their personal growth in each of these areas on a scale of 0 (I did not experience growth in this area as a result of my crisis) to 5 (I experienced this change to a very great degree as a result of my crisis,) (Tedeschi et al., 1998, pp 6).

Regarding PTG and the factors that influence it, many demographic variables have been studied. It has previously been determined that nationality has an effect on PTG (Taku et al., 2008). This study found that the Americans and Japanese experience PTG differently due to differences in rumination and ways of thinking about and dealing with a traumatic event. While the Americans are more likely to have an individual sense of individual victimization, more disclosure, and more extended rumination after a traumatic event, the Japanese are more likely to have a sense of shared victimization, less disclosure, and more deliberate and short-term rumination. Although these differences between nation of residence have been discovered, no study has ever examined the effects that a person’s living arrangement may have on PTG.

In a survey conducted by Rab, Mamdou, and Nasir (2008), it was revealed that students living in dormitories experience higher levels of depression and anxiety than those who live at home. Participants in this study consisted of a sample of 87 female medical students. Of these students, 36 resided at home and 51 resided in a dorm. Participants responded to a hospital anxiety and depression scale, and the dormitory residents were found to have significantly higher levels of both anxiety and depression. Twenty nine percent of dormitory residents were found to be depressed, as compared to five percent of those living at home, and 51 percent of dormitory...
residents were found to be suffering from anxiety, as compared to 33 percent of those who reside at home. This shows that there is an emotional difference between students who live in dorms and those who live at home, and that those who live in dorms often have more mental health issues.

A study conducted by Pierce (2009) revealed that students living in the dorms experience more stress in response to a divorce than those living at home. A stress test was administered to a sample of 32 college freshman (11 living at home, 22 living in the dorms) who had experienced a parental divorce. This test rated a student’s stress level on a scale of one to 100. The mean stress test score of those living at home was 37.52, and the mean score of those living in the dorm was 44.09, revealing that students who live in the dorms experience higher levels of stress. Although this study revealed that students in the dorms have higher stress levels than those at home, one problem is that it cannot be determined whether the stress is a result of the divorce or not.

However, a study by Buchanan, Dornbusch and Maccoby (1996) has revealed that living arrangement does have an effect on how adolescents experience a divorce. They found that those who live in arrangement in which they are allotted time to live with each parent (for example, they spend one week living in the mother’s house and one week in the father’s on a rotating basis) experience lower levels of stress than those who live with either the father or the mother. This reveals that in order to properly cope with a divorce, an adolescent must have the opportunity to spend time with both parents (Dornbush & Maccoby, 1996). Applying this principle to college students who live in dormitories, it is possible that the fact they spend significantly less time with parents than those who live at home, could be causing them to have a more negative reaction to a divorce.

Another important factor in coping with a traumatic event is having a comfortable place in life where no stressors are present (Hines, 1997). For many people, home is a familiar place of comfort where many of their life stressors are absent, and a place where they can relax. Many college students who live in dorms lack this area of comfort (Hines, 1997). Students who live in dorms (especially freshman) are often dealing with stressors such as having to find new friends, having new responsibilities (such as cleaning and cooking), and being in an unfamiliar place. With the addition of these stressors to the ones that may already be pre existing in a student’s life, the ability to recover from a traumatic event may be compromised.

Taking into account discoveries of current research comparing the emotional differences and the experience of stress to students who live in dorms or by themselves to those who live at home, it is hypothesized that place of residence does have an effect on PTG. Students who live in college dorms experience significantly higher levels of stress than those who live at home. It is possible that this may have an effect on recovery from a traumatic experience, thus affecting PTG. The current hypothesis is that students who live at home experience higher levels of PTG because they are experiencing less stress in other areas in their life and in general, thus giving them a greater opportunity to focus on recovering from a traumatic event and consequently growing as person as a result.

This study examines PTG in both an American and a Japanese sample, and it has previously been discovered that a person’s nationality has an influence on their PTG (Taku et al., 2009). Taking this into account, it is also possible that a person’s living arrangement and their nation of residence has an on PTG. These cultures have different ways of thinking about and coping with a traumatic or stressful event and different methods of socialization for dealing with traumatic events (Taku et al., 2009). Due to the cultural differences in rumination, disclosure,
and thinking patterns, it is further hypothesized that living arrangement and nationality may have a combined effect on PTG.

**Method**

**Participants**

Participants from two nations (America and Japan) took part in this study. There was a total of 757 participants (American \( n = 469 \); Japanese \( n = 288 \)). In the American sample there were 199 males (25.5%), 347 females (74.3%), and 1 (1.7%) did not respond. In the Japanese sample, there were 110 (38.6%) males, 171 (60.0%) females, and 4 (1.4%) chose not to respond. The average age of the participants was 19.7 (SD = 2.37) years old, and most (98.9%) were in their first two years of college. The American sample was asked to take part in the survey as part of their introductory psychology class, and the Japanese sample consisted of teaching majors who volunteered to take part. There were four options given for living arrangement: with family, by myself, in the dorm, or other. Three hundred ninety five participants reported living with their families, 305 (65%) from the U.S. and 90 from Japan (31%). One hundred sixty eight participants reported living alone, 24 from the U.S. S., 104 (50%) from Japan, 144 lived in the dorms 97 (21%) from the U.S. S., 47 (16%) from Japan, and 48 participants reported “other for their living arrangement 41 (9%) from the U.S., and 48, (3%) from Japan. Answers for “other” included living with a roommate or significant other, and living with extended family.

**Measures**

*Posttraumatic Growth Inventory (PTGI):* The PTGI is a paper and pencil survey in which participants answer questions about positive changes they have experienced as the result of a traumatic or stressful event that had occurred within the last five years. There are 21 questions to which participants respond with a number from 0-5 (0: I did not experience this change as a result of my traumatic/stressful event, 5: I experienced this change to a great degree as a result of my traumatic/stressful event). There are five subscales: Appreciation of Life, which comprises three of the 21 questions (“I have a greater appreciation for the value of my own life”), Relating to Others, which has seven items (“I learned a great deal about how wonderful people are”), New Possibilities, which has five items (“I have established a new path for my life”), Spiritual Change, which has two items (“I have a stronger religious faith”), and Personal Strength, which has four items (“I discovered that I’m stronger than I thought I was”).

*Posttraumatic Growth Inventory Japanese Version (PTGI-J):* The PTGI-J is a translation of the original PTGI. It consists of the same questions using the same 0-5 rating scale as the English version, but the Spiritual Change and Appreciation of Life subscales are combined due to differences between the cultures.

**Results**

To determine the main effects of both nation and living arrangement, and the interaction effect, a factorial ANOVA was performed. Although no significant results were yielded for the total PTGI score, there were significant interaction effects (\( p < .05 \)) for three of the five PTGI subscales (See Table 1). The significant subscales were Relating to Others, \( F (3, 678) = 3.17 \), New Possibilities, \( F (3, 677) = 2.74 \), and Personal Strength, \( F (3, 677) = 2.86 \). These results indicate that although living arrangement, when combined with a person’s nation of residence, three of the five PTGI subscales are affected. Table 2 shows the F values of the main effects for the significant subscales. Although nation alone had a significant effect for both the New Possibilities and Personal Strength subscale, and living arrangement alone had a significant
effect for the Personal Strength subscale, there were significant interaction effects for all three of the significant subscales. Tukey post hoc tests (See Table 3) revealed that those who live with their families experience higher relating to others scores than those who live by themselves or in the dorms. They also revealed that those who live by themselves or in the dorm have higher scores on the New Possibilities and Personal Strength subscales. American participants who lived by themselves scored highest on the Personal Strength subscale. The Japanese participants who lived in the dorms scored highest on the Relating to Others subscale for the whole sample. For this subscale, the Japanese who lived in the dorms scored the highest within their culture. The Americans who lived by themselves scored the highest on the New Possibilities subscale. The lowest scores for all three subscales came from the Japanese who reported a living arrangement that fell under the “other” category.

The hypothesis that the students who live at home experience higher PTG was supported only for the Relating to Others subscale. For the other two significant subscales (Personal Strength and New Possibilities), students who lived by themselves or in the dorms scored higher. However, these results did fully support the second hypothesis that living arrangement and nationality have a combined effect on PTG, due to the cultural and personality differences between the different cultures and living arrangements.

Discussion

These findings suggest that certain living arrangements may be more conducive to recovery from a trauma and PTG. For example, living at home might provide an arena of comfort that is not present in the dorms or by oneself. Also, people who live by themselves or in the dorms are often dealing with stressors that are not present at home, such as cleaning and cooking, paying bills, and meeting new people. These factors may inhibit PTG.

Those who live at home scored higher on the Relating to Others subscale, possibly because people who live by themselves or in the dorm might not interact with people as often as those who live with their families. Those who live in the dorms and by themselves scored higher on the New Possibilities and Personal Strength subscales possibly because when a person is on their own, they are more likely to go out and explore new options instead of going to their family for assistance and advice and also because when they are not with their family they may have greater feelings of self-sufficiency and independence.

No significance was discovered for the Spiritual Change or Appreciation of Life subscales. It is possible that those who are strongly religious before experiencing their traumatic event are the ones who are most likely to report spiritual change after the event. For those who are not very religious to begin with, it is likely that they will not report much spiritual change. The Japanese generally report being less religious than the Americans and it is likely that those who were raised in a religious environment will remain religious regardless of their living arrangement. These factors could be preventing an interaction between living arrangement and nation on the Spiritual Change subscale. As for the Appreciation of Life subscale it is possible that a person’s attitude towards the meaning and purpose of their life is unchanged by their culture or living arrangement. Those who have a positive demeanor are likely to maintain this attitude no matter where they live or what their culture is and vice versa.

As previously stated, past research has shown that culture has an effect on the amount of PTG that a person experiences. Americans and Japanese have different ways of coping with traumatic events. The American and Japanese cultures have different ways of thinking about and dealing with traumatic events, such as differences in disclosure and victimization. Americans are
more likely to have a sense of individual victimization (“Why did this have to happen to me?”) and are more likely to disclose the details of their event. People from non-Western cultures are more likely to have a sense of shared victimization (“When I suffer, so do the people who love me”) and are less likely to disclose their event (Johnson et. al, 2009). There are also cultural differences in rumination. Japanese are likely to deliberately ruminate about their event directly after it happens and also in their recent past, while Americans are more likely to only have ruminated in their recent past (Taku et. al, 2008). Combined with the differences that occur between the different living arrangements, these cultural differences appear to have an effect on PTG and recovery from a traumatic event.

This was a rather small sample, so it might be beneficial to use a larger sample in future research. Also, this sample was limited, using only undergraduate students. It is possible that living arrangement may have an effect on a person’s PTG when they are in a different age group. There were also fundamental differences in the demographics of the two nationalities. In the Japanese sample, many more participants lived in the dorms or by themselves, whereas in the American sample, a majority of the participants lived with their families. The mean age of the Japanese sample (21.74) was also higher than that of the American sample (19.87). Many more females participated in the study than males (516 females, 232 males), which could be distorting the results. Since the participants in this study answered questions about events that had occurred within the past five years, it is possible that the participants had been living in a different arrangement when the event happened. Since a large majority of the participants in this study were college freshman, it is likely that the traumatic event had happened while they were still in high school. In effect, those who have moved to the dorms or into a solo living arrangement likely experienced the majority of their PTG when they were still living at home. This would need to be controlled in future studies.

Since PTG is a relatively new area of research, there is much room for future research. Future research in this area could examine the combined effect of living arrangement and some of the other demographic variables. Vishnevsky et al. (2010) found that gender has an influence on PTG, due to the fact that women are more likely to seek professional help and also to disclose their event than men. These factors may also be influenced by a person’s living arrangement. Since the sample in this study focused on only one age group, it would also be useful to study the effect that living arrangement has on PTG among people of different ages (e.g. older adults, children).

It may also be practical to study the differences in coping strategies among the people of the different living arrangements. For example, the people who live alone may be predisposition to be more independent and self-sufficient. Thus, the correlation between those who live alone and their score on the Personal Strength subscale may be reversed.

Also, it was previously stated that those who live at home are provided with an arena of comfort that is not present when living alone or in the dorms. This is a statement that needs to be further investigated, as some people may feel more comfortable in the dorms or by themselves. Participants whose families function on a healthy level would certainly feel comfortable at home, but those who experience a lot of family issues at home may be comfortable living away. In the future, it may be practical to include some measurement of the level of comfort that is being experienced by each participant in their living arrangement.
Conclusion

In conclusion, this study has revealed that living arrangement and nationality have an effect on three of the five PTG scales. These findings may have implications for practitioners working with people who have experienced a traumatic event. They could take preventative measures, by making sure that college campuses have resources available to the assist any students who live in the dorms who may have experienced a traumatic event. It would also be useful for practitioners to have the knowledge of a person’s living arrangement so they will know which area of a person’s recovery to focus on (i.e. helping those who live alone in relating to others, helping those who live with their families to be self-sufficient). This study does provide evidence that where you live and where you’re from does have an effect on PTG.

References


Table 1: Two Way ANOVA Results of the Effects of Living Arrangement and Nation on the PTGI Subscales

<table>
<thead>
<tr>
<th>Factor</th>
<th>With family (n = 395)</th>
<th>By myself (n = 168)</th>
<th>In the dorm (n = 144)</th>
<th>Other (n = 48)</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>U. S. (n = 305)</td>
<td>Japan (n = 90)</td>
<td>U. S. (n = 24)</td>
<td>Japan (n = 97)</td>
<td></td>
</tr>
<tr>
<td>RO</td>
<td>2.55 (1.29)</td>
<td>2.12 (1.11)</td>
<td>2.55 (1.29)</td>
<td>2.66 (1.14)</td>
<td>2.68 (1.09)</td>
</tr>
<tr>
<td>NP</td>
<td>2.36 (1.27)</td>
<td>2.17 (1.33)</td>
<td>2.91 (1.09)</td>
<td>2.45 (1.20)</td>
<td>2.85 (1.23)</td>
</tr>
<tr>
<td>PS</td>
<td>2.98 (1.23)</td>
<td>1.62 (1.15)</td>
<td>3.56 (.92)</td>
<td>2.05 (1.24)</td>
<td>3.36 (1.16)</td>
</tr>
<tr>
<td>SC</td>
<td>1.94 (1.72)</td>
<td>.96 (1.16)</td>
<td>.26 (1.70)</td>
<td>.34 (1.02)</td>
<td>1.90 (1.72)</td>
</tr>
<tr>
<td>AL</td>
<td>3.15 (1.38)</td>
<td>2.23 (1.48)</td>
<td>3.51 (.95)</td>
<td>2.32 (1.10)</td>
<td>3.28 (1.17)</td>
</tr>
</tbody>
</table>

*indicates significance at p < .05

*RO = Relating to Others, NP = New Possibilities, PS = Personal Strength, SC = Spiritual Change, AL = Appreciation of Life

Table 2: F Values of the Main Effects for the Significant Subscales

<table>
<thead>
<tr>
<th>Factor</th>
<th>Living Arrangement</th>
<th>Nation</th>
<th>Interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>RO</td>
<td>.77</td>
<td>1.67</td>
<td>3.17 *</td>
</tr>
<tr>
<td>NP</td>
<td>1.59</td>
<td>4.92 *</td>
<td>2.74 *</td>
</tr>
<tr>
<td>PS</td>
<td>3.5 *</td>
<td>4.83 *</td>
<td>2.86 *</td>
</tr>
</tbody>
</table>
Table 3: Post Hoc Results (Tukey)

<table>
<thead>
<tr>
<th>Factors</th>
<th>Mean Difference</th>
<th>Standard Error</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>RO with family</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>by myself</td>
<td>-.01</td>
<td>.12</td>
<td>1.0</td>
</tr>
<tr>
<td>in the dorm</td>
<td>.06</td>
<td>.12</td>
<td>.97</td>
</tr>
<tr>
<td>other</td>
<td>-.07</td>
<td>.20</td>
<td>.99</td>
</tr>
<tr>
<td>by myself</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>in the dorm</td>
<td>.06</td>
<td>.15</td>
<td>1.0</td>
</tr>
<tr>
<td>other</td>
<td>-.06</td>
<td>.22</td>
<td>.99</td>
</tr>
<tr>
<td>NP with family</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>by myself</td>
<td>-.12</td>
<td>.13</td>
<td>.81</td>
</tr>
<tr>
<td>in the dorm</td>
<td>.04</td>
<td>.13</td>
<td>.99</td>
</tr>
<tr>
<td>other</td>
<td>-.45</td>
<td>.16</td>
<td>.13</td>
</tr>
<tr>
<td>by myself</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>in the dorm</td>
<td>.16</td>
<td>.16</td>
<td>.75</td>
</tr>
<tr>
<td>other</td>
<td>-.33</td>
<td>.22</td>
<td>.45</td>
</tr>
<tr>
<td>PS with family</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>by myself</td>
<td>.41</td>
<td>.12</td>
<td>.01</td>
</tr>
<tr>
<td>in the dorm</td>
<td>.11</td>
<td>.12</td>
<td>.81</td>
</tr>
<tr>
<td>other</td>
<td>-.54</td>
<td>.20</td>
<td>.03</td>
</tr>
<tr>
<td>by myself</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>in the dorm</td>
<td>-.30</td>
<td>.15</td>
<td>.17</td>
</tr>
<tr>
<td>other</td>
<td>-.95</td>
<td>.21</td>
<td>.00</td>
</tr>
</tbody>
</table>
Differences between the Most Experienced Traumatic Events on Posttraumatic Growth

Brenton R. Yanos, Melanie Phillips, and Lauren Rogers

Faculty Sponsor: Kanako Taku
Department of Psychology
Oakland University

Abstract

This study examines the relationships between the effects of the most commonly experienced traumatic events on posttraumatic growth (PTG), the positive outcome one experiences after struggling with a traumatic event. The PTG Inventory is a 21-item scale consisting of five subscales that assess PTG. Of 443 university students, 236 participants rated either Death (n = 96), Family Issues (n = 68), or Romantic Relationship Problems (n = 74), as their most traumatic event. To differentiate which traumatic event resulted in the highest PTG score, a One-Way ANOVA was executed, yielding significant results for four of the subscales: Personal Strength F(2,220) = 3.23, Appreciation of Life F(2, 217) = 5.78, New Possibilities F(2,186) = 7.66, and Spiritual Change F(2,211) = 3.27. A post-hoc showed people experiencing Death had a higher score on Appreciation of Life (M = 2.99; SD = .75) and lower score on New Possibilities (M = 2.55, SD = .82; M = 2.36, SD = .82, respectively). Limitations, future directions, and clinical implications will be discussed.

There is an extensive amount of literature focusing on both the physical and psychological adverse outcomes from experiencing a traumatic or stressful life event. However, there is relatively little research focusing on the development of positive outcomes that can result from struggling with a traumatic event, a phenomenon called posttraumatic growth (PTG), and even less focused on the dissimilarities between the effects of different traumatic events on PTG. Thus, this study was focused on examining the relationships between the effects of the most commonly experienced traumatic events of university students (Death, Romantic Relationship Problems, and Family Issues) on PTG.

There are several events that can generally be considered traumatic or stressful, including war, natural disasters, physical assault (particularly rape), car accidents, financial issues, or the death of a loved one (Barlow & Durand, 2009), depending on biological, psychological, and social factors of the individual. These same factors also influence the extent of growth post trauma, measured by the Posttraumatic Growth Inventory (PTGI). Semi-equivocal results exist as to whether the type of event, however, influences PTG.

Tedeschi and Calhoun (1996) suggest that the scale consistently determines how successful individuals who have struggled with a traumatic event are in redefining or strengthening their perceptions of self, others, and the meaning of events, and that after experiencing a stressful life event, some individuals may find improvements in their sense of purpose, closer relationships to others, and changes in life priorities. One study shows that female adolescents who report interpersonal problems, such as relationship troubles, another person’s problems, conflict with a friend, and sexual abuse/harassment, have lower levels of growth on multiple PTGI subscales (Ickovics et al., 2006), comparable with another study which
demonstrates that more life-threatening or life-changing events, such as a death of someone close, result in greater PTG (Tedeschi and Calhoun, 1996). However, these results contrast Park, Cohen, and Murch (1996) and Milam, Ritt-Olsen, and Unger (2004), who found no differences in PTG between traumatic events among college students, which is the present studies sample. Based upon these previous works, there were three hypotheses for the present study.

The first hypothesis was that Death would result in the highest scores of PTG on the Relating to Others, Spiritual Change, and Appreciation of Life sub-scales of the PTGI. The researchers thought that since Death relates directly to changes in interpersonal relationships between persons and to life itself, it would yield the highest scores of PTG on Relating to Others and Appreciation of Life. Also, as exemplified by ritualistic spiritual ceremonies such as funerals, Death was predicted to show highest PTG scores on Spiritual Change. Hypothesis 2 was those who report Family Issues as their most traumatic event would show the highest score on the New Possibilities sub-scale of the inventory because the family cluster is commonly thought of as a support group to draw strength or advice from when making major life decisions. Hypothesis 3 was Romantic Relationship Problems would result in the highest scores of PTG on Personal Strength because when there are problems between romantic partners, and if the relationship should end, the individuals involved would grow stronger from the experience and implement changes, if necessary, in future relationships. This is thought mainly for the group of university students that participated, as an immaturity may exist when it relates to romantic relationships.

Method
Participants
Due to the nature of the study, of 443 undergraduate students (M age = 19.57, SD age = 3.81) from a Mid-western university, 238 participants rated either Death (n = 96), Family Issues (n = 68), or Romantic Relationship Problems (n = 74), as their most traumatic event. The sample consisted of 62 (26.3%) males and 176 (73.7%) females. The participants were at least 18 years-old and ranged to 48 years of age (M age = 19.30, SD age = 2.56). A majority of participants were Caucasian (79.6%) freshman (51.7%). Participants were recruited through subject pool from introductory Psychology courses where the students are required to either participate in experimental research or write a paper.

Measurements
Posttraumatic Growth Inventory (PTGI). The PTGI was used to assess the positive outcomes one may experience after struggling with a traumatic or stressful life event. The PTGI is a 21-item scale consisting of five subscales that assess PTG: Appreciation of Life (three items), Spiritual Change (two items), Personal Strength (four items), New Possibilities (five items), and Relating to Others (seven items). The responses to the inventory questions are on a scale from 0-5 (0: I did not experience a change, 5: I experienced a change to a great degree). Internal reliability with the current sample was satisfactory for the subscales via the following coefficients: Relating to Others (α = .82); New Possibilities (α = .81); Personal Strength (α = .72); Spiritual Change (α = .82); Appreciation of Life (α = .70). Total internal consistency for the PTGI with the current sample was α = .90, consistent with the Cronbach’s alpha of the original study by Tedeschi and Calhoun (1996).

Most Traumatic Event. Participants were asked to check all of the traumatic events that they experienced within last five years from a list of possible traumatic events including natural
disaster, accident or injury, serious illness, family issues, financial related issues, death, assault, etc. They were then instructed to indicate the one event from the list which was the most traumatic. Death, Romantic Relationship Problems, and Family Issues were the three most frequently experienced traumatic events, and were therefore chosen to be analyzed for this study.

Results

As shown in Table 1, a One-Way ANOVA yielded significant results for four of the subscales of the PTGI: Personal Strength $F(2,220) = 3.23$, Appreciation of Life $F(2, 217) = 5.78$, New Possibilities $F(2,186) = 7.66$, and Spiritual Change $F(2,211) = 3.27$. A bonferroni post-hoc showed that those individuals experiencing Death had a higher score on Appreciation of Life and a lower score on New Possibilities than those experiencing Romantic Relationship Problems, who had a lower score than Death on Appreciation of Life, but a higher score on New Possibilities. The post-hoc also showed significant group differences ($p < .01$) between Death and Romantic Relationship Problems on Appreciation of Life ($p = .003$) and New Possibilities ($p = .000$). However, there were marginal differences between Death and Romantic Relationship Problems on Personal Strength ($p = .062$) and Spiritual Change ($p = .073$), as well as between Family Issues and Romantic Relationship Problems on Spiritual Change ($p = .079$). There were no group differences between Family Issues and Death or Romantic Relationship Problems on any other sub-scale. Overall, results showed that Death resulted in the greatest PTG on Appreciation of Life, Relating to Others, and Spiritual Change, while Romantic Relationship Problems resulted in the greatest PTG on Personal Strength and New Possibilities. Family Issues produced PTG amounts that were between those results of Death and Romantic Relationship Problems on all five sub-scales.

Discussion

Overall results only partially supported Hypothesis 1: Death would result in the highest group differences of PTG scores on Relating to Others, Spiritual Change, and Appreciation of Life. Death resulted in the greatest amount of PTG on Spiritual Change and Appreciation of Life, as well as on Relating to Others, but at a non-significant level. It has been suggested by Davis and McKearney (2003), that recollection of a traumatic experience from one’s past can lead to one subsequently strengthening their belief that their life is meaningful. In particular, reminders of death may lead some individuals to exaggerate the extent to which their life seems meaningful, thereby possibly influencing the Appreciation of Life sub-scale. Perhaps the ANOVA did not yield significant results for Relating to Others because many individuals who experience a traumatic event may tend to not share their experiences with those around them (which would assist in creating personal and intimate connections to others), and therefore not increase the amount of PTG on the Relating to Others sub-scale.

Furthermore, results negated Hypotheses 2 but supported Hypothesis 3: Family Issues would result in the highest scores of PTG on New Possibilities, while Romantic Relationship Problems would result in the highest scores of PTG on Personal Strength, respectively. Romantic Relationship Problems resulted in the highest PTG for New Possibilities, instead of the predicted Family Issues, as well as on Personal Strength. In retrospect, Hypothesis 2 was most likely negated because if there are issues in the family structure, the family group is probably not going to be a supportive entity to the individual as predicted.

Park, Mills-Baxter, and Fenster (2005) suggest that Death may have resulted in the highest amount of PTG (on three of the sub-scales) because the more growth that individuals
report from their most traumatic experiences, particularly death, the more positive are their attitudes towards death itself, which makes the individual introspect their own lives and make them more appreciative to be alive. Death and Romantic Relationship Problems resulted in the greatest group differences on Appreciation of Life and New Possibilities, and on Relating to Others, but again at a non-significant level. There were also marginal group differences between Death and Romantic Relationship Problems on Personal Strength and Spiritual Change, and between Family Issues and Romantic Relationship Problems on Spiritual Change. It is possible that because Family Issues had PTG amounts between those of Death and Romantic Relationship Problems on all five sub-scales, the scores were too close to the other two variable’s scores to produce significant differences between Family Issues and Death or Romantic Relationship Problems.

Interesting to the researcher, as the three most experienced traumatic events were all interpersonal-relationship related, the ANOVA did not produce significant results for Relating to Others. Since there were only group differences between Death and Romantic Relationship Problems (on Appreciation of Life and New Possibilities), a connection possibly exists between Death and Romantic Relationship Problems when it comes to posttraumatic growth. Future research should be done on further examining this connection, particularly the effects of the death of a romantically involved partner. Unfortunately, this could not be done with the participants used for this study because of their demographic characteristics, in particular the rarity of university students experiencing this meticulous traumatic event. This may lead to more effective coping mechanisms when experiencing death or romantic relationship problems.

On the basis that this study found those dealing with conflict in their romantic relationships had the highest amount of PTG on the sub-scales New Possibilities and Personal Strength, further exploration should be done on the gender differences of the sample. If women are found to have reported more Romantic Relationship Problems as being traumatic, and afterward report more growth from this stressful event, then this could lead to explorations about the perceived differences in the thought processes of men and women when it comes to relationships. This research could lead to more effective ways for treating relationship problems with romantic partners and increase the amount of couples that stay together.

It is important to be aware of the variety of psychological growth that can occur after experiencing a traumatic event: Particularly the loss of someone close, troubles in a romantic relationship, and issues in the family structure, which were the most frequently reported events considered traumatic by university students. With the knowledge of the amount of posttraumatic growth that can occur, researchers in a clinical setting working with undergraduate students should now examine the negative symptoms and positive outcomes that may be stimulated by this psychological struggle. Additionally, since this study showed the PTGI has a satisfactory reliability based on the Cronbach’s alpha coefficients (α = .90), and since the PTGI is a self-reported measure, future studies should observe the reliability characteristics of the inventory at a different point in time, to examine any possible long-term effects.

There were some limitations to this study: Even though there was space provided to write about each traumatic event and, in detail, the most traumatic event, the researcher did not catalog more stringently each event. For example, was Death the passing of a parent, sibling, friend, or partner? Or exactly what kinds of family issues were occurring? To test the hypotheses more rigorously, the severity of the event should also have been taken into account, as well as if the event happened directly or indirectly to the participant.
References


Table 1: Means and SD by the three most experienced traumatic events and ANOVA results

<table>
<thead>
<tr>
<th></th>
<th>Death (n = 96)</th>
<th>Relationship (n = 74)</th>
<th>Family Issues (n = 68)</th>
<th>df Between, Within</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Strength</td>
<td>2.41 (.79)</td>
<td>2.73 (.86)</td>
<td>2.68 (.90)</td>
<td>2, 220</td>
<td>3.23</td>
<td>.041*</td>
</tr>
<tr>
<td>Appreciation of Life</td>
<td>2.99 (.75)</td>
<td>2.55 (.82)</td>
<td>2.84 (.83)</td>
<td>2, 217</td>
<td>5.78</td>
<td>.004**</td>
</tr>
<tr>
<td>Relating to Others</td>
<td>2.52 (.81)</td>
<td>2.26 (.82)</td>
<td>2.42 (.86)</td>
<td>2, 204</td>
<td>1.81</td>
<td>.167</td>
</tr>
<tr>
<td>New Possibilities</td>
<td>1.74 (.85)</td>
<td>2.36 (.82)</td>
<td>2.01 (1.05)</td>
<td>2, 186</td>
<td>7.66</td>
<td>.001**</td>
</tr>
<tr>
<td>Spiritual Change</td>
<td>1.92 (1.13)</td>
<td>1.44 (1.23)</td>
<td>1.95 (1.43)</td>
<td>2, 211</td>
<td>3.27</td>
<td>.040*</td>
</tr>
</tbody>
</table>

*indicates significance at p < .05

**indicates significance at p < .01
Art that Really “Grabs” You: Using the Environment to Prime Concepts in a Creative Generation Task

Angela Hasman, William Fuss, Caitlin Kleist, Yvonne Miles, and Stephanie Camarata

Faculty Sponsor: Cynthia Sifonis
Department of Psychology
Oakland University

Abstract

The goal of this study was to determine whether features of the environment can be used to prime concepts, such as hostility, and its effect on idea generation. Music, art, and examples are a few environmental features that have been shown to have an effect on performance in generative tasks. 206 participants were placed in environments where they were exposed to heavy metal music, three photographs, and/or three example ideas. They were asked to generate ideas for twenty minutes. Ideas were examined for the presence of example features (e.g., fangs, spikes, weapons) and conceptually related features that weren’t included in the examples. Participants who saw examples were more likely to include example features in idea generation but not more likely to include conceptual features. Participants who were exposed to music and/or photographs were more likely to include conceptual features in their ideas but not more likely to include target features. Implications for using the environment to enhance idea generation are discussed.

Introduction

Understanding the processes by which people come up with new ideas is of acute interest to a wide range of disciplines. Communities, organizations, schools, families, and individuals all benefit from creative ideas, from new ways of gaining a competitive edge in the job market to more effective school safety. Thus, creativity is valued as an intriguing phenomenon, a coveted quality, and a tool for success. One area of research that has sparked interest in many professions is the role of the environment in creative tasking – specifically, what people see and hear during creative generation and how these variables affect their performances.

One visual variable often involved in creative tasking is the use of examples for inspiration and/or instruction. In the past, examples have been used to jumpstart the creative process, but Smith, Ward, and Schumacher demonstrated that viewing examples can cause a conformity effect, or increase the likelihood that people will include example features in their ideas (837). In their study, participants were given a creative task in which they were asked to draw “other-world” creatures. They found that participants who viewed examples were more likely to include example features in their drawings than those who did not view examples (Smith, Ward, and Schumacher 839-841). The conformity effect was observed even when participants were asked not to include example features in their drawings, demonstrating that decisions to conform may not have been conscious. In light of such research, the use of examples in creative tasking appears to be counterproductive, perhaps prohibiting access to original ideas (Smith, Ward, and Schumacher 844). However, Marsh, Bink, and Hicks conducted a follow-up study proposing that concepts can be implicitly suggested through examples, and that conformity to a concept does not necessarily inhibit creative processes (355).
The study by Marsh, Bink, and Hicks tested a theory of conceptual priming in which they predicted that if people are likely to conform to examples, they may also be likely to conform to a concept (356). They used the same drawing task as Smith, Ward, & Schumacher but primed a hostile concept by creating three new examples that shared conceptually related features: fangs, spikes, and weapons (Marsh, Bink, and Hicks 356). The conformity effect was replicated; participants who viewed examples incorporated more target features (fangs, spikes, and weapons) in their drawings than those who did not view examples (Marsh, Bink, and Hicks 358). However, participants who viewed examples also incorporated additional hostile features that were not present in the examples: horns, claws, and protective coverings (Marsh, Bink, and Hicks 358). In fact, conformity to the hostile concept was found to be greater than conformity to example features (Marsh, Bink, and Hicks 358). Results of a post-test questionnaire confirmed that most the participants were not aware of the primed concept. In other words, participants unconsciously conformed to the concept while managing to produce novel ideas about the kinds of features a hostile creature might have (Marsh, Bink, and Hicks 358). These findings suggest that the processes by which people come up with new ideas can be implicitly manipulated, and that by introducing a concept, environmental stimuli may be used to enhance or modify those processes.

The present study is based on Marsh, Bink, and Hicks, but to further explore the effects of visual and auditory stimuli, we set out to test the priming abilities of other environmental stimuli including physical characteristics and music. The role of the physical environment in creativity is gaining interest (McCoy and Evans 409). For example, marketing research has shown that environmental cues can influence product evaluation and choice. Berger and Fitzimons tested the effects of real world stimuli on the purchasing of products that were either perceptually or conceptually related to the stimuli (1). They asked people to fill out questionnaires while exposing them to naturally occurring colors and found that color-associated products were more accessible when that product color was prevalent in the environment (Berger and Fitzimons 3). Thus, people are more likely to choose a product if environmental cues encourage it. Likewise, environmental cues have been shown to enhance creativity in nursery school children (W. Ward 543). William Ward found that creative children are better able to come up with solutions to a posed problem in an environment filled with cues, as opposed to an environment with no cues (543).

In addition to the physical environment, studies have shown that auditory variables such as music can directly affect creative performance and modify perceptions of environmental stimuli (Gatewood 356; Hallam, Price, and Katsarou 111). Ziv and Goshen demonstrated how cognitive processes can be influenced by the perceived mood of background music by studying five and six-year-old children (303). The children were read a story while either ‘sad’ (minor key, slow tempo) or ‘happy’ (major key, quick tempo) music played in the background (Ziv and Goshen 306). Most of the children who heard ‘happy’ music interpreted the story as happy, while most of the children who heard ‘sad’ music interpreted the story as sad (Ziv and Goshen 310).

The aforementioned evidence suggests that physical elements and sounds in an environment can influence people’s creative processes. With the Marsh, Bink, and Hicks study as a starting point, the current objective was to test the effects of examples, photographs, and music through a creative drawing task with measures of conformity to examples (conformity effect) and conformity to the concept (conceptual priming) as dependent variables. Based on previous research, we predicted that (1) the conformity effect would be replicated; more example
features would appear in drawings of participants who viewed examples than participants who did not view examples. We also hypothesized that (2) conceptual features not present in examples would appear more in drawings of participants who had been exposed to a hostile environment (photographs, music, and/or examples) than in drawings of participants who had not been exposed to a hostile environment, demonstrating conceptual priming.

Method

Participants and Design

Two hundred twenty five Oakland University undergraduates participated in exchange for experimental credit in accordance with APA ethical guidelines. Participants were randomly assigned across conditions and tested in groups of one to four. Data from fifteen participants were eliminated due to failure to follow instructions and data from four participants were eliminated due to experimental error. For further data elimination information and the final participant counts for each condition, please refer to table 1.

Experimental sessions were conducted in a standard lab room. A hostility concept was primed by exposing participants to heavy metal music, three conceptually related photographs, and/or three example ideas that shared specific hostile features. Each manipulated environmental element (music, photographs, and examples) was counterbalanced with a control, and every possible combination of variables was tested. There were eight conditions total. Please refer to table 1 for the number of participants in each condition.

Table 1 Total Number of Participants in Each Condition after Eliminating Unusable Data

<table>
<thead>
<tr>
<th>Condition</th>
<th>Data Eliminated</th>
<th>Final Data Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Music/Photograph/Example</td>
<td>1</td>
<td>29</td>
</tr>
<tr>
<td>Music/Photograph/Control</td>
<td>3</td>
<td>29</td>
</tr>
<tr>
<td>Music/NoPhotograph/Example</td>
<td>0</td>
<td>28</td>
</tr>
<tr>
<td>Music/NoPhotograph/Control</td>
<td>10</td>
<td>18</td>
</tr>
<tr>
<td>WhiteNoise/Photograph/Example</td>
<td>1</td>
<td>28</td>
</tr>
<tr>
<td>WhiteNoise/Photograph/Control</td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td>WhiteNoise/NoPhotograph/Example</td>
<td>0</td>
<td>27</td>
</tr>
<tr>
<td>WhiteNoise/NoPhotograph/Control</td>
<td>3</td>
<td>27</td>
</tr>
</tbody>
</table>

Procedure

Environmental elements were manipulated in the following ways. In the music / no music conditions, prior to generating ideas, participants listened to a 90-second clip of either heavy metal music or white noise. In the photograph condition, three different ‘hostile’ photographs were hung on separate walls with the idea that photographs would be seen but not consciously analyzed. In the no photograph condition, all walls were bare. In the example / no example conditions, participants were given 90 seconds to view either examples or controls. The order went like this: participants listened to either heavy metal or white noise for 90 seconds, then read instructions for the drawing task, then observed their examples/controls for 90 seconds, and then they were prompted to begin drawing. Instructions for the generative drawing task were adapted from Smith, Ward, and Schumacher and read:

Imagine a planet just like Earth existing somewhere in the universe. It is currently uninhabited. Your task is to design new creatures to inhabit the planet. Within the
allotted 20 minutes draw as many new and different creatures of your own creative design as you are able. Duplication of creatures now extinct or living on the planet Earth is not permitted. Provide both a side view and a front view of each creature. After completing the drawing of the creature: (1) label each part of the creature, (2) briefly describe and explain the creature, and (3) continue to the next page and design a new creature.

Participants were allotted 20 minutes to sketch as many ideas as they could. Drawing paper was provided and was split in half and labeled ‘front view’ and ‘side view.’ All paper had brief instructions reminding participants to clearly label and explain their drawings. At the end of the 20 minutes, participants marked any unfinished drawings as ‘incomplete.’

**Materials**

The heavy metal song was selected based on its incomprehensible lyrics (lyrics were in Japanese), intense shouting (relating to the hostile concept), and the researchers’ opinions that the song would not cause emotional distress. The song was entitled “Agitated Screams of Maggots” by Dir En Grey. A sample was taken from the first 90 seconds of the song. A 90-second clip of continuous white noise was used for the control condition. Both music and white noise were played at a reasonable level using an iPod docking station and a standard iPod. Three photographs were selected for the photograph condition displaying obscurely hostile environments (see figure 1). The first photograph featured an enormous tree that had overgrown an ancient city in the jungle. The second featured a dark tornado and a large bolt of lightning. The third photograph featured an abandoned train station with graffiti on the walls.

![Figure 1. Photographs selected for photograph condition.](image)

The examples used in the example condition were adapted from Marsh, Bink, and Hicks. Participants were presented with three example creatures, each sharing three hostile features: fangs, spikes, and some kind of weapon. Each example was displayed on a separate page, clearly labeled, and paired with a brief description. Side and front views were given. Creature examples can be viewed in figure 2. The control condition was given three short readings, no longer than a paragraph each. The readings consisted of three different personal accounts of people who had taken part in a similar study and their reactions to that study.
Figure 2. Examples 1, 2, and 3 used for example condition adapted from Marsh, Richard, Martin Bink, and Jason Hicks. “Conceptual priming in a generative problem-solving task.” *Memory & Cognition* 27.2 (1999): 355-363. Print.

**Coding**

Participants’ tendencies to incorporate example features and conceptual features in generative drawings were examined. Coded example features were fangs, spikes, and weapons. Coded conceptual features were horns, claws, and armor. Number of drawings per participant was also recorded. The nine raters coded the drawings individually and were blind to condition. Samples were pulled and independently coded to obtain average inter-rater reliability scores for the seven measures. Calculate averages were as follows: number of drawings .96; fangs .78; spikes .62; weapons .73; claws .86; horns .99; and armor .99.

**Results**

Data were analyzed using separate 2 x 2 x 2 factorial ANOVAs, with alphas set at .05. The three factors represented in each ANOVA were the presence or absence of photographs, heavy metal music versus white noise, and examples versus controls. Dependent measures included number of drawings generated, proportion of drawings that included target features (fangs, spikes, and weapons), and proportion of drawings that included conceptual features (claws, horns, and armor).

For number of drawings generated, a significant main effect of photographs was observed, $F(1, 206)=3.79$, $\eta^2=.02$. Participants generated less drawings when photographs were in the room ($M=2.98$, $SE=.13$) than when they were not in the room ($M=3.33$, $SE=.13$). There were no other significant main effects on the number of drawings generated. However, there was a non-reliable interaction between music and examples, $F(1, 206)=3.57$, $p=.06$, $\eta^2=.02$. Post hoc analyses indicate that when examples were viewed, participants who listened to heavy metal music ($M=3.30$, $SE=.18$) drew more pictures than those who listened to white noise ($M=3.00$, $SE=.18$).
However, when no examples were viewed prior to the generation task, participants who listened to white noise (M=3.40, SE=.19) drew more pictures than those who listened to heavy metal music (M=2.91, SE=.19).

As predicted, a test of likelihood to include targeted example features in drawings revealed a significant main effect of examples, \( F(1, 206)=12.62, \eta^2 = .06 \), replicating the conformity effect found in Marsh, Bink, and Hicks (358). Participants who viewed examples prior to the generation task (M=.19, SE=.02) included more target features in their drawings than participants who did not see examples (M=.10, SE=.02). In addition to the main effect of examples on proportions of target features, a significant interaction was observed between music and photographs, \( F(1, 206)=4.914, \eta^2 = .02 \). Post hoc analyses indicate that if participants were exposed to photographs, there was no difference on proportion of target features between hearing music (M=.12, SE=.03) and hearing white noise (M=.16, SE=.03). However, if participants were not exposed to photographs, those who heard music (M=.21, SE=.03) were more likely to include target features in their drawings than those who heard white noise (M=.11, SE=.02). A test of the likelihood to include conceptual features in drawings showed significant main effects of music and photographs, \( F(1, 206)=5.32, \eta^2 = .03 \), \( F(1, 206)=4.34, \eta^2 = .02 \). Participants who listened to the heavy metal music (M=.09, SE=.01) were more likely to include claws, horns, and armor in their drawings than participants who listened to white noise (M=.05, SE=.01). Participants who were exposed to photographs (M=.09, SE=.01) were more likely to include conceptual features in their drawings than participants who were not exposed to photographs (M=.05, SE=.01).

**Discussion**

Environmental characteristics were tested as agents for priming a concept of hostility. Using the research of Marsh, Bink, and Hicks as a platform, examples, photographs, and music, were used to prime a concept of hostility. Environmental variables were tested by exposing participants to various combinations of the variables and asking them to generate creative drawings. Drawings were coded for hostile features and proportions were analyzed with respect to number of drawings generated, target features (hostile features present in examples), and conceptual features (hostile features not present in examples).

Results showed that participants who were exposed to photographs generated fewer ideas than participants who were not exposed to photographs. This result was surprising since William Ward’s study of preschool children suggested that environmental cues should offer sources for more ideas (543). However, his results were evident in children who were rated as creative, but not in children who were rated as uncreative (W. Ward 543). Perhaps if the current sample was larger, more creative participants would have been represented and more drawings would have been generated in the presence of photographs.

In regard to the target features (spikes, fangs, and weapons), the conformity effect found by Smith, Ward, and Schumacher and Marsh, Bink, & Hicks was replicated, confirming our first hypothesis. However, it is unclear as to whether the inclusion of target features was due to conformity to examples or conformity to the hostile concept, since the target features were under the umbrella of the hostile concept. Further research may be able to distinguish between the cognitive processes behind each kind of conformity.

A significant interaction between music and photographs was also observed on the measure of target features. Post hoc analyses showed that when photographs were present, there was no difference between proportion of target features drawn by participants who heard music
and proportion drawn by participants who heard white noise. However, when no photographs were present, more target features were seen from participants who heard music than from participants who heard white noise. This may suggest an expectancy effect; participants may have included hostile features in their drawings in order to produce what they thought the researchers wanted. While the heavy metal music may have prompted thoughts of hostility, the obscurely hostile photographs could have distracted from this idea.

In their study, Marsh, Bink, and Hicks found a main effect of examples on conceptual features: people who saw examples were more likely to include target features as well as additional conceptual features in their drawings than people who did not see examples (358). Our analyses of conceptual features showed no main effect of examples, but there were main effects of music and photographs. Participants who heard heavy metal music included more conceptual features in their drawings than those who heard white noise. Likewise, participants who were exposed to photographs included more conceptual features in their drawings than those who were not exposed to photographs. These results support our second hypothesis in regards to music and photographs and show that environmental stimuli can be used to prime a concept of hostility. It is unclear why our conceptual results did not replicate those of Marsh, Bink, and Hicks. It could be explained by differences in operational definitions, but whatever the reason, this is especially interesting because the conceptual features were not prompted by examples, but by photographs and/or music.

Although exciting, this pilot study was not without limitations and results should be analyzed cautiously. One limitation to our study was that data was unequally spread across conditions, which may have decreased power and caused either Type I or Type II errors. The original participant count was encouraging, but a reasonable amount of data had to be excluded due to research error and participant failure to follow instructions. In the future, a larger, more diverse participant pool should be used to clarify results and decrease the chance of error. Also, neither the photographs nor the song selection were pilot tested. Pilot testing would have helped rule out confounding variables such as individual musical preferences and photograph visibility. Future research could include a post-test questionnaire asking participants if they recognized the song, if they noticed anything peculiar about the room, and how the study made them feel. It would also be helpful to include a measure for gender in a post-test questionnaire since males may naturally be more likely to include hostile features in their generations than females.

This study adds to previous research highlighting a number of environmental factors that can influence creative processes. We have shown that people are likely to unconsciously conform to examples, but if a broader, more implicit concept can be introduced in the environment, it may encourage originality even if it means operating inside that concept. There are many possible exciting implications of this research. For example, if businesses want their employees to think “outside the box,” instead of showing them examples of previous work, they can introduce a concept through environmental stimuli that will subtly change thought processes. Future research should investigate the cognitive processes behind what makes people conform to a concept and what makes them conform to specific features. In conclusion, more research needs to be conducted concerning the processes by which people come up with new ideas, but this study can be used to pilot future studies pertaining to conceptual priming and creativity research.
Works Cited


Individual versus Social Responsibility: Paradigms for Health Education

Amal Alsamawi and Nitya Sethuraman

Faculty Advisor: Nitya Sethuraman
Department of Psychology
University of Michigan-Dearborn

Abstract

Different paradigms are used by public health officials to enhance the health of the population. Two important paradigms, individual responsibility and social responsibility, are reviewed for their effectiveness in reducing illnesses among people, and a third, more holistic paradigm that combines the strengths of each of these models is proposed.

As the Bush administration tried to escape facing the health care crisis in the United States, the Surgeon General, Dr. Sullivan, initiated an individual responsibility campaign. It promoted the idea that making the correct choices to maintain good health is an individual responsibility; individual responsibility implies that each individual must take accountability for one’s own actions. Thus, if the individual doesn’t take necessary action to enhance his/her wellbeing, the individual is the cause of his/her own suffering. This suggests that any individual that isn’t healthy can, more often than not, be blamed for his/her own failing health. Although public health efforts have correlated strongly with the decrease in infectious diseases, some health officials are seeking other means to solve ailments that plague our society. One of the most recent campaigns to enhance the health of the public is the Individual Responsibility campaign. The campaign aims to get people to actively take responsibility for their health. In theory, this might not be such a bad idea. Sometimes people get so caught up with their busy schedules they forget to make healthy decisions that will positively impact their health. If only we could help people become more self conscious and aware of their health needs, perhaps the rate for chronic illness in society would decline.

Ultimately, by this reasoning the ailing person should not expect to receive healthcare aid from the rest of society because each individual is liable for his/her primary care, or lack thereof. However, the view that individuals must take responsibility for themselves can undoubtedly feed directly into institutional racism and the perpetuation of inequalities. It reinforces the stereotypes of poor people and people with health problems as being lazy and negligent which, unfortunately, ignores social factors that are intimately connected with income and health and many times even dominate the decisions an individual might make. Research has correlated illness with social and environmental factors such socioeconomic status and air quality. For example, air pollution that may cause unpreventable and irreversible conditions such as asthma can be seen in higher rates in poorer areas, which are often located in the vicinity of garbage and waste facilities and factories, than in upper and middle class areas. Furthermore, socioeconomic factors put restraints on what one can and cannot afford. For instance, healthy eating options are not available to those who can barely afford adequate amounts of cheaper and less healthy options.

What Dr. Sullivan failed to realize or maybe even decided to ignore was the fact that complying with health advice and making healthy choices is harder for the poor than for
individuals in the middle and upper classes. Sometimes it’s not by preference that poor people decide that they are not going to buy their medicine and instead put food on the table for their families. That cannot exactly be considered a fair choice.

To label individuals on the lower end of the economic spectrum as irresponsible and making the wrong choices would be a vast generalization and misdiagnosis of the problem. According to the World Health Organization, the social determinants of health are the conditions in which people are born, grow, live, work, and age, including the health system. These circumstances are shaped by the distribution of money, power, and resources at global, national, and local levels, which are themselves influenced by policy choices. This suggests that the choices we make are dependent on more than the will power one builds up to avoid potentially harmful behaviors. Therefore, the personal responsibility paradigm alone fails to promote and maintain the health of people and society at large.

Although it might seem apparent that health educators who follow an individual responsibility approach to potentially increase the health of society fail to solve root causes of illness in the United States, nonetheless, we value individuality and the individual freedoms that come with it. How do health educators balance American values of individuality with the interest of society in its entirety? Which is a more effective way to promote the health of society: education and the promotion of legislation that hold individuals responsible, or a more ecological approach to prevention that works to provide an environment that makes easier healthy decisions and provides individuals with the opportunity to make these decisions?

In understanding the ecological perspective, it is important to think of every individual as the product of his/her environment, not only the choices that s/he makes. This is illustrated by an example of the ecology of organisms given by Malcolm Gladwell: “the tallest oak in the forest is the tallest not just because it grew from the hardest acorn; it is the tallest also because no other trees blocked its sunlight, the soil around it was deep and rich, no rabbit chewed through its bark as a sapling, and no lumberjack cut it down before it matured” (Gladwell, 2008:19-20). Accordingly, the environment influences individual wellbeing (Stokols, 2003). With this proposal, one must be able to identify behavioral and organizational “leverage points” for health promotion and [must] consider both personal and other-directed health behaviors as targets for change (Stokols, 2003). This idea is related to the concept of social ecology, a term that was coined by philosopher Murray Bookchin in 1960, which assumes that many problems are rooted in sociological issues. There are, no doubt, limitations to the idea of personal responsibility without considering social and environmental factors. The promotion of health by enhancing the wellbeing of people’s “social ecology” (Stokols, 2003), has been suggested as a more holistic paradigm. The field of social ecology gives great attention to the social, institutional, and cultural contexts of people-environment relations (Stokols, 1991). This is necessary in order to minimize the effects of inequality resulting from the disproportionate exposure to agents that affect health negatively.

Evidence is further provided in a study conducted throughout the years 2003 to 2007, when researchers found that obesity prevalence increased by 23% to 33% for children in low-education, low-income, and households with higher unemployment rates. Furthermore, overweight prevalence increased by 13% to 15% for children in low education and low-income households. This study did not find however, any significant increases in obesity or overweight prevalence for children in other socioeconomic groups. Furthermore, obesity prevalence for children with parents having less than 12 years of education was 30.4% in 2007, 3.1 times higher than the prevalence for children with parents with a college degree. Obesity prevalence for
children below the poverty threshold was 27.4%, 2.7 times higher than the prevalence for children with family income exceeding 400% of the poverty threshold. Nearly half of all children in the low-education and low-income stratum were overweight, compared with less than 23% of children in high-education or high-income stratum. Inequality indices indicate significantly higher levels of education, income, and employment disparities in obesity and overweight prevalence in 2007 than in 2003 (Singh et al., 45). These statistics illustrate the disproportionate burden of illness individuals with lower education and socioeconomic status bear in comparison to people of higher socioeconomic status and educational levels; these gaps continue to increase throughout the years. It seems highly unlikely that the vast majority of poor people are any less responsible than the rest of society when it comes to taking care of one’s health.

The majority of research conducted has found positive correlations between health and socioeconomic status and education levels. When education and socioeconomic status improved, health status also improved. However, there are health disparities between ethnic groups even when controlling for socioeconomic factors and education. Not only do education and economic factors play a role in the status of one’s health, one’s racial or ethnic group may also play a role in that “group’s” overall health status. Barr states that:

Part of the difference is due to the material benefits of social and economic advantages—better nutrition, better housing, better sanitation and better health care… [however] there is a second effect of being of a member of a racial or ethnic group that faces discrimination that extends beyond socioeconomic status. The experience of discrimination, especially when accompanied by a sense of powerlessness to confront that discrimination, is associated with measurable differences in cellular and physiologic functioning that, over time, lead to increased illness in a way that is analogous to the effects of socioeconomic status disadvantage (Barr, 2007: 249).

Although many experts have linked several factors with health some scientists still remain skeptical of the disparities specifically between ethnic groups. A group of researchers questioned if there might be a gene that links premature birth to a gene that a black woman might carry. In one study, three groups of newborns: African American, White American and African immigrants to the United States were examined (Richards and Collin, 2007). African immigrant and White American’s babies were found to have about the same rates for premature birth. However, African Americans had drastically higher rates of premature newborns. Also what they found was that it only took one generation before African immigrant’s daughters suffered the same risks as African American women.

The environment, genetics, education levels, socioeconomic status and a number of other factors play a role in one’s health status. However, this increased susceptibility to premature births and high infant mortality rates among African American women can also be explained by the wear and tear caused on a pregnant woman’s body from the stresses of racism that have accumulated over the years of her life. “Stress due to experiences of racism could contribute to African-American women’s adverse birth outcomes” (Nuru Jeter, 2009). With so many variables that are factored in to produce health outcomes, it is not sufficient to rely on a campaign that supports individual responsibility since the things individuals can be responsible for are limited.

As long as inequalities separate us, we shouldn’t and will never be able to hold everyone to the same standards. Health officials must be sensitive to our differences and try to treat illnesses from its root causes. For the most part researchers believe that the most effective way to
improve individual’s health is by combining a number of different methods to embrace the complexity of human behavior. The need for a more prudent and realistic course of action exists. Health educators need to work with a more balanced approach—one that ensures the creation of healthy public policies and health-promoting environments, within which individuals are better able to make choices conducive to health. Health status of individuals and groups is influenced not only by environmental factors but also by a variety of personal attributes, including genetic heritage, psychological dispositions, and behavioral patterns. Thus, efforts to promote human well-being should be based on environmental and personal factors, rather than on analyses that focus exclusively on environmental, biological, or behavioral factors (Stokols, 1991).

References


Lithium in the Treatment of Bipolar Disorder: Evidence of Intracellular Mechanisms that Substantiate Two Prominent Theories of Action

Hayley Amsbaugh

Faculty Advisor: Keith Williams
Department of Psychology
Oakland University

Abstract

Bipolar Disorder is a serious chronic illness that is disruptive to daily functioning and can be life threatening. Diagnosis is complex due to the variable nature of the disorder and symptoms. Treatment is even more complex, usually involving drugs from multiple classes. Mood stabilizers like lithium have proven to be effective by offering therapeutic symptom relief of the manic and depressive episodes that characterize the disorder. Although lithium has been commonly prescribed for decades and its efficacy established, its mechanism of action is still debated. Animal models point to Gsk-3β inhibition and inositol depletion as molecular targets with respect to hippocampal structures. This paper will review the data in support of these two prominent theories. Examination of their intracellular mechanisms provides targets for novel pharmacotherapies in the treatment of Bipolar Disorder.

Deviating from euthymia or the normal range of mood states, individuals with Bipolar Disorder experience pervasive, disquieting manic and depressive episodes. Meanwhile, the high risk of suicide associated with the disorder poses a lethal threat. The rate of suicide among bipolar individuals is 20 times the rate observed in the general population (McIntyre et al., 2008). Although the term Bipolar Disorder accurately portrays the defining characteristic of the disorder (experiencing opposing mood extremes), the term is not specific enough to describe the many potential individual diagnoses. The Diagnostic and Statistical Manual of Mental Disorders IV lists two main types of Bipolar Disorder, though many subtypes and different specific classifications exist. The first type listed in the DSM, Bipolar I, is characterized by one or more manic or mixed episodes and one or more major depressive episodes. The second type, Bipolar II, is defined by at least one episode of major depression and at least one episode of hypomania (a milder form of mania). The variety of specific clinical diagnoses emanate from features a patient may present with or without, such as psychotic features, mixed mood states, rapid-cycling, drug-induced mood cycling, or milder manic and depressive mood states, termed Cyclothymic Disorder. Because of the variable nature of the disorder and the variety of associated positive and negative symptoms, many possible pharmacotherapies exist to treat people suffering with Bipolar Disorder. Of these therapies, lithium is most widely employed (Marmol, 2008).

As with many other drug therapies, lithium’s medicinal properties were discovered serendipitously and utilized before its mechanisms of action were completely understood. Lithium (Li+) is the lightest of the alkali metals and possesses properties similar to magnesium and sodium. Its positively charged ion binds easily to chloride to form a salt substitute, which was recommended to people with cardiovascular disease in the 1940s after a discovery that decreased sodium intake was beneficial to hypertensive patients. After several reports of toxicity and a few deaths, lithium was banned and its research halted (Marmol, 2008). In spite of the ban
and lithium’s toxic effects in excess quantities, the Australian psychiatrist, John Cade, was experimenting with lithium urate (the only soluble salt of uric acid) in guinea pigs in 1949. He believed that a compound excreted in the urine underlay mental illness, and was testing his hypothesis when he noted that the guinea pigs administered lithium became sedated. He then began treating his psychiatric patients with lithium carbonate and found it beneficial to those experiencing manic symptoms (Cade, 1949 as cited in Marmol, 2008). Following Cade’s discovery, many studies were conducted to confirm lithium’s clinical efficacy as an anti-manic agent. Accumulating evidence of lithium’s behavioral effects lead to its approval by the FDA in 1970 for the treatment of mania in Bipolar Disorder (How is bipolar treated?, 2010).

Lithium has become the “gold standard” in treating Bipolar Disorder for its mood stabilizing and anti-suicidal properties, and continues to be the mainstay in drug treatment. Lithium is proven effective in reducing both manic and depressive symptoms and reducing the rate of suicide in many bipolar individuals (Tondo et al., 1998). Despite lithium’s acclaimed status as the gold standard, about 50% of patients don’t respond sufficiently to lithium monotherapy, and their symptoms require adjunctive or alternative treatment (Post, 1996). The search for more effective treatment strategies is ever-present. While lithium is shown to hold anti-manic and antidepressant capabilities in clinical trials, its mechanisms of action are still under debate. The hippocampus presents as an anatomical target, but the uncertainty about the pathophysiology of Bipolar Disorder offers little further assistance in explaining the illness. The current explanations stem from lithium research. Determining a mechanism of action for lithium entails implicating certain molecules and processes in the brain involved in mood regulation. Research provides insight concerning the workings of Bipolar Disorder and more importantly, provides physiological targets for novel, more effective pharmacotherapies.

The evidence of lithium’s cellular effects on rodent hippocampi and cell preparations support two prominent theories, hypothesized to explain lithium’s mechanism of action. The first is the glycogen synthase kinase-3β (Gsk-3β) theory, which proposes that lithium acts by inhibiting Gsk-3β, therefore increasing the many downstream targets of Gsk-3 that serve neurotrophic and neuroprotective functions. The second prevalent theory is that of inositol depletion, according to which lithium exerts its therapeutic effects by depleting neuronal myo-inositol levels. Inositol phospholipids play an important role in cell signaling pathways (Creighton, 1999) and also in regulating neurotrophic and neuroprotective factors. This paper will review data in support of these two prominent theories. Studies included in this review examine effects of lithium administration in animal behavior paradigms and rodent hippocampal cell analyses.

The first theory involves a decrease in glycogen synthase kinase-3β expression to regulate lithium’s behavioral effects. Gsk-3β is a serine/threonine kinase that phosphorylates or inactivates many of its downstream targets, thereby reducing their expression. This inhibitory effect is observed in the hippocampus where mediation of its downstream targets influence mood. Gsk-3β is an important enzyme in the brain because it regulates the determination of cell fate (Klein & Melton, 1996) including neuronal survival and apoptosis (Gould & Manji, 2005), as well as regulating additional molecules linked to depression. Low Gsk-3β activity is associated with the prevention of apoptosis, and conversely, high Gsk-3β activity associated with apoptosis (Gould & Manji, 2002). Since reduced hippocampal volumes and densities have consistently been observed in depressed individuals, it can be inferred that cell turnover rates play a role in depression, and that increasing cell turnover rates would produce antidepressant
effects. Decreasing apoptosis or increasing proliferation of neurons in the hippocampus would result in an increase in cell densities and theoretically, a reduction of depressive symptoms.

The antidepressant effects of lithium via Gsk-3β inhibition with regard to cell turnover rates are demonstrated by Silva et al. (2008), in the article, “Lithium blocks stress-induced changes in depressive-like behavior and hippocampal cell fate: The role of glycogen-synthase-kinase-3β.” A comparison of behavior elicited in Porsolt’s Forced Swim Test (FST) by rats treated with Li⁺ and rats administered a Gsk-3β-specific inhibitor, illustrates the parallel effect of lithium and Gsk-3β inhibition on depression. Subsequent brain analyses offer an explanation for the drugs’ antidepressant effects. Prior to testing, researchers induced a state of depression in half of the rats by subjecting them to chronic mild stress (CMS) for 14 days. CMS is a widely accepted method of modeling depression in a rodent, and is quantifiable in the FST. The two variables used to measure depressive behavior in the FST are latency to immobility and time spent immobile. Compared with controls not subjected to CMS, depressed rats exhibited decreased latencies to immobility and increased times spent immobile. Lithium and the Gsk-3β specific inhibitor, AR-A014418 were similarly effective in preventing the depressive behavior caused by CMS, suggesting that Gsk-3β inhibition may mediate lithium’s antidepressant properties. When administered to depressed rats, both drugs produced antidepressant effects by increasing latency to immobility and decreasing time spent immobile.

Following the experiment, rats were sacrificed and their brains removed and analyzed for CMS and lithium-induced effects on cell proliferation and apoptosis in the dentate gyrus (DG) of the rats’ hippocampi. CMS reduced cell turnover in the DG by decreasing cell proliferation and increasing apoptosis. Decreased cell turnover in response to CMS supports the relationship between depression and reductions in hippocampal volume in the more recent neurogenic theory of depression. Lithium administration to depressed rats reversed negative cellular CMS effects; lithium increased cell proliferation and prevented cell death, resulting in cell turnover rates similar to controls. The neurogenic effect observed in the present study concur with previous findings that gray matter is increased in the brains of lithium-treated patients (Bearden et al., 2007). It is also interesting to note that Gsk-3β expression was increased by CMS and its upregulation was significantly reduced by both Li⁺ and AR-A014418. The finding that the depressive state induced in the rats produces increased Gsk-3β expression and that lithium administration decreases Gsk-3β expression, confirms the role of Gsk-3β in depression and supports its inhibition as a mechanism of action for lithium’s antidepressant properties. Decreased Gsk-3β activity results in increased neuronal anti-apoptotic effects, (Gould & Manji, 2002) which promote the survival of cells and maintain hippocampal densities. Despite the effect of Gsk-3β on apoptosis, a causal relationship cannot be determined by the concurrent decrease in Gsk-3β and increase in cell proliferation in the present study. The antidepressant properties of Gsk-3β inhibition are attributed to its reduced apoptotic effects and the increased expression of its downstream targets.

While lithium has a direct effect on proliferation and Gsk-3β expression, its inhibitory effect on Gsk-3β indirectly regulates other molecules in the hippocampus. These substrates or other molecules are considered downstream targets of Gsk-3β and several play a role in mood regulation. Since lithium inhibits Gsk-3β, and Gsk-3β inactivates its downstream targets by phosphorylation, lithium indirectly increases expression of these targets. The relationship between lithium and Gsk-3β is elucidated by O’Brien et al. (2004) with the examination of β-catenin, a major substrate of Gsk-3β. β-catenin is found in two places in the cell. When located
in the cell membrane, it is involved in structural cell support in cell adhesions and when in the cytosol, its role is in transmitting the Wnt signal back to the nucleus. (Wnt is a signaling pathway with a role in normal development in a range of species from *Drosophila* to humans) (Gould & Manji, 2002). Lithium directly inhibits Gsk-3β through competition with magnesium (Ryves & Harwood, 2001), and therefore increases expression of β-catenin. Gsk-3β is also inhibited by Wnt signaling, which likewise, increases β-catenin. O’Brien et al. conducted a battery of behavioral tests illustrating lithium’s anti-manic and antidepressant properties before sacrificing mice to perform brain analyses. The increases in β-catenin, found upon hippocampal assessment, concur with previous research to confirm lithium’s inhibitory effect on Gsk-3β. The increases in β-catenin could have downstream effects on Wnt signaling, as β-catenin is a mediator of Wnt signaling. To determine if lithium affects Wnt signaling, and possibly serves as another mechanism for how lithium inhibits Gsk-3β, BAT-gal mice (transgenic promoter-reporter mice) were utilized. BAT-gal mice brains examined post-mortem reveal β-galactosidase levels, which are used as an assay to provide quantifiable evidence of the effect of β-catenin on Wnt signaling (Gould & Manji, 2002). Increases in β-galactosidase, found in the hippocampus, amygdala and hypothalamus of BAT-gal mice, support the relationship between lithium, Gsk-3β and Wnt signaling. Lithium was therefore determined to exert Wnt-like inhibitory effects on Gsk-3β in manic and depressive animal behavior paradigms. Although Gsk-3β’s substrate β-catenin does not have a behavioral correlate, many of its other substrates do.

In the aforementioned study by Silva et al. (2008), two downstream targets of Gsk-3β, synapsin-1 and B-cell-CLL/lymphoma2-associated protein-1 (BAG-1), were also examined in response to CMS and lithium administration. After behavioral effects were established, subfields of the rats’ dentate gyri were tested for expression of the two target substrates. The first substrate examined, synapsin-1, serves a neurotrophic function by promoting synaptic plasticity, or the ability of a synapse to adapt and change in strength. Synapsin-1 is a protein involved in the docking and release of synaptic vesicles and accumulates when Gsk-3β is inhibited (Gould & Manji, 2002). The second substrate, BAG-1, serves a neuroprotective function by enhancing the effects of the anti-apoptotic molecule B-Cell/lymphoma2 (Bcl-2) (Takayama et al., 1995); it is also increased when Gsk-3β is inhibited. Exposure to CMS decreased both synapsin-1 and BAG-1 in rat hippocampi. Lithium and the Gsk-3β-specific inhibitor prevented the decreases in both downstream targets by upregulating synapsin-1 and BAG-1. These intracellular findings support the role of Gsk-3β in the antidepressant action of lithium, and indicate that some of its mood stabilizing effects are mediated by neuronal plasticity and survival in the hippocampal dentate gyrus.

Additional support for the role of neurotrophic and neuroprotective factors in the therapeutic action of lithium is provided by Hammonds and Shim (2009). They examined brain-derived neurotrophic factor (BDNF), B-Cell CLL/lymphoma2 (Bcl-2), and phosphorylated cAMP response element binding protein (CREB) in mouse hippocampi in response to four weeks of lithium treatment. BDNF is a key neurotrophic factor in the brain and has received much consideration recently for its association with depression. Simply put, more BDNF means a better mood. BDNF promotes cell growth, differentiation and survival (Binder and Scharfman, 2004). Bcl-2 serves a neuroprotective function by blocking pro-apoptotic processes to prevent cell death (Adams and Cory, 1998). CREB is a transcription factor necessary for expression of neurotrophic and neuroprotective factors like BDNF and Bcl-2 (Shaywitz & Greenberg. 1999). Hammonds and Shim did not relate these factors to Gsk-3β directly, however other research
suggests a connection. The effect of lithium on a gene defined by BDNF promoter IV activity, and the ability of Gsk-3 inhibition to mimic lithium’s effect on the gene were investigated by Yasuda et al. (2009). Gsk-3 was determined to possess the ability to activate the BDNF promoter gene and therefore increase BDNF, parallel to the effect of lithium. Gsk-3β inhibition was linked to increased Bcl-2 and CREB expression in the review by Rowe et al. (2007).

At the end of the four-week experiment by Hammonds and Shim, mice were sacrificed and their hippocampi were removed and unrolled for excision of the dentate gyrus and area CA1. Both regions were tested for expression of BDNF, Bcl-2 and CREB. The DG displayed significantly increased levels of all three factors in response to lithium treatment. In area CA1, lithium induced an increase in Bcl-2 and CREB but not in BDNF. The DG was previously examined by Silva et al. and shown to respond favorably (in terms of changes correlated to antidepressant action) to lithium. The increase in BDNF and the anti-apoptotic molecule Bcl-2 suggest a mechanism for the antidepressant action of lithium, with Gsk-3β as a possible mediator.

Although there is convincing evidence that lithium acts according to the Gsk-3β theory, there is equally compelling evidence in support of the second reigning theory, which asserts lithium works via inositol depletion. Inositol was proposed as a pathway for lithium’s behavioral effects years before Gsk-3β, and remains a popular theory. Inositols are sugar-like carbohydrates and consist of nine inositol isomers. The main isomer is myo-inositol and is commonly just referred to as inositol. Together the inositols comprise a major signaling system in the body that serves functions in metabolism, secretion, phototransduction, cell growth and differentiation (Serretti et al., 2009). The latter two functions are neurotrophic and have an effect on mood when observed in the hippocampus. Inositol is found exogenously in beans, nuts, grains and fruits like cantaloupe. It is also synthesized endogenously from glucose 6-phosphate by myo-inositol-1-phosphate synthase and inositol monophosphatase (IMPase), and recycled in the phosphotidylinositol cycle. Lithium depletes neuronal inositol levels by blocking IMPase that converts inositol-1 phosphate to myo-inositol (Serretti et al., 2009).

To determine behavioral effects of inositol depletion and provide support for the inositol depletion theory, Bersudsky et al. (2008) tested lithium-treated mice, inositol transporter knockout mice and control mice in behavior paradigms, and measured their behavioral responses. Mice were first evaluated in the pilocarpine seizure test, in which subjects are injected with pilocarpine hydrochloride and assessed for signs of seizures. Lithium is known to cause seizures in the pilocarpine seizure test that are reversed with the administration of inositol (Kofman et al., 1993). Although the seizures produced by the combination of pilocarpine hydrochloride and lithium in rodents do not translate to manic or depressive effects, it is a consistent response that can be used to determine similarities of other treatments to lithium. The absence of seizures in controls, coupled with the abrogation of lithium-induced seizures with myo-inositol, demonstrate that lithium depletes inositol. Inositol knockout mice should therefore elicit similar signs of seizures in the pilocarpine seizure test. Pilocarpine hydrochloride produced limbic seizures in 41% of knockout mice and in 57% of lithium-treated mice, while no seizures were observed in control mice. There was no significant difference between treatment groups, though both groups were significantly different from controls. This suggests that seizures elicited by lithium in the pilocarpine seizure test are mediated by inositol depletion. While the seizures produced in the test don’t correlate with symptoms of Bipolar Disorder, they might help explain a side effect of lithium treatment. Tremors are common in lithium patients, and toxic levels of
lithium are capable of producing seizures in humans; perhaps inositol depletion is a mechanism for these related occurrences.

The second animal behavior paradigm, the FST, provides evidence of the antidepressant effects of inositol depletion. Inositol knockout mice were compared to mice treated with the classic antidepressant, imiprimine, and to controls. Knockout mice were significantly more mobile than controls and behaved similarly to imiprimine-treated mice. The similar attenuation of helplessness behavior in both treatment groups supports the antidepressant properties of inositol depletion. These antidepressant effects, mediated by the depletion of inositol, merit cellular analysis with the hippocampus as a possible anatomical target.

The strongest evidence of cellular effects of inositol depletion comes from in vitro studies. In the article, “Lithium Increases Synapse Formation between Hippocampal Neurons by Depleting Phosphoinositides” (2009), Kim and Thayer track postsynaptic density protein 95 (PSD95) using green fluorescent protein (GFP) to demonstrate hippocampal synapse changes in response to lithium administration. They tested their hypothesis that lithium would induce synapse formation in cultured rat hippocampal cells. Cells from rat fetus hippocampi cultured for at least 12 days until they displayed functional synapses. Phosphatidylinositol-4-phosphate (PtdIns(4)P) was added to the cells. PtdIns(4)P plays a role in cytosol-membrane signaling and regulates inositol monophosphate as well as other cellular processes relating to the Golgi complex (D’Angelo et al., 2008). The cultured neurons were placed on the stage of a confocal microscope and cell locations recorded. PSD95-GFP puncta (regions stained with PSD95-GFP) were counted using advanced software. Neurons that expressed PSD-95-GFP were stained with FM4-64 FX, fixed, and fitted on a slide. These double stained regions represent functional receptor sites. The neurons themselves were deemed functional, viable neurons by their retention and expression of DsRed2 expression vector in the soma and dendrites. Researchers then added lithium to the neurons and observed a significant increase in the number of puncta after four hours compared to untreated neurons. The new puncta represent newly formed synapses and are evidence of the neurotrophic effects of lithium administration. To determine if increased synapse formation induced by lithium was mediated by Gsk-3β, a Gsk-3β inhibitory peptide was added to neurons not treated with lithium, and puncta were counted. Inhibition of Gsk-3β should produce the same effects as lithium if it underlies synapse formation. Puncta did not show a significant increase, indicating that synapse formation induced by lithium is not mediated by Gsk-3β. The effect of inositol phosphates on synapse formation can then be tested by adding myo-inositol to lithium-treated cultures. The addition of myo-inositol should prevent lithium from increasing synapse formation if inositol depletion is lithium’s target. Myo-inositol did in fact decrease synapse formation, providing cellular support for the inositol depletion hypothesis. Researchers cited Mello et al., (1993) as finding axonal sprouting in the hippocampus of subjects exhibiting seizures in the lithium-pilocarpine seizure test. Inositol-related processes appear to be responsible for this finding. Lithium also increases growth cone spread in cell cultures, which is reversed with the addition of myo-inositol (Shaltiel et al., 2007). The increased communication between neurons as a result of synapse formation and growth cone spread is a potential explanation for the antidepressant effects of inositol depletion observed by Bersudsky et al. (2008) in the FST.

Together, a review of these articles provides convincing data in support of both the Gsk-3β inhibition theory and the inositol depletion theory to explain lithium’s mechanisms of action. Behavioral paradigms were first conducted in rodents to model therapeutic relief of symptoms in humans. Once behavioral responses similar to lithium treatment were established in Gsk-3β-
inhibited and inositol-depleted rodents, researchers then examined cellular mechanisms that may mediate the behavioral effects. Both pathways were implicated in lithium’s antidepressant action as assessed in the FST as well as cellular effects relating to certain neurotrophic factors found in analysis of rodent hippocampal cells and cell preparations. Each theory provides additional specific mechanisms to serve lithium as a mood stabilizer. Gsk-3β inhibition leads to the increased expression of several neurotrophic, neuroplastic, and neuroprotective factors like BDNF, synapsin-1 and Bcl-2 respectively, while inositol depletion results in increased neurotrophic functions that promote neuronal growth and communication. Many of the studies implicate the hippocampus as an anatomical target for lithium treatment. Cell proliferation and death described by Silva et al. (2008) were localized to the hippocampus and specifically, to sub-regions of the DG. The DG was further examined by Hammonds and Shim (2009) and found to express neurotrophic and neuroprotective molecules in response to lithium treatment. Together these data suggest that the DG plays a role in lithium’s mechanism of action by regulating cell fate.

Both proposed pathways were substantiated by behavioral and cellular assessment, yet neither one alone provides enough data to explicitly account for lithium’s mechanism of action. The evidence points to multiple mechanisms in the hippocampus involving both pathways. Examination of the two theories provides molecular objectives to be more specifically targeted by novel pharmacotherapies in the future treatment of Bipolar Disorder. Specifically targeting these molecules and processes in the brain offers the hope of creating more effective treatment strategies to combat this destructive disorder and ease the pain of those suffering with it.

Footnotes

1 Although existing antidepressants that regulate neurotransmitters are effective in treating unipolar depression, more consideration must be given to the complex case of bipolar depression, where typical antidepressants have the potential to spur the onset of a manic episode. Mood stabilizers, particularly lithium, are held in high regard in the treatment of Bipolar Disorder because of their combined antidepressant and prophylactic capabilities. Not only is lithium an antidepressant and anti-manic agent, it also is effective in preventing relapse into manic or depressive phases, and in reducing suicide rates. The paradoxical therapeutic properties of lithium suggest a complex mechanism of action, which, although requiring further investigation, does not appear to involve neurotransmitter regulation.

References


Importance of Health Literacy and Effective Communication within the Relationship between the Physician and Older Patient to Improve Patient Health Outcomes and Quality of Life

Jessica L. Harshfield and Rie Suzuki

Faculty Advisor: Rie Suzuki
Department of Public Health and Health Studies
University of Michigan-Flint

According to the Center for Disease Control and Prevention (CDC), the leading causes of death in older populations, those aged 65 and over, are heart disease, cancer, and stroke (Gorina Y, Hoyert D, Lentzer H, & Goulding M). However, research has shown that in all three diseases, social support has been an important mediating factor that determines its course. For example, one recent study with older patients affirmed a positive correlational relationship between low social support, depression, and coronary heart disease morbidity (Dimensions of social support 248). In another study, it was concluded that “social support could ameliorate the degree of uncertainty, anxiety and depression in older cancer patients” (Perceived uncertainty 2311). Finally, in regards to stroke patients, a third study noted the crucial role that social support plays in “post-stroke adjustment” (Coping with the Challenges 1136).

Considering the impact that social support has on health outcomes, it can also play a role in an elderly patients’ overall quality of life. Quality of life is described as both a subjective and objective construct that is defined as “the overall picture of health” and encompasses the broad dimensions of a person’s physical and mental health, as well as social status (Schirm, V. 139-46). Although all three of these areas can be considered as interrelated, and most certainly co-dependent, the research outlined in the following pages will have a predominant focus on the elderly patient in regards to the social context of quality of life, or the impact of social support, within the healthcare system.

The focus of this paper is on one important aspect of social support within the healthcare environment, the nature of the relationship between practitioner and patient. An in-depth discussion will entail the healthcare practitioner’s role in disseminating social support to elderly patients and how it relates to the quality of their communication exchanges, the patient’s ability to understand important health information, and the patient’s health outcomes. The topic of health literacy will also be discussed as one implication that impacts communication within practitioner-patient relationships.

In recent years, the concept of health literacy, or the ability to understand health information, has received an increased amount of attention, especially in regards to older individuals. Deficiencies in health literacy has caught the attention of the healthcare industry because of the barriers it presents for effective communication between practitioner and patient. The negative outcomes that occur as a result of health illiteracy and poor communication span a wide spectrum and may include a patient’s misunderstanding of: admission protocols, medical procedures, diagnostic test results, prescription drug regiments, dietary and wellness guidelines, and hospital discharge and follow-up care instructions (Schirm, V. 139-46).

All of these negative health outcomes, in turn, have a direct impact on a person’s overall quality of life, and subsequently places them at an increased risk of developing, and dying from, the three most common chronic conditions: heart disease, cancer, and stroke. From a social
contextual standpoint to the interrelated components of physical and mental health, a person’s quality of life as a result of poor health is affected in the sense that it inhibits a person’s ability to easily navigate the healthcare environment, to have a sense of independence, and to lead a life of satisfaction (Schirm, V. 139-46). These areas of quality of life have been considered to be especially important for older individuals.

The goal of this paper, which complements the significant findings of recent research, is to establish an argument in favor of improving the healthcare environment, mainly through enhancing the degree of social support present between practitioner and the older patient. One way to do this is by improving communication effectiveness in regards to the health literacy deficiencies of older individuals. Improvements in the practitioner-patient relationship, communication practices, and health literacy are all important and significant as to how they impact an elder patient’s quality of life and autonomy potential. That is, when a patient is able to understand his or her health conditions, the resulting outcome is a decrease in the rate of the leading causes of death in the older population.

Social Support and its Influence on Health Outcomes

Recent research in gerontological medicine has verified the relationship between the extent to which an elderly person receives social support and the affect it has on health outcomes. Not only does social support contribute to physical and psychological well-being by reducing stress levels and the occurrence of and recovery from disease; it also affects mortality rates. Studies conducted with older populations have shown that isolation from others can produce a “two- to four-fold increase in all-cause mortality” (Golden, J., Conroy, R.M. & Lawlor, B.A 280-90). On the other hand, the presence of social support has been correlated with improved “cardiovascular, endocrine, and immune functioning,” along with areas related to psychological aspects of functioning, which include “personal competence, perceived control, sense of stability, and recognition of self-worth” (Schirm, V. 139-46).

Social support can be implicated to play a role in health outcomes because of the benefits it has on physiological and psychological functions. More specifically, the presence of social support can assist in a person’s ability to effectively adapt to illness by reducing the production of stress hormones cortisol and prolactin (Spiegel). In addition, disclosure to others has “been shown to decrease avoidant coping and minimize negative emotional reactions to a stressor” (Stress, Coping, and Health Behavior 223-4). Furthermore, because social support “meet[s] basic human needs for companionship, intimacy, a sense of belonging, and reassurance of one's worth as a person,” just simply knowing that someone cares about another’s well-being, the person’s motivation to maintain health and, subsequently, a good quality of life, is much higher (Heaney, C., & Israel, B. 185-97). Older adults, in particular, realize that “higher levels of social engagement [are] associated with health and well-being” and often describe social support as being more central to successful aging than even physical health (Golden, J., Conroy, R.M. & Lawlor, B.A., 280-90).

The Dissemination of Social Support and the Practitioner-Patient Relationship

Social support can be comprised of either informal or formal connections. Family and friends make up the informal connections of a person’s social network, or web of interactions (Heaney, C., & Israel, B. 185-97). Formal connections, on the other hand, include people such as healthcare practitioners. Although social support is usually given and received through the more obvious channels of family and friends, substantial consideration is being placed on the role that
formal social support connections, specifically health care professionals, should play in the dissemination of social support to patients.

There are four broad types of social support, defined by the attitudes and behaviors on which the support is based: emotional (i.e. empathy, trust, caring), informational (i.e. advice, suggestions), instrumental (i.e. tangible aid and services), and appraisal (i.e. constructive feedback). However, healthcare professionals, as opposed to the informal connections of family and friends, tend to offer informational social support more often than the other types of social support (Heaney, C., & Israel, B. 185-97).

It can be debated, though, that social support cannot exist in any degree without the presence of emotional support and therefore should be not be considered equal to the other types. Between the practitioner and patient, specifically, a patient-centered care relationship based on caring and empathic understanding should be established in order to better aid the physician in disseminating his or her primary role of informational support. In summary, when an adequate emotionally supported, patient-centered relationship is established, patient anxiety levels about disclosing health information to their physician are more likely to be lower. This, in turn, assists the practitioner in more effectively addressing patient health outcomes (Heaney, C., & Israel, B. 185-97).

In spite of the informational social support that a practitioner can provide to improve patient health outcomes, a patient may not consider this to be the practitioner’s role. Therefore, the patient may fail to confide in the practitioner as a resource for social support. In addition, establishing an ‘equal’ relationship based in reciprocity, or the mutual exchange of resources, may not be readily accepted by neither the practitioner nor the patient, due to power differentials (Heaney, C., & Israel, B. 185-97). Especially in regards to the elderly, practitioners may be susceptible to age bias. This can negatively impact the health practitioner’s judgment on proper treatment, and thus fail to provide the elderly patient with adequate medical care. This can potentially cause the elderly patient to become self-conscious about clarifying health information that is not understood. Therefore, a mutually respectful relationship, founded on good communication and emotional and informational support, must be established in order to ease patient anxiety about clarifying misunderstood health information, to raise treatment adherence rates, and improve health outcomes and overall quality of life.

**Improving Communication Effectiveness between Practitioner and Patient**

Strengthening the dyadic social support interactions between the practitioner and the patient requires the implementation of effective communication techniques, a responsibility that is centered around active listening, or the acknowledgement of feelings and clarifying and asking questions, and awareness of nonverbal behavior, such as crossed arms and not being seated at eye-level with one another (Effective Communication). From the practitioner’s point of view, a professional who engages in communication with his or her patient’s best interest in mind can more readily develop a strong, reciprocal social relationship with a patient. Furthermore, effective communication allows for them to arrive at a more accurate diagnosis, and subsequently prescribe a beneficial treatment. From the patient’s point of view, a patient who senses a strong social bond with his or her healthcare provider will consequently feel more comfortable in self-disclosing his or her concerns about their health and asking questions about medical procedures when they are not well understood.

When the practitioner and patient can effectively communicate, a patient’s perceived level of support is greatly improved, and the quality of the patient’s social environment is enhanced. Improving communication also allows a patient a better understanding of health
information and this, in turn, will improve health literacy, health outcomes, and the overall quality of life in the older individual.

**Understanding Health Literacy and Its Impact on Health Outcomes**

When communication between the practitioner and the elderly patient is effective, patient health literacy dramatically improves. As a definition, health literacy, or “the ability to obtain, process, and understand basic health information and services to make appropriate health decisions,” cannot be measured by the level of completion of a formal education or as the mere ability to read and write (Foubister, V.; America’s Health Literacy). Rather, health literacy is a concept that needs to be viewed within the context of comprehending health information with accuracy and enabling patient autonomy in the health decision-making process. Issues that may be encompassed within health literacy include, but are not limited to, the patient’s unfamiliarity with medical jargon, difficulty in understanding informed consent and making educated healthcare decisions, or fear of asking questions when confused about complex treatment regiments.

The inability to understand health conditions, due to inadequate literacy skills, has become increasingly recognized in the healthcare industry as a significant problem that affects “more than 90 million Americans” (America’s Health Literacy). Those 75 and older are among a subpopulation in the United States that are especially at risk, with “more than two-thirds [with] below basic or basic health literacy (America’s Health Literacy). As a result, an elderly person has a greater likelihood of having poor health outcomes, described in terms of higher mortality rates, greater occurrence of chronic illness, more frequent hospitalizations, and poorer access to care (Quick Guide to Health Literacy and Older Adults). In addition, the problem is exacerbated by less frequent use of preventive health services, reduced ability to self-manage health conditions, increased likelihood of misunderstanding warning labels on prescriptions, and engaging in unhealthy behaviors such as smoking, eating a poor diet, having unprotected sex, and not exercising (Berkman).

**Practical Implications to Improve Patient Health Literacy**

Improving health literacy, and thus patient health outcomes, can be achieved through establishing an environment that encourages dissemination of emotional and informational support and creating a foundation for effective communication within the healthcare practitioner-patient relationship. Working as a team, the practitioner and the patient should assume dual responsibility to ensure that these factors are successfully achieved. Such a commitment requires that the practitioner engage in sensitive, patient-centered care, and to be “respectful of and responsive to a health care user’s needs, beliefs, values and preferences” (Improving Communication—Improving Care). Communication with a patient can be greatly improved when the practitioner applies simple techniques to reassure the patient in the understanding of health information. These techniques include: using easy-to-understand language, instead of medical jargon; slowing speech; reviewing discussed health information; and using visual and printed materials (Ask Me 3). A “teach-back” system can also be especially beneficial in assisting a patient with understanding medical procedures and his or her health conditions. One study that investigated practitioner use of the teach-back system found the technique to be quite successful in that it “increased patients' knowledge of their disease and medication regimens; it also raised their level of confidence in managing their conditions” (Foubister). Techniques such as the teach-back system are effective in that they allow a patient to take responsibility for his or
her personal health care, to improve physical health, to have a greater sense of independence, and to enhance quality of life.

Individual patient responsibility is important in improving health literacy. This ensures that the patient thoroughly understands the information that is dispensed by the physician, and subsequently enables the patient to make necessary health decisions and to manage his or her health conditions. In addition, modern healthcare has increasingly encouraged patients to become more proactive with their health maintenance. Greater patient responsibility involves “problem-solving, decision-making, resource utilization, collaboration and taking action” (Jones 841-7). In addition, it also entails working with the healthcare practitioner to improve communication and to clarify misunderstood health information. To improve communication, patients have been encouraged to work collaboratively with their practitioners when making health decisions, to provide the practitioner with a full list of medications currently being taken and a comprehensive medical history, to ensure prescription regiments are clearly understood; to gather and understand the results from tests, and to become well-informed on health information and medical procedures by initiating individual research (Improving Health Care Quality). The patient who follows these guidelines and takes responsibility for his or her health care will realize better health outcomes due to an increased understanding and awareness of his or her personal health conditions. Furthermore, the practitioner-patient relationship, as a whole, is enhanced once the practitioner and patient have developed a “common language,” or a shared method of communication, through which health information can be mutually shared.

When both the practitioner and the patient work cohesively as a team, the patient especially benefits because “anxiety, pain, and psychological distress” are lowered and “rates of compliance and symptom resolution” are increased (Weiss, B.). The risk of chronic illness is reduced, along with the occurrence of medication errors and frequent hospitalizations. These benefits ultimately lead to better patient health outcomes and an enhanced overall quality of life.

Conclusion

The goal of this paper has focused on how the implementation of effective communication techniques can potentially better the health literacy skills for those who are deficient in being able to understand the nature of their health conditions. This argument was presented within the context of the healthcare environment, namely the practitioner-older patient relationship. As was discussed, the relationship between practitioner and patient can possibly be enhanced through incorporating into practice a patient-centered model of care that emphasizes the important role of social support on health outcomes, as well as on the elder patient’s quality of life and ability to be autonomous in disease maintenance and making decisions regarding his or her health care.

In order to improve health literacy, and thus communication effectiveness in the practitioner-patient relationship and patient health outcomes, practitioners and patients need to be able to work cohesively as a team. This involves the health care practitioner to be knowledgeable in the area of health literacy and to be willing to provide informational, as well as emotional, social support. Practicing a patient-centered care model, optimizing patient understanding of health conditions through effective communication, demonstrating active listening, and engaging in empathic understanding allows for better health outcomes of patients.

Patients themselves can also be encouraged to improve their health literacy by taking responsibility in making decisions concerning their medical care. Initiatives such as the Ask 3 campaign, presented by the Joint Commission, support this proactive patient behavior by
reminding the patient to ask three questions after each visit with their healthcare practitioner: “What is my main problem?; What do I need to do?; and Why is it important for me to do this?” (Ask Me 3). By providing support services and educational materials to patients, as well as encouraging more comprehensive education to physicians, patients can improve their ability to understand health information and thus their health outcomes and overall quality of life.

References


Jones, F. “Strategies To Enhance Chronic Disease Self-Management: How Can We Apply This To Stroke?” Disability and Rehabilitation 28(2006): 841-847.


The assessment of physical accessibility at the Urban Health & Wellness Center for People with disabilities, Part 1

Tracy Sweeney and Rie Suzuki

Faculty Advisor: Rie Suzuki
Department of Public Health and Health Studies
University of Michigan-Flint

Abstract

People with disabilities have been less likely to obtain primary preventive clinical services because of the physical inaccessibility of equipment and buildings, and providers’ lack of knowledge about these issues. Therefore, the purpose of this study is to examine physical accessibility and usability of outpatient clinics in the Genesee county area for people with disabilities (PWD). The Urban Health and Wellness Center at the University of Michigan-Flint was assessed during the fall semester of 2009. The rater independently used the Outpatient Health Care Usability Profile and the Kentucky Cabinet Survey to calculate the score, indicating that the higher % represented the usable. The results indicated that 71 percent of parking and 100 percent of the exterior doors were usable. On the other hand, signage (67 percent) and ramps (zero percent) were less usable. The implications include the availability of ramps and re-designed signage in future modifications.

Introduction

Prevalence of breast cancer is much higher, in the United States, among women with disabilities than woman without disabilities. “One in eight women will develop breast cancer during their lifetimes. In spite of the advances in technology to improve early diagnosis and an increased emphasis on education to promote awareness of early detection, 46,000 women die annually,” (George, 2000, p.6). Women who are tested for breast cancer early on have a greater chance of survival. Primary health care screenings can greatly reduce the impact of many diseases which can ultimately prevent mortality. Take for instance breast cancer; early recognition of the cancer can greatly improve one’s outlook. Women who schedule routine mammograms will most likely detect cancer at an early stage. “Breast cancer is the most frequently diagnosed cancer and the second leading cause of cancer death among women in the United States,” (Smeltzer, 2006, p.3). Since breast cancer is easily diagnosed, it is vital for women to schedule regular mammograms.

Even though preventive care is essential for maintaining good health, women with disabilities are much less likely to receive preventive care. As a result women with disabilities have a higher chance of letting early stage illnesses spiral beyond control. For example, women who are not able to utilize breast cancer screenings are more likely to develop a breast cancer that may have been prevented. “Women with a disability have a lower reported mammography rate than women without a disability, 72.2 percent versus 77.8 percent,” (Armour, 2009, p.5).

This disadvantage of health care is directly linked to the large margin of women with disabilities not receiving routine check-ups and health screenings. Reasons for a lower prevalence in cancer screening and routine check-ups among women with disabilities include the inaccessibility of health care clinics which often arises from obstacles in the physical environment. Not every clinic meets accessibility needs in areas of allotted handicapped parking.
spaces, widths of entrances, hallways, ramps, and elevators, signage, and controls to operate
doorways and elevators. For example, passageways in health care clinics need to be large enough
to comfortably fit a wheel chair (minimum of 36 inches.) Patient controls need to be operable
with a closed fist, and signs need to be readable to accommodate sensory, physically, and
cognitively impaired patients. If these accommodations are not met in outpatient clinics, they are
not usable for people with disabilities. People who are not able to enter a facility are clearly not
able to utilize any sort of preventive screening.

Women with mobility disabilities are some of the most disadvantaged among those not
utilizing preventive screening. Patients with disabilities who have difficulty entering and using a
health care facility face even more serious disadvantages, for instance the inability to receive a
mammogram due to physical barriers. “There is ample evidence from a variety of well-
conducted randomized controlled trials that annual or biennial mammography is effective in
reducing breast cancer mortality in women 50-69 years,” (Ferrini, Mannino, Ramsdell, & Hill,
2009). In order to receive a mammogram, a woman must stand for a lengthy period of time.
Women with mobility disabilities are often unable to stand for extended periods of time for this
type of testing and have difficulty undergoing mobility transfers to the exam table, so they
frequently go without breast care screening.

Another barrier in receiving appropriate preventive care for women with disabilities is the
providers’ lack of knowledge about issues facing women with disabilities. “Women have
reported their providers’ failures to address screening and health promotion issues even when
women themselves raise the issues.” If health care providers aren’t informing women with
information on the importance of preventive screenings, women will remain uninformed and ill-
equipped to insist on health screenings. Women who are lacking basic information are therefore
highly unlikely to receive preventive care screenings at accessible facilities, (Smeltzer, 2006, 3).

Since preventive screening is essential for all people, it is important for disabled citizens
to have easy access to health care. Therefore, the purpose of this study is to examine physical
accessibility of the Urban Health and Wellness Center to gain information on accessibility for
physically, cognitively, and sensory disabled patients.

Method of Study

A University of Michigan-Flint research assistant conducted an assessment of the
parking, signage, controls, ramps, and doorways of the exterior building of an outpatient
healthcare facility in September of 2009. The exterior building portion of the assessment took the
research assistant an hour and a half to complete. After the research assistant rated the accessibility
on site, the results were calculated on Microsoft Excel, 2007. Results for accessibility were
summarized on Excel tables in order to give accessibility recommendations to the outpatient
clinic.

Participants

The Urban Health and Wellness Center is an affiliate of the University of Michigan
Health System, which is located on the University of Michigan-Flint’s campus. This clinic
provides care for patients, ages 19 to 64, covered by the Genesee Health Plan which is a
community sponsored healthcare program for citizens in Genesee County. The clinic is open
Monday through Friday from 9:30 am to 4:30 pm. Licensed nurse practitioners and physical
therapists provide health screenings, office consultations, physical examinations, physicals,
injections, vaccinations, immunizations, laboratory services, pregnancy and STD tests, and pre
and post-op surgical therapy for acute and chronic pain, (Urban Health and Wellness Center, 2009). The Urban Health and Wellness center has two full-time and two part-time physical therapists, and two-time and two part-time licensed practitioners on staff. This outpatient clinic sees at minimum 300 to 400 patients on a monthly basis.

**Measurements**

Measurements for this study were collected using the Outpatient Health Care Usability Profile, version three (OHCUP), and also with the Kentucky Cabinet Survey. OHCUP was designed to assess the usability of primary care clinics for people with disabilities, (Berardinelli, Cline, Davis, Drum, Horner-Johnson, Laing, Krahn, 2008). Kentucky Cabinet Usability Checklist offered measurement criteria of the same caliber only differing in the areas of parking and signage.

*Outpatient Health Care Usability Profile V3* was used objectively to gain insight on the usability of the Urban Health and Wellness Center on behalf of people with disabilities. The implementation of OHCUP is to check that a clinic meets enough Accessibility Guidelines to be usable for people with disabilities including physical, sensory, and cognitive impairments. The criteria to meet accessibility, defined by OHCUP, for patient arrival required specific measurements for three sections; parking, exterior building, and ramps, signage and controls. Section one, parking, required one in eight parking spaces be van accessible, 98 inches of vertical van clearance, and five by twenty foot loading zones. Section two, walks curbs and ramps, required that the travel route is stable, firm, slip-resistant and requires no stairs, the route leading to the building is 36 unobstructed inches wide, the entrance door has 32 inches clear opening, and that there is eighteen inches of unobstructed wall space. Section three, ramps signage and controls, required that the slope of ramps should be no greater than 1:12 and slip resistant, the width is 36 inches, the top of the handrail is at least 34 inches above the surface, if signs mounted above 80 inches they must provide directions with letters at least three inches high with non-glare finish, raised characters, Braille text and high contrast, and controls be operable with a closed fist.

*Kentucky Cabinet Usability Checklist* was provided by the Department of Vocational Rehabilitation to identify physical and communicational barriers encountered by people with disabilities in health care facilities, (Kentucky Department of Vocational Rehabilitation, 2000, 2). The Kentucky Cabinet checklist was used to assess the same areas of the exterior Urban Health and Wellness Center, but it included five additional measures. (Contact author for more detail)

**Results of Study**

In order to calculate percentages of each section a YES or N/A response counted as useable and received one point, and a NO response counted as not usable and received no points. The points were added after each subsection and divided by the total number of questions. This number was multiplied by one hundred to calculate the usability percentage. Since it is important to distinguish between inapplicable questions, and questions meeting criteria percentages are also given for non-applicable questions, questions that received a YES, and questions that received a NO.
Outpatient Health Care Usability Profile V3, overall the external Urban Health and Wellness Center was assessed 89% usable. Patient arrival had fifty two percent of questions answered YES, eleven percent answered no, and thirty seven percent were not applicable. Twenty four questions out of twenty seven questions received a YES or N/A. Multiplying by 100 gives the accessibility percentage.

\[ \frac{24}{27} \times 100 = 89\% \]

Parking received the score of seventy one percent usable. Out of seven total parking questions, two questions received a no.

\[ \frac{7 - 2}{7} \times 100 = 71\% \]

Walks, curbs, and ramps scored one hundred percent usability by OHCUP’s usability standards. The Center did not exhibit ramps so the ramp subsection was not applicable, but by OHCUP calculation standards, exterior building and ramps were 100% accessible.

\[ \frac{16 - 0}{16} \times 100 = 100\% \]

The Center received the score of seventy five percent usable on the final subsections via OHCUP scoring, signage and controls.

\[ \frac{4 - 1}{4} \times 100 = 75\% \]

Kentucky Cabinet Accessibility Checklist, overall the usability of the Urban Health and Wellness Center was 93% usable.

\[ \frac{40 - 3}{40} \times 100 = 93\% \]

Parking had twenty questions. Two questions received a NO, giving the Urban Health and Wellness Center 90% usability for parking.

\[ \frac{20 - 2}{20} \times 100 = 90\% \]
Walks curbs and ramps, had nineteen questions. One questions received a NO, giving the Urban Health and Wellness Center a 95% usability for walks curbs and ramps.

\[
\frac{19 - 1}{19} \times 100 = 95\%
\]

Signage had one question that received a YES. Signage of Urban Health and Wellness Center was 100% usable.

\[
\frac{1 - 0}{1} \times 100 = 100\%
\]

*Outpatient Health Care Usability Profile V3* showed that parking received the lowest usability percentage, followed by signage and controls, and the highest usability percentage was the walks curbs and ramps. The overall external usability for this profile was 89%. *Kentucky Cabinet Accessibility Checklist* showed that parking received the lowest usability percentage, followed by walks curbs and ramps, and the section with the highest usability percentage was signage. The overall external usability based on this checklist was 93%. The Urban Health and Wellness Center was found to have high external accessibility for people with disabilities.

**Discussion**

Overall, the Urban Health and Wellness Center was mostly accessible for women with disabilities; however, in comparing the checklists there were some differences in the results. Upon assessing the center it was found that parking scored the lowest usability in both checklists. The two checklists differed on the highest usability results due to limitations in the checklist and the center. Both checklists gave a high usability score for the center, but the Kentucky Cabinet Accessibility Checklist gave a higher overall external usability percentage.

These findings were supported by the previously researched article which indicated that outpatient clinics were inaccessible in the exterior portion of the building. Both physical and physician barriers, for example inaccessible offices, examining rooms, and equipment, have been revealed as reasons that persons with disabilities do not receive sufficient primary care services. A large number of people with disabilities are unable to access health care clinics due to the physical structures in the outpatient clinics. Women with physical disabilities have barriers in many internal facilities. For example, they were unable to get positioned for a Pap smear test. If these women are not receiving routine preventive exams, the likelihood of cancer will greatly increase.

**Limitations of Study**

Several limitations were found while conducting the study including limits in the checklists, in the Urban Health and Wellness Center, and in people with disabilities.

Reasons for discrepancies in percentage between checklists are due to differences in questions, depth of questions, and different amounts of questions per sections. The Outpatient Health Care Usability Profile has less overall questions, but more questions for the signage section which produced different scores for that section. This checklist included only questions concerning ramps in the walks, curbs, and ramps section; therefore it had a perfect score whereas The Kentucky Cabinet Checklist asked specific questions about curbs and walks that didn’t
relate to ramps. The Kentucky Cabinet Accessibility Checklist has more questions, and goes less in depth with each question, which is why the scores are much higher for this checklist. Therefore, the Outpatient Health Care Usability Profile captured characteristics of the Urban Health and Wellness Center more than the Kentucky Cabinet Accessibility Checklist because it had more specific questions that helped define the accessibility of the exterior health care clinic. Although the center had high external usability, it did not exhibit ramps so there were limitations to the walks curbs and ramps section in the Outpatient Health Care Usability Profile. Since there were no ramps, all questions received an answer, NA. NA answers were grouped with YES answers, therefore giving a one hundred percent usability score. The Kentucky Cabinet Accessibility Checklist had only one question for signage which had received a YES; therefore the one hundred percent usability was based on only one item.

The Urban Health and Wellness center also exhibited limitations for people with disabilities. The barriers that were found at the external outpatient care building can contribute to physical barriers impeding women with disabilities from receiving preventive care. The center did not provide enough van accessible parking spaces which can limit accessibility for wheelchair bound patients. Patients in wheelchairs needs extra clearance in parking spaces to be able to transfer safely and enter the building successfully.

Women with disabilities also set their own limitations. Since many people, including medical professionals, are not informed on the inaccessibility of healthcare facilities for women with disabilities, women with disabilities need to speak out about the usability problems that they are faced with in the health care settings.

Implications of Study

In the future, a research assistant could use both checklists to ensure all aspects are covered to assess usability of outpatient healthcare facilities. Since each checklist provides differences in detail and in questions, it would be more accurate to assess usability by comparing both checklists used together.

The Urban Health and Wellness Center could provide more van accessible parking spaces, and widen entrance ways to the building. The inaccessibility of parking creates unneeded obstacles for women with disabilities seeking preventive care. If the parking spaces aren’t large enough to perform wheelchair transfers, the patients are not safely transported into the facility. Due to barriers in the external environment, women have a greater struggle to enter a facility to receive treatment.

Medical professionals could be trained and informed about the issues facing women with disabilities to better treat patients with disabilities and understand issues facing these women.

Women with disabilities should be informed on preventive care services to increase longevity of health. Also, these women need to inform health care providers of the physical obstacles that limit the care they receive. If these women don’t make their voice heard, the chance of sufficient accessibility is limited.

The next step to this research study will be to assess the interior facility to determine internal barriers for women with disabilities. In the future, the research assistant will continue to use multiple checklists to get the most accurate results.
References


Smeltzer, S.C, Preventive health screening for breast and cervical cancer and osteoporosis in women with physical disabilities. Fam. Community Health, 2006, 29, 1 Suppl, 35S-43S, United States


## Student Author Index

<table>
<thead>
<tr>
<th>Student Name</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alsamawi, Amal</td>
<td>263</td>
</tr>
<tr>
<td>Amsbaugh, Haley</td>
<td>267</td>
</tr>
<tr>
<td>Angel, Mary Kathleen</td>
<td>62</td>
</tr>
<tr>
<td>Bastien, Carl</td>
<td>224</td>
</tr>
<tr>
<td>Baugh, Tiffany</td>
<td>105</td>
</tr>
<tr>
<td>Bertin, Jonathan</td>
<td>81</td>
</tr>
<tr>
<td>Brown, Lana</td>
<td>112</td>
</tr>
<tr>
<td>Callan, Sean</td>
<td>239</td>
</tr>
<tr>
<td>Camarata, Stephanie</td>
<td>252</td>
</tr>
<tr>
<td>Castelvetere, Kristin</td>
<td>46</td>
</tr>
<tr>
<td>Christopherson, Eric</td>
<td>150</td>
</tr>
<tr>
<td>Deschamps, Amanda</td>
<td>183</td>
</tr>
<tr>
<td>Dykstra, Susan</td>
<td>203</td>
</tr>
<tr>
<td>Elliott, Tim</td>
<td>159</td>
</tr>
<tr>
<td>El-Zein, Michael</td>
<td>96</td>
</tr>
<tr>
<td>Fuss, William</td>
<td>252</td>
</tr>
<tr>
<td>Gahman, Grace</td>
<td>39</td>
</tr>
<tr>
<td>Harshfield, Jessica</td>
<td>276</td>
</tr>
<tr>
<td>Hasman, Angela</td>
<td>252</td>
</tr>
<tr>
<td>Hossain, Nusrat</td>
<td>56</td>
</tr>
<tr>
<td>Hutchinson, Caitlin</td>
<td>9</td>
</tr>
<tr>
<td>Hull, Jessica</td>
<td>18</td>
</tr>
<tr>
<td>Isaac, Michael</td>
<td>122</td>
</tr>
<tr>
<td>Jarrell, Lynn</td>
<td>233</td>
</tr>
<tr>
<td>Kleist, Caitlin</td>
<td>252</td>
</tr>
<tr>
<td>Koseck, Caitlin</td>
<td>42</td>
</tr>
<tr>
<td>Lowell, Natalie</td>
<td>89</td>
</tr>
<tr>
<td>Malburg, Benjamin</td>
<td>66</td>
</tr>
<tr>
<td>Manns, Myron</td>
<td>186</td>
</tr>
<tr>
<td>Mei, Yuwen</td>
<td>136</td>
</tr>
<tr>
<td>Miles, Yvonne</td>
<td>252</td>
</tr>
<tr>
<td>Nutten, Theresa</td>
<td>169</td>
</tr>
<tr>
<td>O’Connell, Bri</td>
<td>190</td>
</tr>
<tr>
<td>Patel, Ravil</td>
<td>122</td>
</tr>
<tr>
<td>Pauldine, Michael</td>
<td>21</td>
</tr>
<tr>
<td>Usher, Aaron</td>
<td>26</td>
</tr>
<tr>
<td>Phillips, Melanie</td>
<td>239, 247</td>
</tr>
<tr>
<td>Picket, Teila</td>
<td>72</td>
</tr>
<tr>
<td>Pullen, Kathleen</td>
<td>31</td>
</tr>
<tr>
<td>Roberts, Tristen</td>
<td>197</td>
</tr>
<tr>
<td>Rogers, Lauren</td>
<td>239, 247</td>
</tr>
<tr>
<td>Rowan, Allegra</td>
<td>175</td>
</tr>
<tr>
<td>Spangler, Laura</td>
<td>51</td>
</tr>
<tr>
<td>Sorensen, Donya</td>
<td>213</td>
</tr>
<tr>
<td>Sweeney, Tracy</td>
<td>283</td>
</tr>
<tr>
<td>Synder, Thomas</td>
<td>1</td>
</tr>
<tr>
<td>Wagner, Rashard</td>
<td>118</td>
</tr>
<tr>
<td>Wilkinson, Joseph</td>
<td>129</td>
</tr>
<tr>
<td>Wissman, Sydney</td>
<td>34</td>
</tr>
<tr>
<td>Yanos, Brenton</td>
<td>247</td>
</tr>
<tr>
<td>Zaleski, Shawn</td>
<td>144</td>
</tr>
</tbody>
</table>