

THE UNIVERSITY OF MARYLAND
MCNAIR SCHOLARS
UNDERGRADUATE RESEARCH JOURNAL



*Celebrating 19 Years of Student Research and Scholarship
(1991-2010)*

UNIVERSITY OF
MARYLAND

*“Whether or not you reach
your goals in life depends
entirely on how well you
prepare for them and how
badly you want them.*

You’re eagles!

*Stretch your wings and
fly to the sky.”*



DR. RONALD ERVIN MCNAIR, the second African American to fly in space, was born October 21, 1950, in Lake City, South Carolina to Carl and Pearl McNair. He attended North Carolina A&T State University in Greensboro, where, in 1971, he graduated magna cum laude with a B.S. degree in physics. In 1976, at the age of 26, he earned his Ph.D. degree in physics from the prestigious Massachusetts Institute of Technology. Ronald E. McNair was nationally recognized for his work in the field of laser physics. In 1978, he was one of 35 applicants selected from a pool of ten thousand for NASA’s space shuttle program and assigned as a mission specialist aboard the 1984 flight of the shuttle Challenger.

In addition to his academic achievements, he was the recipient of three honorary doctorates and numerous fellowships and commendations. He was also a sixth degree black belt in karate and an accomplished jazz saxophonist. He was married to Cheryl Moore and had two children, Reginald Ervin and Joy Cheray.

On the morning of January 28, 1986, McNair and his six crew members died in an explosion aboard the space shuttle Challenger. In his memory, members of Congress provided funding for the Ronald E. McNair Post-Baccalaureate Achievement Program to encourage low income, first generation college students to enroll in graduate studies. This program is dedicated to the high standard of achievement that Ronald E. McNair’s life represented.

THE UNIVERSITY OF MARYLAND
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TRiO

RONALD E. McNAIR
POST-BACCALAUREATE
ACHIEVEMENT PROGRAM

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University of Maryland, College Park
Volume 2

*Celebrating 19 Years of Student Research and Scholarship
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Acknowledgments

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A note about the structure of the journal: The journal includes abbreviated work of the students' final paper and represents combined efforts of students and their research mentors. The views expressed in the papers and abstracts are not intended to represent the views, beliefs, interests, values, or practices of the University of Maryland, College Park.

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MESSAGE FROM THE DEAN

Dear Reader:

It is such an honor to congratulate the McNair Scholars Program on this second edition of the University of Maryland McNair Scholars Journal. The edition includes the abstracts and scholarly papers of the participants from University of Maryland, College Park, Frostburg State University, and Saint Mary's College of Maryland.

For the past 18 years, the McNair Scholars Program has been an important asset and contribution to the research culture at the University. Since 1991, more than 300 students have benefited from the program's services, opportunities and research mentoring, and we are so very proud to have the program on our campus. We look forward to many years to come partnering with the McNair Scholars Program as we implement the University's strategic plan and diversity strategic plan.

I offer my sincere congratulations to the participants on their latest accomplishments as evidenced in this journal. The students' work in the world of inquiry and discovery, as demonstrated by the abstracts and papers, is a defining moment in their academic and intellectual life.

Finally, I encourage you, the reader, to get to know the McNair Scholars here at the University of Maryland, College Park. Support the scholars through your mentoring, generous time, or financial support for graduate school. To those of you who are already supporting the scholars and their graduate school pursuits, I thank you.

Sincerely,

A handwritten signature in cursive script that reads "Donna B. Hamilton".

Donna B. Hamilton
Associate Provost for Academic Affairs and
Dean for Undergraduate Studies

From the Executive Director



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Dear Reader:

I am pleased to share with you the second edition of the *University of Maryland McNair Scholars Undergraduate Research Journal*. The journal embodies the spirit of Dr. Ronald McNair and the McNair program itself. The collection of scholarly work demonstrates the McNair scholars' dedication and passion for research and scholarship, the scholars' determination to overcome tremendous obstacles to arrive at this point in their academic journey, and the support from family, community and research mentors necessary for their success. The publication represents the culmination of time spent in the field, in research labs, and in libraries to blaze new paths of intellectual discovery and to build upon educational and research experiences during the academic year or in previous McNair Summer Research Institutes.

The diverse interests of a group of very special scholars are evident in the pages of the journal. Research projects undertaken by the McNair scholars include, for example, inquiries related to the self-identification patterns of American-Muslims in post 9/11 America, job satisfaction among LFBTQS faculty members, integrating visual arts in pre-school math, developing a risk assessment tool for pre-release suspects, attitudes toward fatherhood, and maternal parenting behaviors and infants' receptive language in immigrant families. Pursuit of a Ph.D. degree is a serious and challenging undertaking. The abstracts and papers indicate that this group of young scholars has fully embraced the challenge of pursuing a graduate degree and contributing to new knowledge in the larger global community.

I am very proud of each of our McNair scholars and you will know why as you read through this journal. Congratulations to Dr. Southerland for providing the leadership on this effort and to the McNair staff for their service to the students and the University. As readers, we ask for your continued support as we approach our 19th year here at the University of Maryland, College Park.

Sincerely,

Dr. Jerry L. Lewis, Executive Director
Academic Achievement Programs and
Project Director, McNair Scholars Program

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Self-Identification Patterns of American-Muslim in Post 9/11 America

Rashida Ali-Mubarak

Mentor: Dr. Robert Feldman, Professor, School of Public Health
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Abstract

The United States, during the Presidency of George W. Bush, launched a seven-and-a-half-year “War on Terror”, aimed at fighting terrorism. The “War on Terror”, though ostensibly aimed at international targets, may have had a negative impact on Muslims living in America. The War on Terror has the very real potential of creating adversarial relationships between citizens of varying ethnicities. Domestic anti-terrorism activities may serve to cause Muslim Americans to feel marginalized and disenfranchised. It is not uncommon for the patriotism and citizenship of Muslim Americans to be questioned by other Americans, not because of criminal activity, but because of their immigration status, ethnic background, and religion. Therefore, this study will begin to examine how the patterns of self-identification of American-Muslims have been positively or negatively affected by the events of September 11, 2001. This exploratory study will consist of focus groups, segregated by gender, of American-Muslims aged 18-25 years old. Focus group participants will be asked about their experiences and the direct impact of September 11, 2001 on their lives, choice of college major, and choice of future career paths.

Introduction

This exploratory study will investigate the self-identification patterns of American-Muslims and how they are negotiating their dual nationalistic and religious identities in post 9/11 America. The goal is to discover how young adult American-Muslims formed their identities.

Another goal of this exploratory study is to begin to discover how the self-identification patterns of American-Muslims is influenced by interactions with others. The concept of racial microaggressions, which is defined by researchers Sue, Capodilupo, Torino, Bucceri, Holder, Nadal and Esquilin (2007) as “...Brief and commonplace daily verbal, behavioral, or environmental indignities, whether intentional or unintentional, that communicate hostile, derogatory, or negative racial slights and insults toward people of color”, will also be explored. Racial aggression has three forms: microassault, microinsults, and microinvalidation.

At the conclusion of this exploratory study, we hope to begin to develop a framework to begin to better understand the associations between racial microaggression and links to imagined communities and how they affect the

American-Muslims as they forge their own self-identification patterns. Imagined communities are defined as the communities to which individuals feel most aligned with, i.e. the sub-culture that one may belong to. Affiliation with imagined communities, a sub-culture, can be both fluid and static in nature based upon how assimilated an individual becomes within a particular sub-culture versus the dominate culture's community. For the children of immigrants, ethnic or racial minority groups, and or members of religious minority groups conflicts between subculture identity and dominant cultural identities are not new. What is new is how American-Muslims are able to merge their identities.

Purpose of the Study

The purpose of this study is to learn how Muslim Americans currently feel about being "American" compared to how they did prior to the launch of the "War on Terror" as pursued by President George W. Bush. Study participants will be asked how they identified themselves in 1999, 2001, and 2008. We want to determine whether or not self-identification has changed and why. For example, did a study participant self-identify in 1999 as American, in 2001 as Egyptian-American, and in 2008 as Egyptian.

Study participants will be between the ages of 18-25 years old because on September 11, 2001 they were between the ages of 10-17 years old, and in the midst of forming their own identity. According to Psychosocialist Erik Erikson, there are eight stages of psychosocial development, each of which is necessary for the development of and maturation of the personality and psychological skills. Erikson theorized that adolescents aged (roughly) 12-18 years old must form their own identity, separate from their parents or primary care-providers, or risk role confusion. Erikson labeled adolescents as "successful" if they developed a whole self-identity and unsuccessful if they did not.

Definition of Terms

For the purposes of this exploratory research study the terms: "War on Terror", terrorists, Muslim, Islam, ethnicity/ethnic group will be narrowly defined. The "*War on Terror*" is a broad and vague term used by former President George W. Bush to define America's military action after the events of September 11, 2001. Georgetown University Historian Bruce Hoffman (2006) has stated that "It's a war [the War on Terror] without boundaries. It's a war directed against multiple enemies, not just one adversary." (National Public Radio broadcast, 2006). Likewise, former Speaker of the House, Newt Gingrich (R-GA), has stated that, "The multiple adversary make [the] war on terror hard to define." (2006).

According the UN Security Council Resolution 1373, *terrorists* are persons who participate in terrorism. Terrorism is defined as unlawful acts of violence designed to instill fear, perpetuated for ideological purposes, deliberately aimed towards non-military targets.

The terms Muslim and Islam are often used interchangeably by media outlets. But, *Islam* is the religion of those who believe that Muhammed was the last prophet sent by God to mankind, who recited the Holy Qur'an to his followers. *Muslims* are adherents of the religion of Islam.

Ethnic is defined in the Merriam Webster on-line dictionary as of or relating to large groups of people classed according to common racial, national, tribal, religious, linguistic, or cultural origin or background; **b**: being a member of a specified ethnic group. According to the on-line Encyclopedia Britannica, *ethnicity* from the anthropological viewpoint is defined as the identification of a group based on a perceived cultural distinctiveness that makes the group into a "people." This distinctiveness is believed to be expressed in language, music, values, art, styles, family life, religion, ritual, food, naming, public life, and material culture.

Research Questions/Hypotheses

1. How did focus group participants self-identify in 1999, 2001, and 2008? Has there been a significant change over the past eight years?
2. Do American-Muslims feel more or less American today than they did prior to the initiation of the "War on Terror"? Has the "War on Terror" had a negative impact on focus group participants? Choice of undergraduate major and/or career?
3. Do study participants feel especially marginalized by the American government?
4. Have study participants considered changing their name or dress and appearance to make themselves seem more acceptable to other Americans?

Review of Literature

Identity Formation

According to Psychosocialist Erik Erikson, there are eight stages of psychosocial development, each of which is necessary for the development of and maturation of the personality and psychological skills. Erikson theorized that adolescents aged (roughly) 12-18 years old must form their own identity, separate from their parents or primary care-providers, or risk role confusion. Erikson labeled adolescents as "successful" if they developed a whole self-identity and unsuccessful if they did not. Successful adolescents were able to establish an intact self-persona and are capable of maturing social interactions. Unsuccessful adolescents falter and find it difficult to establish mature social interactions.

Members of ethnic minority groups are successful at forming their identities when they are made aware of native customs and mores. Sirin and Fine's (2007) research on immigrant youth shows that the successful integration of both one's own culture and the dominant culture leads to successful adolescent identity development. Successful integration can, however, become stymied by political events beyond the immediate control of both dominant and sub-culture group members. For example,

in the aftermath of the events of September 11, 2001 many American-Muslim youth and their families have reported being the victims of blatant discrimination and harassment in public school settings, public parks, places of employment, etc. This sort of overt discrimination that can negatively scare adolescents and cause a significant retardation in the more normal process of psychosocial development; especially, if individuals prove to be less resilient. The lower levels of resiliency can cause the youth to falter and make poor life course decision and become involved in negative health behaviors, which can cause major setbacks in the adolescent's ability to become a successful, productive member of society.

Symbolic prejudice

Professors Smith and Mackie (year) define "symbolic prejudice" as institutionally accepted "hated for out groups that arises, together with the exaltation of in-group symbols, in response to perceived threat. This definition of symbolic prejudice is appropriate because in the aftermath of September 11, 2001, many American-Muslims have experienced negative backlash. The more threatened some members of the dominant culture felt as a result of the terrorist attacks upon America the more likely they were, are, to lash out and attack an American-Muslim. This near-constant threat of attack is not the proper environment in which adolescents can successfully explore their personality traits and form an intact self-identity.

Self-categorization

Self-categorization is the process of seeing oneself as a member of a social group or imagined community. How adolescents view themselves and their status within their social group varies depending upon whether or not their group is a member of the dominate culture or a sub-culture group.

Research conducted by (...) on Hispanic-American youth demonstrate that when youth are acculturated only within their sub-culture and have limited contact with the dominate culture they are less successful overall. These youth also have more difficulty merging their Hispanic and American identities.

Researchers Sin and Fine (2007) stated that, "...when a culture is under siege, it becomes particularly prominent for those who live for those who live within the diaspora, like immigrant Muslims in the US."

Social Mobility

Social mobility is defined by Smith and Mackie (2000) as the strategy of individual escape, either physical or psychological, from a stigmatized group. (See figure 1) Social mobility can also be defined in terms of an individual's "social capital" which is the value one places in his or her social networking.

The better defined one's social network is within their own group the more capable one may be at making links to the dominant culture. Once secure links to the dominant culture the more able one is to devise a plan to escape the confines of their own social group.

Figure 1

Identity integration	
Assimilation	Marginalization
Separation	Biculturation

Theoretical Framework

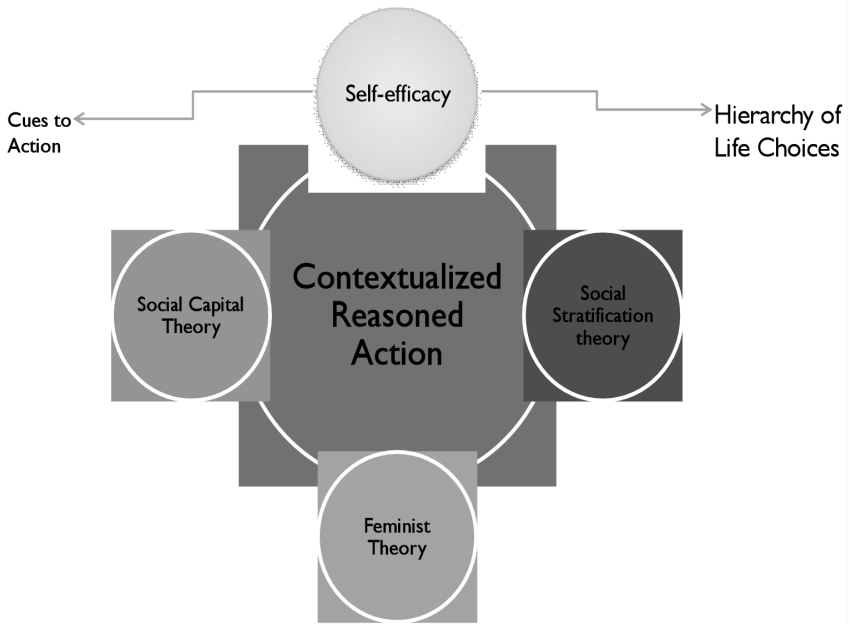
Social Identity Theory is the theory that people's motivation to derive positive self-esteem from their group membership is one driving force behind in-group bias. Application of this theoretical framework serves to explain how identification with a specific group can be a source of pride for people. The social identity is the foundation upon which individuals will interact with members of their own social group as well as members of other social groups. Adolescents are capable of initially identifying socially acceptable roles based upon how their society is stratified and how gender roles are demonstrated by their elders. From within this framework adolescents form their own distinct identities.

Contextualized Reasoned Action is a concept suggested by the student researcher to explain how American-Muslim adolescents may decide to undertake the incremental changes that are necessary to overcome barriers like: social prejudice, social immobility, and the limitations of self-categorization. (See Figure 2) Key to this theoretical model is the innate resiliency of people to seek change, improvement and empowerment in deference to institutional obstacles. Self-efficacy is paramount in this framework because the individual must on some level have received a "cue to action" or some other motivating factor that signals the absolute need to change. The individual must arrange his life choices in descending order of importance and believe that the ability and power to achieve his or her life goals is realistic. In the case of the American-Muslim adolescent, some of their ability to form secure networks within their own ethnic group is hampered by mistrust associated with the aftermath of the terrorists' attacks on September 11, 2001 and subsequent domestic police action and detainment of American-Muslims. Both Social Stratification and Feminist Theory speak to a sense of empower and ambition to rise above their current situation. Together all of these theories culminate in the individual actively selecting one mode of change over all others through which to positively change their lives. For example, one may select attaining higher education, political activism,

or social isolation as how they will interact with dominant culture. According to Britto (2008), and Britton and Amer (2007) when subcultures are under attack the group members are more likely to become more vocally or visually nationalistic in nature. So, the desired change is compartmentalized and undertaken incrementally; within context A, a certain change is desired, while within context B another change is desired.

Figure 2

Contextualized Reasoned Action ©



Ali-Mubarak, copy right 2009

Methods

Sample

The participants for this exploratory study were Muslim students attending the University of Maryland at College Park. Segregated focus groups, one for males and one for females, aged 18–25 years were held at The Adele Stamp (student) Union on the campus of the University of Maryland. The primary criterion for participant selection is that each volunteer had to be a Muslim, between the ages of 18–25 years, and willing to have their voice recorded during the each focus group session.

Procedures

The initial focus group did not yield valuable information because of low volunteer participation. Therefore, a second focus group is being organized for which study participants are to be solicited via list serves from University of Maryland affiliated on-campus Muslim Student Association and the Muslim Women of Maryland student organizations. Members of these groups were invited to participate in segregated focus groups via an announcement on the groups' list serves. The separate moderators will be chosen for each segregated focus group. The moderator for the women's focus groups will be the student researcher. The moderators for the men's focus group will be two American-Muslim Army veterans. The two focus groups will be held on the same day at two different locations within The Adele Stamp (student) Union on the University of Maryland campus. Each focus group participant will be required to sign an IRB approved consent form prior to entering the room where the focus group sessions are to be conducted. Each focus group session will produce an audio recording(s). Each audio recording will be transcribed by the student investigator, coded and analyzed with the SPSS software.

Measures

The audio recordings of the focus group sessions will be analyzed by the student researcher to determine if there are recurrent themes. As this exploratory study continues, an acculturation survey based upon the Acculturation, Habits, and Interests Multicultural Scale for Adolescents (AHIMSA) first developed by Unger, Gallaher, Shakib, Ritt-Olson, Palmer and Johnson (2002) will be developed. The survey will be tailored to identify the acculturation patterns of American-Muslims. The researchers will examine how acculturation positively or negatively affects identity formation in American-Muslim adolescents.

Discussion

This exploratory study is the first of its kind to study how American-Muslims adolescents and young adults have been affected by the events of September 11, 2001. This study, upon its conclusion will be the first study to involve participants who actually live in an area that was attacked by the terrorists. The suspicion is that since previous studies involving adolescents who were toddlers and elementary school-aged children at the time of the terrorists' attack and did not live in an area which was under attack, demonstrated shifts in identity formation; therefore, analyzing young adults who were adolescents on September 11, 2001 should reveal more shifts in more normal patterns of identity formation.

Limitations

The primary limitation of this exploratory study was the time limitation of the five weeks of the McNair Scholars Summer Research Institute. Due to the limitations imposed by the program, researchers were unable to advertise extensively, and have more than one segregated focus group. This project will be undertaken during the upcoming Fall semester at the University of Maryland's College Park campus. During the Fall semester the researchers will conduct two gender segregated focus group sessions and the on-line acculturation survey.

Directions for Future Research

At the conclusion of this exploratory study, the researchers hope to encourage more social scientists to study the affects of the aftermath of the events of September 11, 2001 on American-Muslims, not as suspected terrorists but as fellow Americans devastated by the terror inflicted upon all Americans. The hope is to forge a new dialogue about American-Muslims as a vibrant sub-cultural group that has the potential to see its rate of mental illness, depression, suicide attempts, and rate of negative health behaviors increase due to the direct ill-effects if institutional social prejudice, and social immobility.

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To Show How the Ozone Layer Can Be Destroyed as the Responsibility of Chlorofluorocarbons (CFCS) for this Damage

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Abstract

Ozone is a safeguard for the earth. Ozone protects the earth from a dangerous ultraviolet radiation. The ozone layer has been depleted because of chemicals used by human beings. When the concentration of the ozone layer decreases, the amount of UV light reaching the earth increases. As a result, when the amount of UV light reaching the earth increases the incidence of skin cancer and eye cataracts will increase. Chlorofluorocarbon (CFC) is one of the chemical used by humans that cause ozone depletion. CFCs are man-made chemicals which are used as refrigerants, solvents, foam blowing agents, and outside the United States, as aerosol propellants. Since CFCs are volatile and water insoluble, they can easily escape to the upper atmosphere. Then, they can react with ozone and deplete the ozone layer. Therefore, in order to save the ozone layer from being depleted, we should use other alternative chemicals such as butane and propane.

Introduction

Ozone in the stratosphere is important to life process on earth. Absorbing some of ultraviolet (UV) light reaching the earth from the sun, it acts as a regulation of the amount of UV light reaching the earth's surface. This is important because UV causes sunburn and sometimes skin cancer... effect.

– Larry Parker (2003, p. 3)

Continued depletion of the ozone layer which surrounds the planet may cause lasting harmful effects on the planet in general and living organisms in particular. Identifying the chemical factors that may reduce ozone depletion is important to the survival of life on the planet. An expanded review of relevant research will focus on identifying chemical factors that reduce the concentration of the ozone layer. Current research shows that ozone layer is in fact depleting. According to Parker (2003),

The international scientific community, as represented in the executive summary of the Scientific Assessment of the Ozone Layer--- 1998 state that the appearance of ozone hole during the austral springs has continued

unabated, with ozone column losses of 40-55% during the months of September and October (p. 4).

A decrease in ozone concentration is a problem worthy of investigation for at least one reason. As the concentration of ozone decreases, the amount of ultraviolet (UV) light reaching the earth increases. As a result, the presence of high amount of UV light in the Earth increases the incidence of skin cancer and eye cataracts. According to Anderson and Sarma (2002), "As ozone is depleted, other factors remaining constant, increased transmission of UV-B radiation endangers human health and the environment, for example, by increasing skin cancer and cataracts, weakening human immune system and damaging crops and natural ecosystems" (p. 2).

Consequently, just by realizing how dangerous the UV light is, reducing the factors that contribute to destroying the ozone layer is vital. As an illustration, in 1985, an ozone hole was discovered over Antarctica by the British Antarctic survey. Many scientists were trying to find the cause of the "ozone hole." Three groups of theories were being anticipated to explain the phenomenon. According to Parker (2003),

The first group, dynamics theories, suggested winds were carrying ozone away from the pole, causing the hole. The second group, solar theories, suggested a buildup of naturally caused nitrogen compounds ("odd nitrogen") destructive to ozone was causing the hole. The third group, chemical theories, (like the Molina/Rowland hypothesis), suggested that man-made chlorine and bromine compounds were causing the hole. (p. 4).

However, current research suggests that chlorofluorocarbons (CFCs) are responsible for the hole, depleting ozone concentration in the upper atmosphere. For instance, Hoffmann (2005) states, "Ozone depletion is caused by a simple reaction of ozone molecules and the chlorine found in a certain class of chemicals, the most important of which are chlorofluorocarbons (CFCs)" (p. 9).

This research paper includes discussion and analysis of relevant research and involves recommendations for future research. Identifying and analyzing the chemical factors that reduce depletion of the ozone layer will serve as the foundation for designing an experimental study in the upcoming academic year that will be implemented in summer 2010.

Purpose and Research Question

The purpose of this paper is to understand the chemical factors that contribute to depletion of the ozone layer. Additionally, this paper helps to better understanding of the effect of the chemicals. This research paper is not about climate change, greenhouse effect, or air pollution. The research question is what chemical factors contribute to ozone depletion. Taken together, answering this research question will contribute to current knowledge on chemicals that deplete the ozone layer.

Significance of the Research

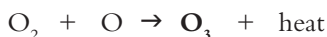
Identifying chemical factors that reduce the concentration of ozone which surrounds the planet is significant for two reasons. First, this is a significant topic for better understanding of the damage that is being caused by the depletion of the ozone layer. For instance, as people become more informed about the damage, it is hope that they will change the behavior to reduce the chemicals that lead to the depletion. Additionally, by realizing the harmful effect of the chemicals causing ozone depletion, the government may ban the production of these chemicals. On other hand, it conform the existing theory about chemicals causing ozone depletion.

Review of the Literature

In addition to explaining chemicals that affect the ozone layer, this chapter addresses several broad areas. First, it explores literature on the ozone layer and its importance for the life processes of the Earth. Then, it covers literature on harmful effects of ozone depletion. Finally, the chapter addresses literature on chemical factors that reduce ozone concentration.

Literature on the Ozone Layer and its Importance

Understanding what ozone means is imperative before studying ozone depletion. As explained earlier, ozone is a molecule composed of three oxygen atoms. Smith (2008) states, “Ozone is formed in the upper atmosphere by reaction of oxygen molecules with oxygen atoms” (p. 449). The equation below shows the synthesis of ozone (O₃) layer below.



Ozone

As illustration, the name ozone was given by a Swiss chemist. Andersen and Sarma (2002), “In 1840, Swiss chemist Christian Schonbein identified this gas as a component of the lower atmosphere and named it “ozone”, for the Greek word *ozien*, ‘to smell’ ” (p.2).

Ozone is one of the important nature’s gifts for this world that serves as an earth protector. Ozone acts like a safeguard protecting the earth’s surface from destructive ultraviolet radiation. Dessler (2002),

For wavelengths, between 200 and 300 nm, ozone (O₃) is the primary absorber, and without O₃ much of this radiation would reach the ground. The role O₃ plays in absorbing there photons is crucial because a photon of 250 nm wavelength has an energy of ~5 ev, enough to break chemical bonds in DNA or interfere in other ways with biological processes. (p. 2)

This statement of Dessler indicates that ozone is vital for the life process on earth. The Ozone layer screens the hazardous radiation from UV light.

Literature on Harmful Effects of Ozone Depletion

Numerous studies reveal that human's behavior is the first and the only to be accused for ozone depletion. However, the consequence of ozone depletion continues to affect not only human beings, but also living organisms in general.

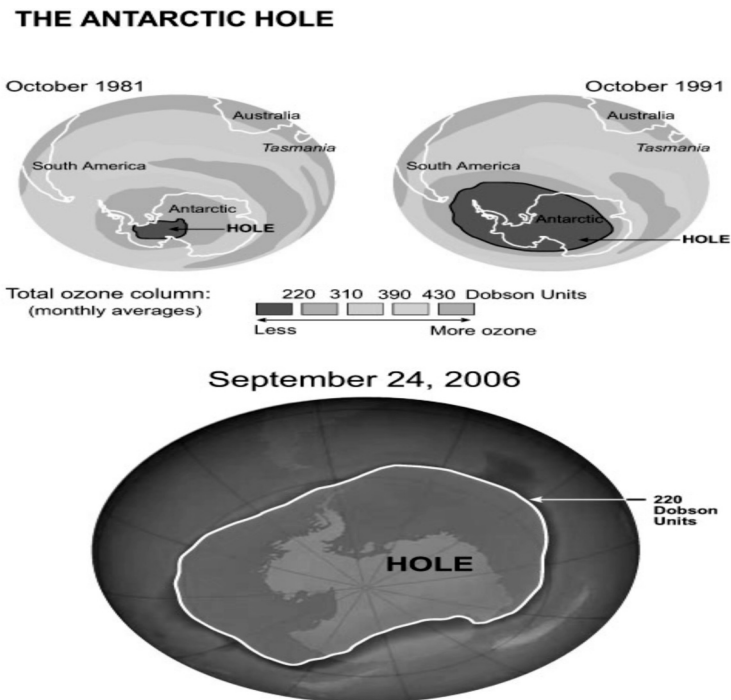
In addition, researches are showing the continuous lost of this protective layer, ozone. Parker (2003),

Ozone losses have been detected in the Arctic winter stratosphere. In early 1995, the WMD reported that, according to data from dozens of northern hemisphere monitoring stations, ozone levels were 10% to 15% below long-term average, with 35% depletion over Siberia. (p. 4).

Parker's statement indicates that the concentration of this essential layer has been reduced. A 35% of ozone layer depletion may allow high amount of UV light to reach to the earth. As mentioned earlier, the presence of high amount of UV light increase the incidence of cancer, eye cataracts, and so on.

In addition, figure 2 shows the size difference between the ozone hole of 1981, 1991, and 2006.

Figure 2



From September 21-30, 2006, the average area of the ozone hole was the largest ever observed.

Source: US National Oceanic and Atmospheric Administration (NOAA) using Total Ozone Mapping Spectrometer (TOMS) measurements; US National Aeronautics and Space Administration (NASA), 2007.

As can be seen in the figure above, the ozone hole increases in size from 1981. As ozone concentration decreases, the amount of UV light reaching to the earth increases. Parker (2003) states, “a review of 14 years of data from the satellite-borne Total Ozone Mapping Spectrometer (TOMS) confirms that , over wide areas, UV-B radiation at the surface increase when ozone levels in the stratosphere decline” (p. 5). Accordingly, an increase in UV light that reaches to the earth would have some immediate and long term consequence. Some of the immediate consequence comprises an increase in the incidence of skin cancer and eye cataracts. On the other hand, some of the long term effect includes a reduced immune response, interference with photosynthesis in plants, and harmful effects on the growth of plankton, the mainstay of the ocean food chain. Hader (1997), “In laboratory studies UV-B radiation affects cellular DNA, impairs photosynthesis, enzymes activity and nitrogen incorporation, bleaches cellular pigments, and inhibits motility and orientation” (p. 12). This statement indicates that without the presence of ozone layer living things do not have long time to live on the Earth.

Hader (1997) says,

We cannot, for instance, predict with confidence for a given degree of stratospheric ozone depletion, what would be: (a) the increase in skin cancer incidence; (b) the changes in terrestrial ecosystems; (c) changes in oceanic productivity; and (d) changes in CO₂ budgets and cycling. (p. 7)

As mentioned previously, the ozone layer screens out some of the sun’s harmful UV light, and therefore, regulates the amount of the UV light that reaches the Earth’s surface.

Literature on Chemical Factors that Reduce Ozone Concentration

Many studies signify that, the ozone layer can be depleted by different kinds of chemicals. The chemicals that are found to be the cause for ozone depletion have chlorine and bromine in them. Anderson and Sarma (2002) state, “All ozone-depleting substances controlled by the protocol have common chemical ingredients of chlorine and bromine” (p. 187). However, not all compounds which have bromine and chlorine cause ozone depletion. For instance, Chlorofluorocarbons (CFCs), Methyl Bromide, Methyl Chloroform, Carbon Tetrachloride, and Halon are the most common chemicals which deplete the ozone layer.

Although, there is a lot to say about these chemicals, this research paper will only concentrate on CFCs. CFC is a man-made chemical made up of three elements; carbon, chloride, and fluorine. Andersen and Sarma (2002), “In 1928, Thomas Midgley Jr, an industrial chemist working at General Motors, invented a chlorofluorocarbon (CFC) as a non-flammable, non-toxic compound...” (p. 4).

As a result, since CFCs are non-flammable and non-toxic, they have been chosen over other chemicals and used for many purposes. According to Parker (2003), “cfc’s have been used as refrigerants, solvents, foam blowing agents, and outside the united states, as aerosol propellants...” (p. 1).

Nevertheless, beside its good characteristics and inexpensive uses, CFC is listed at the first place for its massive destructive of the ozone layer. Although, the ozone layer is far from the Earth, CFC has the ability to escape into the upper atmosphere and destroy ozone. Smith (2008) states, “because CFCs are volatile and water insoluble, they readily escape into the upper atmosphere, where they are decomposed by high-energy sunlight to form radicals...” (p. 550).

Findings from the Literature and Recommendation for Future Research

This chapter will address the findings from the literature and recommendations for future research.

Findings from the Literature

RESEARCH QUESTION:

What chemical factors contribute to ozone depletion?

Chemicals such as Chlorofluorocarbons (CFCs), Methyl Bromide, Methyl Chloroform, Carbon Tetrachloride, and Halon are the most known ozone depleting chemicals. These chemicals have common chemical ingredients of bromine and chlorine. Although all of the above chemicals contribute to ozone depletion, current research suggests that CFCs are responsible for reducing the concentration of ozone mostly. Hoffmann (2005), “Ozone depletion is caused by a simple reaction of ozone molecules and the chlorine found in a certain class of chemicals, the most important of which are chlorofluorocarbons (CFCs)” (p. 9).

Recommendations for Future Research

Completing such study may help people to: (1) better understand the harmful effect of chemicals that contribute to ozone depletion, especially chlorofluorocarbons (CFC), (2) realize how important the ozone layer is, and (3) have enhanced knowledge of the reaction of CFC and O₃ (ozone) after doing an experiment on the process of ozone depletion.

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Experimental Proposal for Identifying the Role of Erythroid-Like Transcription Factor-2 in *Caenorhabditis elegans*

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Abstract

Initially it was believed that when ELT-2 was knocked out in nematodes this caused the nematodes to become sick from all pathogens, even ones that were not previously pathogenic. However, an experiment conducted later suggested that in older cultures of bacteria the ELT-2 knocked out nematodes do not become sick from pathogens that were previously nonpathogenic. In order to clarify the role of ELT-2 in the immune system of nematodes this research proposal was developed. To prepare the nematode stocks, nematodes will be separated into two groups, ones with ELT-2 knocked out and ones with active ELT-2 transcription factors. Then, cultures of bacteria (*Salmonella enterica*, *Pseudomonas aeruginosa*, and *Enterococcus faecalis*) will be made with one of three varied lengths of incubation (24 hours, 48 hours, or 72). Then nematodes will be exposed to bacterial cultures in order to test their survival rate. Statistical analysis will first involve comparing the length of survival of ELT-2 knocked out nematodes to nematodes with active ELT-2 that were grown in the presence of the same bacteria. Second, analysis will involve comparing length of survival of nematodes to how long the bacteria were incubated. This experiment is designed to further understand the role of ELT-2 in the immune function of nematodes. Because of the similarity between ELT-2 in nematodes and transcription factors found in humans this experiment will indirectly help contribute to the greater knowledge of transcription factors in many organisms, including humans.

Introduction

In order to better understand scientific mechanisms further experimentation is always necessary to clarify any discrepancies between results from previous experimentation. This research paper focuses on a proposal for a future experiment designed to study a transcription factor found in *Caenorhabditis elegans* called ELT-2. Initially, it was believed that when the transcription factor was knocked out in *C. elegans* it caused the worm to get sick from multiple bacteria including bacteria that was not normally pathogenic (Kerry, 2006). However, further testing found contradicting data that in older cultures of pathogens knocking out ELT-2 did not cause a decrease in nematode survival rates (Gates, 2008).

Kerry's (2006) experiment involved knocking out ELT-2 in nematodes and exposing them to the pathogens *Pseudomonas aeruginosa*, *Enterococcus faecalis*, and *Salmonella enterica*. The results supported the idea that ELT-2 is required for an immune response to these pathogens. However, Gates (2008) more recent experimentation suggests that ELT-2 may not play a role in immunity. This later experimentation did not find that ELT-2 knocked out nematodes had decreased survival in comparison to nematodes with active ELT-2 transcription factors. This proposal was developed to pinpoint why these researchers found a difference in results.

Problem Statement

To rid this area under study of inconsistencies it is necessary to re-do the experiment with the previous results in mind and to focus only on ELT-2. Science is based on a series of proving and disproving theories and theorems. It is only through scientific trial and error that scientists are able to come as close as possible to the true mechanisms of science.

Purpose of Study, Research Questions and Hypotheses

The main purpose of this proposed experiment is to establish whether there is any validity to Gates (2008) results, which suggest that ELT-2 knocked out nematodes will not have a decreased survival rate in comparison to wild-type nematodes. It was previously believed that knocking out ELT-2 in nematodes caused the organism to be susceptible to any type of bacteria (Kerry, 2006). These results suggest that ELT-2 plays a role in the innate immune system of *C. elegans*. In light of the results from a follow-up experiment (Gates, 2008) the role of ELT-2 is still unclear. Gates (2008) experimentation suggested that ELT-2's function in the immune system of *C. elegans* was not true in older cultures of bacteria that nematodes were exposed to. This experiment was developed to address the discrepancy between the original and follow-up experiment by closely monitoring and manipulating the incubation length/age of bacterial cultures that nematodes will be exposed to.

The role of the transcription factor ELT-2 must be understood in order to reveal its importance in nematodes, and in general, science as well. In the process of trying to decipher the role of ELT-2 the purpose of this experiment is also to reveal the effect of incubation length on the pathogenicity of bacterial cultures.

This experiment will address several issues relating to ELT-2 in nematodes and incubation time of bacterial cultures.

- The first research question this experiment will address is how does knocking out ELT-2 in nematodes affect the nematodes' susceptibility to specific types of bacteria and other pathogens.
 - The second question that will be addressed is how does the growth phase of the bacteria, older vs. fresher cultures, affect the bacteria's ability to affect the survival ability of nematodes.
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- And the third question to be addressed is based on the consequences of the experiment; what role does ELT-2 seem to take in the immune system of nematodes.

Hypotheses

1. The first hypothesis for this experiment is that if ELT-2 is knocked out in nematodes the genetically altered organism will have a decreased survival rate when compared to nematodes with active ELT-2
2. The second hypothesis is that if ELT-2 is knocked out in nematodes then the nematodes will be unable to create an immune response in reaction to a pathogen.
3. The third hypothesis is that if *Salmonella enterica*, *Pseudomonas aeruginosa*, and *Enterococcus faecalis* are incubated for 72 hours they will have a decreased level of pathogenicity than cultures incubated for 48 or 24 hours.

Based on the suggestions of Gates (2008) the hypotheses for this experiment is that that the initial findings by Kerry (2006) are reliable representations of ELT-2 role in immune response. Considering from that fact that the initial experiment was not conducted with bacterial growth phases in mind it is possible that ELT-2 still plays a role in immunity. One main difference between Kerry (2006) and Gates (2008) experiment is how the different types of bacteria were cultured. Because of time constraints Gate (2008) made all the bacterial cultures at the same time and stored them in an incubator for later use. Kerry (2006) made cultures as needed, so the pathogen cultures were fresher than the cultures used by Gates (2008). When the bacterial cultures are fresher it is accepted as true that the bacteria's pathogenicity is stronger than when allowed to incubate and grow for a long period of time. Therefore it is hypothesized that ELT-2 indeed does play a role in the immune system by encouraging transcription of DNA that codes for immunology effector cells. When wild-type nematodes are exposed to bacteria we expect ELT-2 to help the infected nematodes produce cells that help fight off an infection and therefore increase the survival length of the nematodes.

Furthermore, it is hypothesized that because of the viable but non-culturable (VBNC) state older cultures of bacteria will show a decrease level of pathogenicity is allowed to incubate for long periods of time. This means that nematodes with and without ELT-2 knocked out will not get sick from "older" cultures of bacteria because the bacteria has gone into a sort of dormant stage referred to as the viable but non-culturable state. In addition, we expect that in fresh cultures of bacteria, nematodes with ELT-2 knocked out will have decreased survival from bacterial exposure than nematodes with active ELT-2 exposed to fresh cultures of bacteria.

Significance of Research

Even though ELT-2 is a transcription factor found only in nematodes, the mechanisms of how a transcription factor is the same in nematodes as it is in humans (Riddle, Blumenthal, Meyer, Priess, 1998). Because of this fact, the second reason

this research is significant is because the knowledge that can be gained from studying ELT-2 in *C. elegans* adds to the bigger picture of understanding transcription factors in general. Transcription factors play an important role in regulation transcription of DNA. The amount and kind of transcription factors that are active affect what pieces of DNA are transcribed, then translated, to become proteins (Mitchell and Tjian, 1989). Proteins can have 3 vital roles in the cell as enzymes, in cell signaling and structural proteins (Smith and Bender, 1997). Therefore both directly and indirectly, the three roles proteins can have in a cell also affect how an organism's immune system will respond to an infection. Also consequently, the number and type of transcription factors that are active can directly affect the immune system's ability to fight off an infection. By better understanding how transcription factors work scientist can learn more about the immune system and even learn how to manipulate them to fight infections better in both nematodes and humans as well.

In this experiment the model organism being used is a nematode from the species *C. elegans*. Using a nematode to study transcription factors allows a scientist to study basic genetic and immune mechanisms in a relative multifaceted organism without endangering the life of an actual human being. Although the nematode is extremely simple in structure it is sophisticated in other ways including adaptation to almost every type of ecological niche and having a mature form of sexual reproduction that ranges from fatal maternal birth to hermaphroditic reproduction (Wood, 1988). This sophistication increases *C. elegans* useful to science in many ways by being an ideal model organism (Patterson, 2008). Furthermore, nematodes are inexpensive to obtain and use as well as easy to breed and can be frozen until needed later. Being multicellular yet easy to work with makes nematodes an ideal candidate for immunology research.

Lastly, this experiment is important because it deals with 3 types of bacteria that humans can come into contact with on a day-to-day basis; *Pseudomonas aeruginosa*, *Enterococcus faecalis*, and *Salmonella enterica*. *Pseudomonas aeruginosa* is a common bacterium that can be found in soil, water, skin flora and many other environments. It is an opportunistic pathogen meaning that it can infect an individual whose immune system is not working at full capacity (Todar, 2008). This ability to cause disease in humans and animals will emphasize the importance of understanding the pathogenicity of *P. aeruginosa*. By knowing when *P. aeruginosa* is more likely to cause a disease people can better protect themselves from infection. *Enterococcus faecalis* is a commensal bacterium, which means that it can infect an organism without affecting the host and is found in the gastrointestinal tracts of human and other mammals (Paulsen et al., 2003). Since *E. faecalis* is a bacteria normally found in humans and other mammals people may come into contact with it is useful to know this bacterium's ability to cause any life-threatening disease. And *Salmonella enterica* is a bacterium that usually causes infection through food (Swanson et al., 2007). *S. enterica* is a bacterium that people can easily come into contact with if they are not informed about proper food handling. This experiment will reveal the pathology of this bacterium and therefore help people know about how to handle food to avoid diseases from *S. enterica*.

Summary of Theoretical Framework

The rationale for this experiment is based mainly on the findings of Kerry, TeKippe, Gaddis and Aballay (2006) and Gates (2008). Their experimental reports and references previously established the usefulness of studying innate immunity in simpler organisms like *C. elegans* (Mylonakis and Aballay, 2005). However to understand the basis for these previous experiments, as well as this one, it is necessary to understand three theories, innate immune response, viable but non-culturable (VBNC) state, and the danger theory.

Innate Immune Response

Innate immunity is the earliest phase of defense to an infection in which a variety of mechanisms respond in a way that will allow an organism to fight off a pathogen (Charles, Travers, Walport, & Shlomchik, 2001). Usually this response occurs within the first 4 hours and than after that the mechanisms are no longer considered innate immune responses and instead the body produces a response called an adaptive immune response. Nematodes do not have an adaptive immune response (Kerry, 2006) and therefore the innate immune response in *C. elegans* usually lasts longer than 4 hours since it is the main mode of defense for nematodes. The adaptive immune system is capable of distinguishing specific types of pathogens from each other while the innate immune response can only distinguish bacteria, protozoa, viruses and fungi from each other.

The innate immune response has three stages; infection by pathogen, recognition of pathogen by effector cells and than removal of the infectious agent. Infectious agents can infect a nematode 5 different ways; gut colonization, persistent infection, invasion of cuticle, biofilm formation and toxin mediated killing (Gravato-Nobre & Hodkin, 2005).

Viable But Non-Culturable State

Viable but non-culturable (VBNC) state refers to a stage in bacteria in which it fails to grow on typical media on which they would normally grow into colonies but are alive and capable of metabolic activity (Oliver, 2000). During this state a bacterium has a low metabolic rate but upon revival is again culturable. This VBNC state is the main basis for the hypothesis. It is proposed that in cultures made and incubated for longer periods of time, the bacteria will enter this state and will show a decrease level of pathogenicity. In fresh cultures the bacteria will still be in a culturable state and therefore cause ELT-2 knocked nematodes to die faster than nematodes with active ELT-2 transcription factors.

Danger Theory

The danger theory suggests that the mechanism that causes a cell to die determines whether an immune response is initiated (Todryk, Melcher, Dalgleish, and Vile, 1999). It is believed that if the mechanism that causes a cell to die is non-self (a foreign pathogen) than the body will initiate an immune response. The opposite is found to be true too; if the mechanism that causes a cell to die is self,

a biological agent normally found in the body, than the body will not initiate an immune response.

In this experiment *C. elegans* will be exposed to foreign pathogens, specifically 3 different types of bacteria. This will force the infected nematodes to initiate an immune response, which will be measured by recording the days of survival.

Assumptions, Delimitations and Scope

Assumptions

- The first assumption for this proposed experiment is that nematodes only have an innate immune response and do not possess an adaptive immune response.
- The second assumption for this proposed experiment is that the “viable but non-culturable state” theory is true for the bacteria *Pseudomonas aeruginosa*, *Enterococcus faecalis*, and *Salmonella enterica*
- The third assumption for this proposed experiment is that survival assays are an accurate measurement of nematode survivability

The first assumption for this experiment is that *C. elegans* only possess an innate immune system (Kurz & Ewbank, 2003) and not an adaptive immune system. Possessing both systems would complicate this study and make it hard to understand the nematodes reaction to being exposed to bacteria. The second assumption is that the VBNC state is true for the bacteria *Pseudomonas aeruginosa*, *Enterococcus faecalis*, and *Salmonella enterica* all of which are being used to form bacterial cultures. It is hypothesized that these bacteria will enter the VBNC state after being incubated for longer than 24 hours, which puts the bacteria in a dormant stage and therefore decreases that bacteria’s ability to cause an infection. The third assumption for this experiment is that survival assays are an accurate way to test nematode survivability. The goals of establishing the role of ELT-2 and understanding the affect of incubation length on bacterial cultures can only be met if survival assays give an adequate representation of nematodes ability to survive after being exposed to bacteria.

Delimitations

This study will not cover other ELT transcription factors found in the immune system of *C. elegans*. This experiment limits its research to the transcription factor ELT-2. Furthermore this study is limited to studying nematodes from the species *C. elegans* (N2, wild-type) and does not cover the immune system of nematodes of other genetic strains.

Scope

Only one transcription factor will be studied in this experiment, ELT-2 transcription and its role in the immune system. In addition, the coverage of this study will only be on the model organism for this experiment, which will be of the species *C. elegans*. The study will consist of nematode stocks from the University of Minnesota Caenorhabditis Genetic Center and will take place over the span of 4 months in the biology laboratories of St. Mary’s College of MD.

Definitions Related to Research

This section will define and explain important key terms related to this experiment.

Survival Assays

In general an assay is a process for measuring the activity of biological agent or process in an organism (Kerry, 2006). In this case the activity of interest is the survival of a nematode when faced with a bacterial or fungal pathogen. *C. elegans* survival assays will be conducted by transferring nematodes from RNAi plates onto each of the different types of bacterial plates. Every 24 hours the nematodes will be scored as alive, dead, or missing.

Nematode Survival

To establish a nematode's ability to survive it is necessary to define what constitutes as surviving and what constitutes as dying. A nematode is considered dead upon failure to respond to being touch by a pick and if the nematode responds to being touched than it is considered alive.

Nematode

Nematodes, also known as roundworms, are members of the phylum Nematoda. The ones used in this experiment are from the genus and species *Caenorhabditis elegans*. This particular species of nematode is free-living, transparent and lives in temperate soil environments (Culetto & Sattelle, 2000). Their structure system consists of an alimentary canal, which extends from the mouth to the anus, and a digestive, nervous excretory and reproductive system. They do not have a circulatory or respiratory system. Their bodies are long and narrow with their muscles lying right underneath the surface (White, Southgate, Thomson, Brenner, 1986)

RNAi Nematode

RNAi nematodes will be used to refer to the nematodes that have been genetically altered so that their ELT-2s are knocked out.

Transcription Factors

A transcription factor is a protein that binds to DNA sequences and controls the transcription rate of genetic information from DNA to mRNA (Latchman, 1997). Transcription factors can function alone or with the help of other proteins, forming a protein complex that either promotes or blocks the formation of RNA polymerase. The transcription factor of interest in this experiment is ELT-2. ELT-2 is a transcription factor for initiating and maintaining differentiation of the intestine (Maduro & Rothman, 2002). In addition, although it is solely expressed in the intestine, it also controls the endoderm development of an animal throughout a nematode's embryonic stage.

Erythroid-Like Transcription Factors

Refers to a family of factors found in *C. elegans* that are similar to a group of transcription factors found in vertebrates called GATA transcription factors (Shim, Bonner, & Blumenthal, 1995).

Knock Out

This refers to a process where a particular gene, DNA or, in this case, transcription factor, is no longer translated and therefore makes the gene or transcription factor inactive. This is done by a system called RNAi. RNAi refers to RNA Interference. It is a system within cells that helps control which genes are active and inactive. In this experiment RNAi will be used in order to knockout ELT-2. RNAi pathways are initiated by the enzyme Dicer which starts by cutting long double-stranded RNA molecules into short fragments of nucleotides. One of the two strands is incorporated into a complex called the RNA-induced silencing complex (RISC). This degradation of RNA molecules prevents the original DNA from which the RNA was transcribed from being translated into what it is coded for.

Older Cultures

In general cultures are a process that cells or, in this case, bacteria, are grown under controlled conditions. In this experiment “older cultures” refers to cultures of bacteria that were allowed to incubate longer than 24 hours.

Fresher Cultures

“Fresh cultures” refer to bacterial cultures that were incubated for 24 hours or less.

Incubation

Incubation is a biological process for maintaining and growing a bacterial culture at a particular temperature. It is through incubation that cultured bacteria are able to grow into colonies in a controlled environment. This process is done in a machine called an incubator that allows an experimenter to control the temperature, humidity and air composition that a bacterial culture needs to grow.

Pathogen

A pathogen is a biological agent that can cause disease in an organism. In this experiment there are 3 bacterial pathogens of interest. In general a bacterium is a domain of unicellular microorganisms (NCBI database) and can be variously shaped as spheres, rods or spirals. They can survive in many environments ranging from extremely cold temperatures to high elevations. Three types of bacterium will be used in this experiment; *Salmonella enterica*, *Pseudomonas aeruginosa*, and *Enterococcus faecalis*.

Salmonella enterica is a rod shaped, flagellated, aerobic, Gram-negative bacterium. *Pseudomonas aeruginosa* is a rod shaped, single polar flagellum, aerobic, Gram-negative bacterium. *Enterococcus faecalis* is a spherical, non-motile, Gram-positive bacterium.

Literature Review

The following sections will analyze relevant literature to develop a relationship between the literature and the conceptual framework.

Innate Immunity in Caenorhabditis Elegans

Using *C. elegans* as a model organism has become a recently new idea to science (Adams, 2008). Before using *C. elegans* as a model organism can be truly useful to science, scientist must first develop experiments where the main goal is to understand the basic mechanisms of the immune system in roundworms. Patterson (2008) explored the inner workings of *C. elegans* by looking at its interaction with the bacterial pathogens *Burkholderia thailandensis* and *defensin-like peptides*. His initially objective was to enhance the understanding of the human disease Meliodosis, which is caused by a pathogen closely related to *Burkholderia thailandensis* called *Burkholderia pseudomallei*.

In Patterson's (2008) experiment *C. elegans* were exposed to *Burkholderia thailandensis* and then genes associated with the worm's immune system were measured to see which genes were being expressed when an infection occurred. In addition to measuring genes, CS $\alpha\beta$ -type (defensin-like) peptides from the worm were compared to putative protein sequences from the human genome. Defensin-like peptides are proteins that help fight against bacteria, fungi and viruses (Yang et al., 1999) and therefore is another good indicator of an immune response. Patterson (2008) found that the defensin-like peptides shared some similarities to putative protein sequences from the human genome. Furthermore his results showed that *C. elegans* did indeed produce an immune response to *B. thailandensis*. This was shown through the up-regulation of *lys-1* and down-regulation of *abf-2*. The gene *lys-1* is responsible for coding for lysosomes, which are useful for digesting pathogens (Mallo et al., 2002) and *abf-2* codes for an antimicrobial peptide, which works like an antimicrobial (Kato et al., 2002).

Summary and Implications

The innate immune responses that *C. elegans* possess to a wide variety of pathogens has already been well documented and this experiment was a strong contribution to supporting this idea. Through the results of this study it is evident that even though *C. elegans* are simplistic in nature they still possess the genes and peptides to produce an effective response to an infection. Despite successful experiments like this one, scientist still do not know or understand a lot to about the genome of *C. elegans* nor the specifics of their immune system. This experiment has at least documented that *C. elegans* do indeed respond to pathogens through manipulation of its own genome. This experimentation has also shown some of the specific genes and proteins that are produced in response to a infection. Now this proposed experiment will take the next step to better understanding the role of certain genes in the immune system of *C. elegans* by looking at the transcription factor ELT-2.

Viable But Non-Culturable State Theory

Resuscitation of Enterococcal Cells

The VBNS state is a condition that was identified by Xu et al. (1982) and since then has gained a lot of attention. The viable but non-culturable state theory's significance lies in the fact that it describes the capabilities of an organism that are both potentially harmful and potential beneficial. Bacteria, both pathogenic and nonpathogenic, play a part in the day-to-day lives of humans, which drives scientist to understand the workings of bacteria as well as learn how to use them.

According to Lleo et al. (2001), and many other researchers, the VBNC state is a survival strategy used by bacteria when under environmental stress. Environmental stress can be caused by extreme temperatures, high or low elevations, abnormal air composition, moisture content, and many other unique environmental conditions. These experimenters sought to mimic what happens when fecal enterococci are released in nutrient-poor environments and than ingested by humans or animals, which allows the bacteria to revitalize. Enterococci can cause urinary tract infections, bacteremia, bacterial endocarditis and meningitis. It has a high level of antibiotic resistance and therefore understanding its pathology is important to knowing how to defend against it.

In order to study the pathology of fecal enterococci, different enterococcal species in the VBNC state were placed in a lake water microcosm, an artificial ecosystem, and were monitored for their rate of resuscitation. First enterococcal cells where induced into the VBNC state. Then these cells were stained with the Live/Dead kit to determine how many/which cells were dead or alive. For cells that were still alive but had low colony levels mRNA detection was used to determine if the cells were still viable. For microcosms whose colony reached lower than 0 or 1, resuscitation experimentations were conducted. These cells were plated and incubated and checked daily for colony formation.

The results showed that even though the enterococcal cells were in the VBNC state they still produced mRNA. Production of mRNA but lack of colonies signifies that the cells are non-culturable but still viable (Sheridan et al., 1998). In order to test if the cells in the VBNC state are capable of resuscitation they were played and incubated. They found that the cells of all three strains of enterococcal cells were actually capable of resuscitation from the VBNC state.

VBNC *Aeromonas Hydrophila* and Virulence in Goldfish

In 2000 Rahman, Suzuki and Kawai conducted an experiment similar to the one being proposed in this paper. These experimenters sought to study the virulence of *Aeromonas hydrophila* in goldfish. Goldfish were exposed to *A. hydrophila* cultured at varied lengths; 1-day, 28-day, and VBNC cells. Mortality of goldfish was monitored over the span of 15 days. To confirm the death of the fish from the bacteria, the bacteria from the goldfish's kidney was isolated and cultured and identified. They found that goldfish exposed to *A. hydrophila* incubated for 1 day had a significant higher mortality rate than bacteria incubated for 28 days. Furthermore they found

that goldfish exposed to *A. hydrophila* incubated for 1-day as well as 28-days both had a higher mortality than goldfish exposed to bacteria in the VBNC state.

Summary and Implications

In Lleo et al. (2001) the researchers were able to successfully induce enterococcal cells into the VBNC state as well as resuscitate them back into being culturable. Based on these findings it is now known that VBNC state occurs in *Enterococcus faecalis*. This experiment will try to replicate this state in *Salmonella enterica*, *Pseudomonas aeruginosa* as well as *Enterococcus faecalis*. If these states are inducible in all 3 bacteria it will then be determined if this state affects the pathogenicity of these bacteria to nematodes.

Futhermore, Rahman, Suzuki and Kawai (2000) experimentation supports the idea that bacteria entering the VBNC state can affect the pathogenicity of bacteria. It is hypothesized that the longer bacteria is incubated for the more likely it will enter the VBNC state. As it enters this VBNC state the ability of the bacteria to infect an organism will decrease. The end result will be a decrease in mortality.

Danger Theory

The danger theory refers to the way the immune system responds to an infection. It proposes that the immune system works by distinguishing between self and non-self. According to the danger theory if the cause of cellular death is from non-self (foreign pathogen) then the host will produce an immune response to fight off the cause of death. Although there has been some controversy about the danger theory being valid (Vance, 2000) it is still seen as the best explanation of the immune system.

The Danger Project is a group of researchers that seek to further explore this phenomenon and have done extensive studies to better understand the immune system. A study conducted by Aicklein and Greensmith (2007) sought to study the danger theory in a unique way by using two immune inspired algorithms. The immune inspired algorithms they looked at were the Artificial Immune System (AIS) and the Intrusion Detection Systems (IDS). These researchers sought to develop these algorithms in a way that would allow them to use them in order to detect a problem in an organism by taking concepts of the innate immune response and using it as the basis for the algorithms. The goal for their research was to discover the missing link between AID and IDS and this goal was reached by qualitatively comparing the two algorithms. The research and analysis showed that it is possible to develop a newer and better AID algorithm based on the principles of the Danger Theory.

Summary and Implications

There is some doubt about the validity of the danger theory. It is thought to be too simplistic in nature and does not explain all capacities of the immune system. However this study has shown that the danger theory is a valid foundation for

explaining the abilities of the immune system and that it is capable of explaining responses to infection that it was not even originally meant to explain.

Research Design & Methods

The following sections of Chapter 3 will concentrate on the methodology for how this experiment will be conducted. The topics that will be addressed are subjects of experiment, apparatus, design, procedures, data analysis strategies, strategies for minimizing bias and error, and ethical considerations.

Methodology

Subjects

Nematodes will be obtained from the University of Minnesota Caenorhabditis Genetic Center and maintained as published by Brenner (1973). Stock plates of N2 (wild-type) *C. elegans* will be briefly kept as dauers at 15°C on 10 centimeter SB plates (0.25% Bacto-peptone (BD Bioscience, Sparks, MD), 2.0% agar, 51.3mM NaCl, 1mM MgSO₄, 1mM CaCl₂, 25 mM KPO₄, pH 6.0, 12.9 μM cholesterol) with 200μl of OP50 *E. coli*. The worms will be grown at 25°C for all of the experiments.

Apparatus

First, an incubator will be used to encourage bacterial growth. Later, to separate nematodes from stock solution, a centrifuge will be used. GraphPad Prism software will be used to run statistical analysis at the end of the experiment.

Design

There are three independent variables in this experiment. The first independent variable is whether the nematode has been genetically altered to have ELT-2 silenced or is a wild-type nematode with active ELT-2. The second independent variable is the incubation time of the bacterial cultures with three levels, 24, 48 or 72 hours. And the third independent variable is the type of bacterial culture the nematode is exposed to. The dependent variable is the number of days the nematodes survive after being exposed to different bacterial cultures. The experimental group that contains nematodes that are wild-type serve as controls for corresponding genetically altered nematodes that were exposed to bacteria cultures incubated for the same amount of time.

Procedures

Bacterial strains. Bacterial strains will be stored as glycerol stocks in a freezer at -80°C. To make cultures each type of bacteria will be grown in Luria-Bertani (LB) broth and on agar plates, except *E. faecalis*, which will be grown in brain-heart infusion (BHI) medium. All pathogens will be grown at 37°C.

Six centimeter SK plates (0.35% Bacto-peptone (BD Bioscience, Sparks, MD), 2.0% agar, 51.3mM NaCl, 1mM MgSO₄, 1mM CaCl₂, 25 mM KPO₄, pH 6.0, 12.9 μM cholesterol) will be inoculated with 100 μL of the pathogen, which will be spread on the plate to ensure an even lawn. Then the plates will be put in a 37°C incubator. To compare older cultures to fresher cultures, plates will be incubated according to assigned incubation group; 24 hours, 48 hours, and 72 hours.

Forming transgenic nematodes. For this study, N2 (wild-type) worms will be transferred from their stock plates onto 15cm SB plates and will be incubated overnight at 25°C. Then the worms will be washed off the plates and put into a 15mL conical vial using 2mL of M9 buffer (22mM KH₂PO₄, 42.3 mM Na₂HPO₄, 85.6 mM NaCl, 1mM MgSO₄). After letting the worms settle to the bottom some of the supernatant will be removed. After resuspending the solution containing the nematodes, 200μL of the solution will be pipetted onto the RNAi plate (SB media containing 1mM isopropyl-beta-D-thiogalactopyranoside (IPTG) and 50μg/mL ampicillin) containing either the blank vector control or ELT-2. These RNAi bacteria will be cultured from freezer stocks and grown in LB broth for 24 hours.

Survival assays. *C. elegans* survival assays will be conducted by transferring nematodes from RNAi plates or from original nematode stock onto each of the bacterial cultures. Every 24 hours the nematodes will be recorded as alive, dead, or missing. After recording their status the live nematodes will be put onto new bacterial cultures from the same incubation time group. *C. elegans* that do not move after being poked gently with a pick will be considered dead. *C. elegans* that respond to being poked by a pick will be scored as alive. Three independent trials will be run for each bacterial pathogens used.

Data Analysis Strategies

The data from each trial will be analyzed using GraphPad Prism® software. Statistical analysis will be performed for each trial using the Kaplan and Meier product limit method to generate survival curves (GraphPad, 2007). Then Log-rank (Mantel-Cox) tests will be performed on the combined data from each pathogen to determine if there is a difference between the survival rates of the RNAi knockdown treatments and the vector control treatments. The p-value will measure the likelihood of randomly selecting subjects whose survival curves that are different than will be actually observed. P-values below 0.05 are statistically significant or in other words that the result is not due to chance alone.

A 3-way ANOVA will also be used to compare the percentage of nematodes surviving in each experimental group to each other. Using the three previously mentioned independent variables as the three variables needed to conduct a 3-way ANOVA.

Strategies for Minimizing Bias and Error

To avoid bias and error three independent trials will be ran for each bacterial pathogen used. Furthermore to avoid counting offspring of nematodes as original nematodes the live nematodes will be transferred onto new plates for a total of four days while they are laying eggs. Another strategy that will be implemented is also an important part of the experiment itself. Instead of plating all the bacterial pathogens at the same time each trial will involve plating and incubating a specific bacterial pathogen at 24-hour intervals, going up to 72 hours. For example *Salmonella enterica* will be cultured first. After 24 hours plates that are intended for this category will then be exposed to ELT-2 knocked out nematodes or a vector control nematode. After 48 hours plates that are intended for this category will then be exposed to their corresponding treatment. This would be conducted up until 72 hours for each bacterial pathogen and each trial.

Ethical Considerations

Although nematodes are microscopic and sometimes parasitic organisms they are still animals and therefore subjected to the animal laws established by the government for using animals in research. According to animal laws one main rule to follow is to provide a humane environment. For the nematodes that are not being used currently, they will be kept in a freezer, which slows down their metabolic activity, but does not kill them. Inevitably all nematodes used in this experiment will die either from exposure to a pathogen or from it's short life span (2-4 weeks). The advantage of studying the immune system *C. elegans* is seen as beneficial enough to the science of Immunobiology that it outweighs the loss of *C. elegans*'s life and therefore this experiment will not violate the laws of the Animal Welfare Act.

Expected Findings and Future Research

Expected Findings

Since this is only a research proposal there are no real findings yet. Instead there are only the expected findings, which are the same as the hypotheses. They are listed below:

1. The first hypothesis for this experiment is that if ELT-2 is knocked out in nematodes the genetically altered organism will have a decreased survival rate when compared to nematodes with active ELT-2
 2. The second hypothesis is that if ELT-2 is knocked out in nematodes then the nematodes will be unable to create an immune response in reaction to a pathogen.
 3. The third hypothesis is that if *Salmonella enterica*, *Pseudomonas aeruginosa*, and *Enterococcus faecalis* are incubated for 72 hours they will have a decreased level of pathogenicity than cultures incubated for 48 or 24 hours.
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Future Research

Once this experiment is conducted then further experimentation can be done to further understand the immune system of *C. elegans* as well as the pathogenicity of specific types of bacteria. One potential topic for research would be to study the pathogenicity of other types of bacteria besides the 3 that will be tested in this experiment. Knowing the changes in the pathogenicity of bacteria has implications in the medical world as well as in experimentation. Everyday humans come into contact with bacteria, some lethal and some beneficial. Knowing the capabilities of these bacteria can help people better prepare themselves against infection as well as demonstrate to doctors the medicinal use of certain bacteria.

Another potential topic for future research could be studying other transcription factors in the immune system of *C. elegans*. ELT-2 belongs to a family of other factors, specifically the Erythroid-Like Transcription Family. Although some information is known about these other transcription factors, little is known about them in the context of the immune system of *C. elegans*. A similar experiment to this one could be conducted that focuses on the role of all ELT factors in the immune system of *C. elegans*.

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Visualizing Amine Groups Tethered to a Glass Surface

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Honors: Outstanding Oral Delivery of Research

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Abstract

This study determined the viability of a new technique for visualizing micron (or smaller) sized areas of amines tethered to a glass substrate. The experiment utilized a methodology that requires the use of amine functionalization, plasma cleaning, and an elastomeric mold to pattern amines on a glass surface. Electro-less copper metallization was used to verify that the patterned amine region was indeed present on the surface of the glass. The results suggest that metallization can be used to detect amine groups on glass; however, more experimentation is needed to attain maximum selectivity in the devised visualization technique.

Introduction

In science, advancement is essential. If scientists can develop better technology to build and process microarrays then the advancement in biotechnologies can be conceptually limitless. Previously, the field of genomics, the field of chronicling genomes of various species, was limited by the lack of technology. This caused the first part of the Human Genome project to take years to complete. Today, a scan of the entire human genome can take a few minutes and rebuilding the genome can take less than a week to complete. The availability of this technology has vastly improved the ability of scientists in the field of disease prevention to be able to pinpoint genetic markers for various illnesses. Similar to the computer revolution in which computer processing improved in power and speed by reducing the size of computer chips, a new direction in genomics has been fueled by microarrays (Schena, 2003). By further reducing the size of microarrays to the nano or micro-scale, technology in the biotechnology fields will be improved, and this improvement will lead to more understanding and efficiency in health fields and disease prevention.

Schena (2003) defines the term microarrays as a “scientific word derived from the Greek word *mikro* (small) and the French word *arayer* (arranged)” (p 4). More simply put, microarrays consist of arranged fragmented DNA or protein pieces attached to a substrate or ligand. These devices are used as diagnostic and analytical tools in the fields of biotechnology and genetics. The first step in the actual creation

of microarrays is to functionalize (which is to place groups of compounds on) the surface of the substrate. In the second step, DNA is placed on the surface of the ligand, usually by a printing technique controlled by a mechanical system. The functionalizing compounds, usually amino-silanes or epoxy-silanes, are used to attract and hold the strands of DNA electrostatically or covalently to the surface of the substrate (Blalock, 2003; Sheena, 2003).

Many techniques exist to confirm that amine groups are on the surface of the substrate. (Moon et al, 2007). These techniques are helpful to confirm that the amine groups are present in the desired arrangement before analyzing DNA microarrays. Selective metallization is a good technique because of its simplicity and the ease of obtaining good visible results. There appears to be no reported studies using this method to detect micron sized areas of amine on glass substrates.

The purpose of the study is to determine if metallization (electro-less deposition) can be used as a viable technique to detect micron-sized (or less) areas of amines patterned on a glass substrate. The goal is to provide a relatively simple method to confirm a desired pattern of amines on glass. The glass will be patterned by selectively cleaning away certain areas of an amine functionalized substrate. This selective cleaning will be performed by protecting specific areas of amines using a polydimethylsiloxane (PDMS) stamp. Questions to be addressed include:

- How necessary are amine groups to metallization?
- How effective is the plasma cleaning or etching in removing amine groups during selective cleaning?
- What are some of the variables that can be adjusted to improve the selectivity of the metallization process?

Background and Research Plan

Background Terms

Microarrays. Microarrays consist of pieces of fragment DNA or protein attached to a substrate or ligand (the medium to which the DNA fragments are attached to). These arrays are used as diagnostic and analytical tools in the fields of biotechnology and genetics. Microarrays are essential in chronicling genetic material and, forming gene libraries, such as the Human Genome Project. For the last few years, microarrays have gained importance as a technique to understand the frequency with which genes are expressed for various species. The development of microarray technology leads to more understanding of gene expression which has vast applications in medical technology, forensic evidence, pharmaceutical production, environmental restoration, and agricultural advancements (Blalock, 2003; Reece, 2004; Schena, 2003; Schena, 2005; U.S. Department of Energy Office of Science, 2008). For instance, understanding of gene expression, which is the process by which genetic information flows from gene to messenger RNA and is converted to a protein (the state of a gene being activated), has led to the development of gene therapy (Reece, 2004; Schena, 2003). Gene therapy is the ability to repair or

replace faulty genes with a properly functioning gene. However, gene therapy has been stalled because the expression of one gene can influence the rate or intensity in which other genes are expressed.

While microarray technology and bioinformatics adds valuable knowledge to unexplored areas of biology and genetics through the use of supercomputers, the data generated is so vast that the ability to analyze and reproduce the data is very limited and unreliable. According to Blalock (2003), "Regardless of the application, generating high quality microarray data requires reliable manufacturing and processing techniques" (p 94). Each microarray manufacturing company has to deal with specific variables within their production technology; no production system will be exactly the same. Troubleshooting for each manufacturing company is necessary. Even if a standard methodology for creating microarrays existed, each machine (microarrayer) would contain nuisances and variables specific to that machine that would need to be controlled. Simply stated in Blalock (2003), microarray manufacturing is a science in which the user tries to control variables in their system to generate a reliable and reproduce product. The variance in the production and manufacturing of microarrays leads to technological variance which has to be over come in addition to the experimental variance of the biological systems. These technological variances limit the reliability and reproducibility of the microarray products, which means that the development of new technologies to manufacture and analyze microarrays could be the break through that could cause a revolution in not only health care and medicine, but would also advance biotechnology in a way that would change the concept of ordinary everyday life. Picture a future where a swipe of a customer's finger could instantly put the charges on his or her bank statement, where drugs can be genetically tailored to fit an individual's genetic material, and where medical diagnoses would be more efficient and accurate.

Manufacturing of Microarrays. Microarrays are made using sophisticated robotic systems, arrayers, in order to mass produce consistent microarrays at a small cost. The first step in the actual creation of microarrays is to functionalize, or place groups of compounds on, a surface of the substrate. In the second step, DNA is placed on the surface of the ligand usually by a printing technique controlled by the mechanical system. The functionalizing compounds, usually amino-silanes or epoxy-silanes, are used to attract and hold the strands of DNA electrostatically to the surface of the substrate (Blalock, 2003; Sheena, 2003).

Although, glass is an ideal substrate because of "the combination of structural roughness and highly polar surface groups," the polarizable groups on the surface of the glass allow for environmental contaminants such as organic molecules and debris to attach to the glass surface (Blalock, 2003). These surface contaminants prevent the amine groups from adhering to the polarized groups, and this prevention causes the amine coating to be non-uniform. Thus, before any substances are placed on the substrate, the substrate must be sterilized to rid the surface of contaminants. This research paper will explore two viable techniques to clean surfaces. The first method exposes the glass surface to oxygen plasma, and the second method

involves the use of Hydrofluoric acid (HF). Although both methods of sterilization function in a different ways, each technique produces hydroxyl groups bound to the silicon atoms at the glass surface.

Plasma Cleaning. Plasma cleaning is an essential element of the amine functionalization or slide coating process. Plasma cleaning is gaining popularity in the slide coating process because this technique eliminates organic contaminants without the toxic waste generated in an acid or alkaline cleaning process. Oxygen plasma cleaning functions by stimulating oxygen plasma (a substance that contains properties of a gas and liquids) through low or high frequency radio waves in an oxygenated environment. These radio frequency waves cause diatomic oxygen molecules to split and become extremely reactive. When these oxygen atoms come into contact with surface contaminants, the molecules are oxidized into water vapor, carbon monoxide and carbon dioxide. These gases are removed by the vacuum stream (Birch, 2003; Blalock, 2003).

Hydrofluoric Acid (HF). The use of HF is one of the oldest methods to clean glass. However, the chemical reactivity of HF makes it extremely dangerous. HF is a powerful acid that has the ability to decalcify bones and cause lung and heart failure. HF operates by literally eating away the surface of the glass and any contaminants on the surface. According to Birch (2003), "The fluoride ions rupture siloxane bonds" (Alkaline solution cleaning, paragraph 3). The result is that pieces of glass break away from the surface, and this removal of glass causes the surface of the glass to become rough. The amount of etching or cleaning required depends on the concentration of HF and the amount of time the substrate is in contact with acid.

Amine Coating. By manipulating the amine coating through patterning, scientists can validate the effectiveness of their patterning technique before the manufacturing of their microarrays. Amine groups are not the only compounds used to functionalize glass. Epoxy groups and aldehydes are also commonly used. However, the aldehyde coatings can sometimes create bias in microarray analysis due their hydrophobic interactions (Sчена, 2003). The amine groups are functionalized to the glass surface with the use of amino-silanes. Aminosilanes are a group of molecules containing amine groups (which are groups of atoms with a nitrogen atom possessing a lone pair of electrons) bonded to a central silicon atom. The aminosilane compounds react to the surface of the glass, which is composed of silanol groups. This reaction allows the aminosilane groups to attach to the surface (Blalock, 2003; Sचना, 2003). The amine groups can then react with the phosphorus atoms of the DNA and binds the DNA strands to the substrate forming microarrays. Conversely, these amine groups can be used to deposit metal onto a substrate, and by doing so they essentially confirm their presence on a substrate.

Selective Metallization. Selective metallization is a process to distinguish the shape or patterning of a compound by depositing metals onto its surfaces. Usually, the metallization process is used to distinguish the amine groups of a compound or to confirm that the amine groups are present in the desired arrangement before conducting DNA analysis. However, many types of selective metallization exist.

New methods of metallization and photolithography are constantly evolving and being created especially for applications concerning circuit boards.

Traditional methods. Early methods of metallization were based solely on the concepts of etching and lithography (Ferrier & Larson, 1990). In print making processes such as etching and lithography, metal is removed to create a design. The difference between the two art techniques, lithography and etching, is the way in which the removed area is used to create either a negative pattern or positive pattern. Rathus (2007) explains that in some print making processes the, “Areas that are not meant to be printed are cut below the surface and, areas that are meant to be printed are left raised” (p146). Another print making category, which includes etching, uses the depressed or removed surfaces of the metal to form the design (Rathus, 2007). The elements that separate etching and lithography from other print making processes are the use of chemicals to either remove metal or precondition the surface of the metal for manipulation.

Ferrier and Larson (1990) described the early methods of metallization as either subtractive or additive. According to Ferrier and Larson (1990), “[the characteristic] common to the subtractive process is the need to etch away (or subtract) metal to expose substrate surface in areas where no circuitry is desired” (paragraph 8). The flaw of this technique was that it produced error in the results of the metallization process by exposing some areas of the substrate that should not be exposed. Also, the technique was not economical because it discarded metal material which has to be re-processed to be reused. Ferrier and Larson (1990) noted that, “Additive processes, on the other hand, begin with exposed substrate surfaces and build up thereon metallization in desired areas, the desired areas being those not masked by a previously-applied pattern of plating resist material ...” (paragraph 10). Flaws of the additive process included limited choice of metal material and ability to build the metal coating to the desired specification.

The difficulties of the additive and subtractive processes led to the creation of a hybrid method of metallization which included methods from both processes. In the reformed process, the surface of the chosen material, called the substrate, was first coated with a layer of electro-less metal and then areas that metallization was unwanted (resist) were stripped away or etched off to reveal a metalized pattern. Ferrier and Larson (1990) explained that, “In this process, however, the deposition of metal over the resist is quite substantial and leads to difficulties in cleanly stripping the resist, often resulting in the remaining metallized areas adjacent the resist (e.g. conductors) having ragged edges or slivers, correspondingly poor fine line resolution or definition, and risk of shorting” (paragraph 12). The weaknesses of the hybrid process lead to the modernization of selective metallization which required a systematic use of solvents to induce the coating of the substrate.

Modern methods. Most modern electro-less metallization techniques use a three step method that calls for a preparatory agent, followed by a catalyst immersed in some type of activating and/or deactivating agent, and in the final step the substrate becomes metalized (Ferrier& Larson, 1990; Charbonnier, Romand, Harry, & Alami,

2001). However, many methods combine two of the three steps to make a more economical step (Ferrier& Larson, 1990). The preparatory step, also referred to as the preconditioning phase, functions by blanketing the substrate surface in a thin film, which allows an increased surface for metal deposition to take place; however the mechanisms for the adhesion of the metal to the preparatory agent is not full known (Dressick & Calvert, 1993; Ferrier& Larson, 1990). The catalyst covers the substrate in seeds of positively charged ions or catationic metal molecules which attract the metal that will be deposited.

The process used in the study was adapted from the work of Charbonnier et al because of the simplicity and clarity in the procedures. The procedures require plasma cleaning for the first step followed by the addition the catalytic PdCl₂. Then the substrate is exposed to a reducing bath, and then to a copper solution mixed with formaldehyde (which induces metallization). The complete process is described in the methodology section of this report.

Research Plan

The plasma cleaning technique had dual functions in this study. The first function is associated with the creation of the amine functionalized slides, and the second function is to form a pattern by etching away unwanted compounds for the substrate. Knowing the chemical nature of oxygen plasma allows scientists to manipulate the characteristic of the plasma cleaning process to pattern amines through the use of a protective mold. The protection stamp or mold is created by a substance called PDMS (Polydimethylsiloxane).

PDMS is an elastomeric polymer with the ability to form an air tight seal on the glass substrate. This seal prevents the area underneath from being exposed to the reactive oxygen atoms. The results are that unwanted (unprotected) amines are etched off the surface of the substrate leaving only the areas where the mold was sealed to the glass. The existence of a patterned amine slide, however, is still an assumption that must be proven by some technique or spectroscopy. The only way to prove that the amines are arranged in the desired pattern is by employing a technique to visualize (see) the pattern. The flaw of spectroscopy, such as XPS (X-ray Photoelectron Spectroscopy) is that the technique only proves that amine groups lie on the surface of the substrate, but it can not prove that the amine groups form a pattern. So the technique presented to confirm that the substrate was pattern in a pre-determined design was metallization because it is simple and cost effective.

Methodology

Palladium Solution. To create the palladium solution about 0.01 grams of palladium chloride (PdCl₂) was placed in 100 ml of de-ionized water with stirring until the solution turned to a pale yellow color. The solution was then processed through 0.65 micron filter.

Copper Solution. The reagents Copper sulfate pentahydrate ($0.28 \text{ M Cu SO}_4 \star 5\text{H}_2\text{O}$), sodium tartrate tetrahydrate ($0.60 \text{ M KNaC}_4\text{H}_4\text{O}_6 \star 4 \text{ H}_2\text{O}$), 0.60g ethylenediamine tetraacetic acid (EDTA) were mixed in 5 ml of deionized water. Sodium pellets were added to increase the pH to about 11. The solution was filter through 0.2 micron filter.

Amine Coating. For the study, #2 glass cover slips were used as the substrates. The substrates were sterilized then coated in an amine solution consisting of 5 ml aminopropyltrimethoxysilane in 100 ml of methanol for four hours. Following the functionalization the substrates were sonicated then dried for a few minutes in the oven.

Metallization. The substrate with a PDMS protection stamp sealed to its surface was placed in the plasma cleaner to remove unwanted compounds from exposed areas. The PDMS stamp was removed and the substrate was placed in a beaker of palladium solution for about 15 minutes. The slide was washed thoroughly, rinsed in three washes of deionized water, and then placed in a reducing bath of NaHPO_3 ($0.1 \text{ M Na HPO}_3 \star \text{H}_2\text{O}$) at a temperature of 84°C for about 10 minutes. The substrate was then rinsed for a minute and left to air dry. Then the copper solution was mixed according to the ratio of one part formaldehyde to five parts copper solution. A few drops of the copper and formaldehyde mixture were dripped on to the surface and time was allotted for metallization to occur. After a sufficient time, the substrate was rinsed one final time to remove any excess copper and the copper solution.

Results

In order to determine the viability of the metallization process, one amine functionalized slide was plasma cleaned with a PDMS stamp in place. The results appeared to convey (Figure 1(a)) that metallization was not a specific method because more metal occurred on the sides of the substrate rather than on the desired area (middle). However, that slide (shown in Figure 1(a)) exhibited hydrophobic interactions in the middle of the slide, and this caused the copper and formaldehyde mixture to flow more readily to the areas at the sides of the glass. The sides of the glass therefore had a higher probability to metalize because the copper solution was more prevalent around the edges of the substrate.

To test if amine groups were necessary for metallization, an as received glass slide was subjected to the metallization process. For this slide, metallization was centralized in the middle, where the PDMS had been positioned during plasma cleaning. However, substantial metallization also took place on the edges of this slide. The conclusion derived from this sample was that maybe metallization was not a very selective process or that maybe some contaminants were still present on the edges of the substrate even after the plasma cleaning.

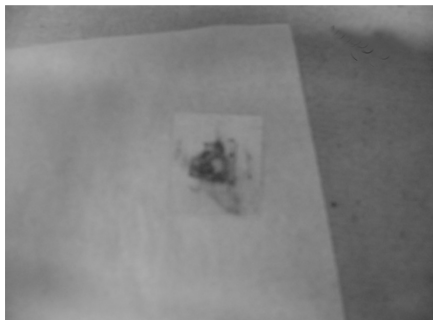
Figure 1 (a)**Figure 1 (b)**

Figure 1: (a) An amine functionalized slide that was selectively cleaned using a PDMS stamp. More metallization occurred on the sides of the slide than in the middle of the slide where the protection stamp was placed. (b) A functionalized slide with the protected area in the center of the slide, the most of the metallization occurred on the protected area. The hole that appears in middle of the metalized occurred because the PDMS piece was not sealed to the glass in that spot.

To determine if metallization in the unprotected region was due to contaminants, the plasma cleaning time was increased to 6 minutes. Two functionalized slides were used. One was pre-rinsed and the other was not. No PDMS stamp was utilized for any of these slides. Although both slides were metalized following the same metallization procedure, one slide experienced more metallization than other (Figure 2). The lack of metallization in the center of both slides suggested that contaminants were mostly cleaned from these areas. The sides of the substrate could have been contaminated after the plasma cleaning because the slides are handled by holding the sides of the slides. However, if the slides were contaminated due to handling then the non-coated slides that were plasma cleaned would have contained metallization along the sides (not shown). These non-coated slides showed no such metallization, and so it is currently unclear why the sides of these substrates were metalized. Nevertheless, the lack of any metal deposition near the slide center suggested that increasing the plasma cleaning time helped to reduce the amount of surface contaminants and any undesired amine groups.

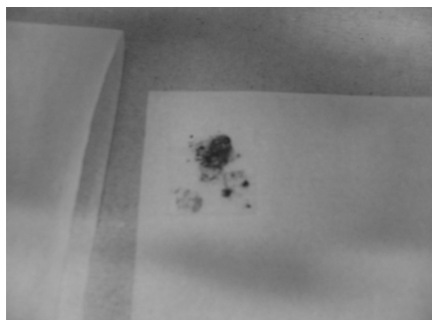
Figure 2 (a)**Figure 2 (b)**

Figure 2: (a) A functionalized slide that was pre-rinsed in methanol and acetone, and was plasma cleaned for 6 minutes. Metallization did not confirm the predetermined pattern. The metallization observed was not concentrated in the middle of the slide. (b) An amine functionalized slide that was pre-rinsed in methanol and acetone and plasma cleaned for 6 minutes. Metallization occurred all over the slide; however, the metallization might be due to the temperature of the NaHPO_3 being lower than normal.

By understanding that more time is required to clean functionalized substrates, the next experiments were devised to test the optimum time for a functionalized substrate to be cleaned and a clamp's effect on the selective cleaning process. The clamp was used to hold the PDMS stamp against the glass substrate. The idea being that this would create a better seal between the PDMS and glass. It was predicted that more time would be needed to clean the unprotected areas of the substrate because the clamp would reduce the amount of plasma that would come in contact the surface of the substrate.

First, two functionalized glass slide were cleaned for 12 minutes with no PDMS stamp or clamp. The metallization of one substrates showed copper deposition only along the left edge (Figure 3(a)). The other slide was pre-rinsed in methanol and acetone before it was plasma cleaned which resulted in a clean slide. Another slide (not shown) was subjected to the same variables with the exception of a slightly longer cleaning time, and similar results were achieved. The results (Figure 3(b)) indicated that plasma cleaning was suitable enough to clean a functionalized slide. Thus, it was probable that more time would be needed to clean a functionalized slide placed in a clamp because the clamp would prevent some of the oxygen plasma from reaching the glass surface.

Two slides were used to test this idea. The time for the plasma cleaning was chosen to be 25 minutes. The results showed a concentration of metallization in the center of the substrates (Figures 3(c) and 3(d)). However, metal also appeared in unprotected areas, which suggests that not all amines were being cleaned off unprotected areas or that maybe hydroxyl groups were also experiencing metallization.

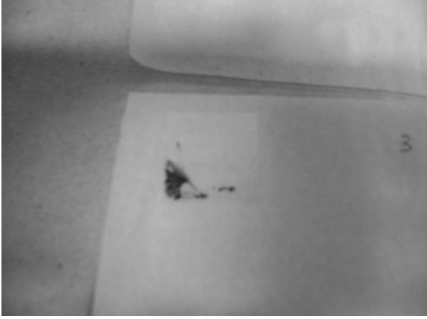
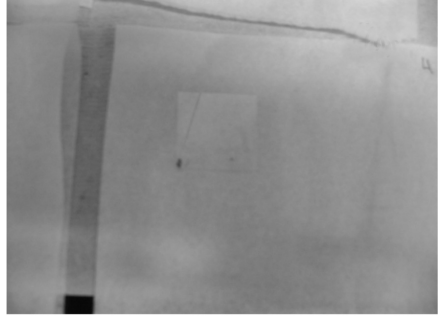
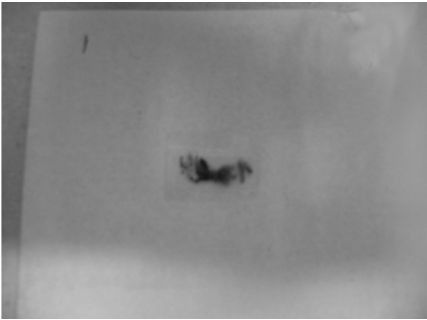
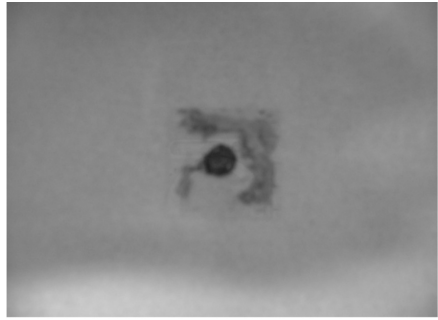
Figure 3 (a)**Figure 3 (b)****Figure 3 (c)****Figure 3 (d)**

Figure 3: (a) A functionalized slide, that was not pre-rinsed in methanol and acetone was used. The substrate was plasma cleaned for 12 minutes. Metallization occurred extensively on the bottom corner of the substrate. (b) The slide appearing here is an amine functionalized slide that was pre-rinsed in methanol and acetone, plasma cleaned for 12 minutes. Small specks of metallization occurred on the slides but the metallization was not significant. (c) Shown is a functionalized slide that was pre-rinsed in methanol and acetone, and plasma cleaned for 25 minutes. No PMDS stamp was used; however the clamp was placed around the slide. (d) This functionalized slide was pre-rinsed in methanol and acetone and plasma cleaned for 25 minutes. A PDMS stamp was used to protect the desired area from being plasma cleaned. Metallization occurred more extensively in the desired areas, but metallization still occurred on the sides of the substrate.

To verify or eliminate the possibility that hydroxyl groups were causing metallization, a functionalized slide that had been selectively cleaned using a PDMS stamp was exposed to vapor of a fluorinated silane, (tridecafluoro-1,1,2,2-tetrahydrooctyl) dimethyl chlorosilane. The proposed plan was that fluorinated silane molecules would react with the hydroxyl groups on the surface of the glass preventing any metallization by these hydroxyl groups. For this sample, the large

contact angle for a drop of the copper-formaldehyde mixture on the glass substrate suggested that the fluorinated silanes were on the surface of the substrate. But metallization still occurred in unprotected areas, and this confirmed that amines groups were not being completely removed from exposed areas.

These amine contaminants could also be blamed for metallization occurring outside the protected area of amines. The standard procedure for plasma cleaning usually calls for materials to be sonicated first. So two slides were sonicated for five minute intervals in acetone, isopropyl alcohol, and water, and then baked to dry. For these samples, metallization was concentrated in the middle of the slide, but unexposed areas still metallized (Figures 4(a) and 4(b)).

It was proposed that maybe the hydrophobic interactions influenced the how the substrate metallized; therefore the ratio of formaldehyde to copper solution was increased (from 1:5 to 1:1) so that all of the substrate would be covered by the copper solution at the same time. The effect of changing this ratio led to no metallization occurring on the slide at all.

Figure 4 (a)

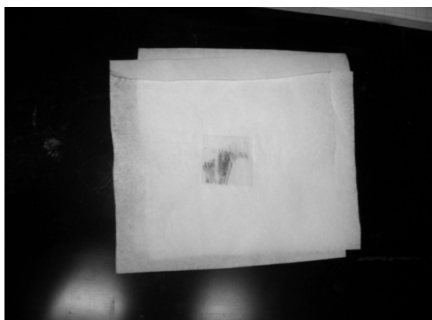


Figure 4 (b)

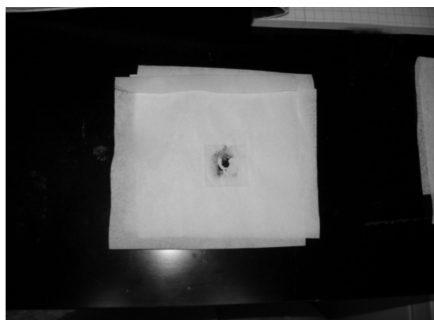


Figure 4: (a) This functionalized slide was sonicated for 5 minutes in sequential washes of acetone, isopropyl alcohol, and a water rinse. The slide was dried in an oven at 150°C for ten minutes. While the metal is denser in the desired area, pockets of metallization still took place along the edges of the cover slip. (b) This slide (functionalized) was also sonicated for 5 minutes in sequential washes of acetone, isopropyl alcohol, and a water rinse. The slide was dried in an oven at 150°C for ten minutes. Then the slide was metallized and the observed result was that while metallization mainly occurred in the middle of the slide, and metal still appeared on the sides of the slide.

Another possible process to clean unwanted amines off the surface of the glass was to use HF. HF literally removes glass layers from the surface of the substrate. Therefore, any amines in exposed areas of the substrate would be removed during the selective cleaning step because that area of glass substrate would be eaten away, dislodging the amine groups in these areas. The results reveal that metallization appeared everywhere, suggesting that HF did not remove the unprotected amine groups from the surface of the glass (Figures 5(a) and 5(b)).

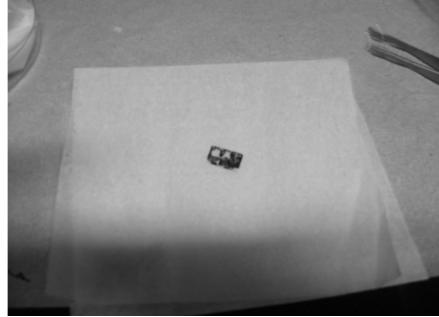
Figure 5 (a)**Figure 5 (b)**

Figure 5: (a) This amine coated slide was subjected to HF for 30 seconds; the slide was metalized and metal deposited on the entire slide. Some of the metal had peeled off during the rinsing. (b) The functionalized slide shown was placed in HF for two 10 seconds dips to determine the viability of the HF etching for the metallization technique. The result observed was that the entire slide metalized. The holes that appear on the slide are the result of the copper solution peeling off during the rinsing.

Another strategy tested was to functionalize a PDMS stamp and place it on a plasma cleaned slide. A non-functionalized slide that has been plasma cleaned will not metalize (not shown). Thus, the plan was to use a PDMS stamp to place amines on selected areas of a clean slide. This stamping process would avoid problems associated with trying to remove amine groups from certain areas of a slide. However, removing the stamp from the cleaned slide after 2 hours and exposing the substrate to the metallization solutions led to the metal to deposit everywhere on the slide (Figure 6). The proposed explanation is that amine groups radiated out from the location where the stamp was placed to the fringes of the glass slide. It is plausible that a shorter stamping time, using an amine functionalized PDMS stamp, will produce better results.

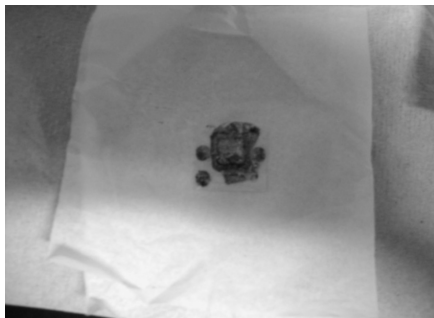
Figure 6

Figure 6: Displayed is a non-functionalized slide that had a functionalized PDMS stamp (which had been exposed to the amine solution (10 % v/v APTES in methanol)) placed on its surface for 2 hours. The slide was then metallized. Metallization occurred all over the surface of the slide, and the metallization pattern seemed to contain swirls.

Another proposed strategy to deal with the occurrence of metallization in unexposed areas involved reducing the palladium concentration in the seeding solution. A palladium concentration that is too large may blanket the entire slide with palladium instead of limiting the palladium to the protected amine groups. A slide was exposed to the reduced concentration palladium solution, and then exposed to the other metalizing solutions. Metallization occurred all over the surface of the slide (Figure 7(a)). The results from this slide suggested that while the amine groups in the protected areas receive more deposits of palladium than the unprotected, plasma cleaned areas of a slide (and therefore react quicker with the copper solution), exposing these unprotected areas to the copper solution for long times causes metallization in these areas.

So a time limit was proposed for the substrate's exposure to the copper solution. Another slide (Figure 7(b)) was also introduced to the reduced concentration of palladium; however the exposure to the copper solution was limited. This strategy produced the best results (Figure 7(b)). When the same variables were repeated (see Figure 7(c)) the results were not similar to metallization pattern of Figure 7(b). It is believed that an ineffective stamp caused the variability. The proposed explanation was that stamp used for this particular substrate had lost its adhesive ability due to contaminants on the surface of PDMS. The next step was to try to plasma clean the PDMS stamp. However, the plasma clean caused the stamp to lose its adhesive ability all together.

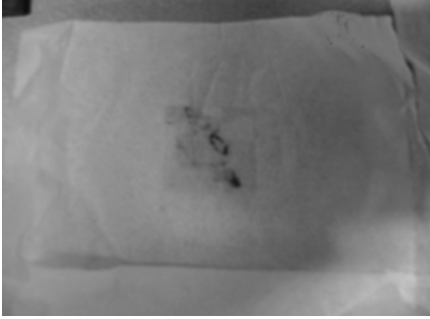
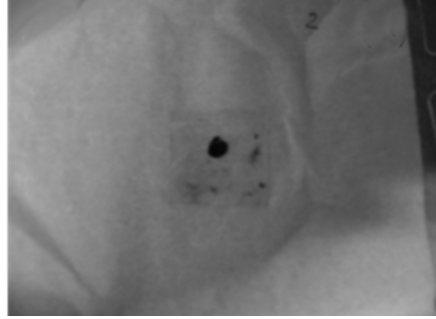
Figure 7 (a)**Figure 7 (b)****Figure 7 (c)**

Figure 7: (a) Shown is a functionalized slide that was pre-rinsed in methanol and acetone, plasma cleaned for 12 minutes, and received a reduced concentration of palladium solution. Metallization did not confirm the predetermined pattern; metallization appeared on the sides and the most of the metal observed was not concentrated in the middle of the slide. Most of the copper deposit came off during the rinsing. (b) A functionalized slide that was pre-rinsed in methanol and acetone, plasma cleaned for 12 minutes, and received a reduced copper solution. The best results were achieved during this study. The substrate's exposure to the copper solution was limited to 2 minute and 24 seconds. None of the metal deposit peeled off during the rinsing. (c) This non-coated slide was pre-rinsed in methanol and acetone, plasma cleaned for 12 minutes, and received a reduced concentration of palladium solution. Metallization occurred over the entire slide. The stamp used for this slide did not form a good seal to the glass.

Conclusions and Recommendations

The results confirm conclusively that amine groups could be selectively visualized using the selective metallization technique. It was also concluded that technique was inadequate to improve microarray technology. However, it is believed that with the right parameters, the technique could become more selective visualization tool that could offer a cost efficient and simplistic way to observe a substrate that has been patterned with micro sized amine areas. By manipulating the parameters of the study, specific variables in the experiment could be observed and evaluated to confirm if those variables led to a more selective metallization technique. Some of the parameters and variables tested were the plasma cleaning time, the use of the clamp to keep the PDMS stamp in place, placing fluorinated silanes on the substrate, the time the copper solution was left on the substrate, palladium solution concentration, the ratio of formaldehyde to copper solution, functionalizing the stamp, pre-rinse in acetone and methanol, and the use of HF to pattern the substrate.

Testing each variable offered a different perspective and sometimes led to other possible variables that could be tested. The most critical variables found were the length of the plasma cleaning time, reducing of concentration of the palladium solution, and the amount of time the copper solution was exposed to the substrate surface. Reducing the concentration of the palladium solution and limiting the metallization time offered the best results observed for the selective metallization procedure (Figure 7(b)). Both variables influenced the rate at which the copper solution was plated on the substrate and amine pattern.

Lowering the concentration of the palladium solution causes a reduction in the palladium seeds on the surface of the substrate, with more of the palladium seeds migrating to the area containing the amines. This allows a greater rate for metallization to occur on the amine groups and not on the surface for the slide. Since more palladium seeds are attracted to the amine groups than the surface of the glass, then the amine-functionalized region of the slide (the area where the protection stamp was placed) should react quicker with the copper solution thus the metallizing faster than any contaminants on the glass surface or the glass surface itself. It was observed that as the copper solution was exposed to the surface of the substrate for prolonged lengths of time a slower rate of metallization took place on the amine functionalized region and more metallization began to occur on other areas of the substrate. The continued metallization of the protected areas of the slide led to unwanted build up of copper that had a tendency to peel off the substrate during the water rinse. This skewed the results of the slide by giving the appearance that the protected area did not receive the desired metal deposit. By changing the concentration of the palladium solution and the exposure time of the copper solution, a greater difference in the time between the substrate and amine group metallization was achieved. Moreover, by controlling the exposure time more accurate results were captured to exemplify the selective of the metallization process.

Extending the length of the plasma clean from 3-15 minutes and pre-rinsing the slide prior to the plasma procedure were successful ways to create a more selective metallization process by eliminating more surface contaminants. These variables were also used in producing the best observed data (Figure 7(b)). The cleaning techniques that were used on the non-coated slides (e.g. increasing the cleaning time to about 6 minutes), reduced the amount of metallization to virtually none. However, for the functionalized slides substantially greater plasma cleaning time was needed to achieve the same results as the non-coated slides; usually about double the cleaning time used for non-coated slides. By adding a clamp to secure the PDMS stamp, the cleaning time had to be increased further and the same quality of results were not received using the functionalized substrate. Nevertheless, the time increase and stamp did work for the non-functionalized glass. The clamp was initially added because a more defined square shaped protective area was observed in the metallization results when the clamp was used; however, in the long run it was proven to be ineffective to achieve a more selective technique.

While lengthening the plasma cleaning time produced better results on slides, this cleaning also generated some unexpected results, such as the PDMS losing its adhesive ability and hydrophobic interactions on the substrates. The observed hydrophobic traits took place in the area protected by the PDMS stamp. In that area, the contact angle of the copper solution on the substrate changed, and the copper solution and water (during the water rinse before metallization) would flow more readily to the unprotected areas rather than staying in the center of the slide (the area desired for metallization). One plausible explanation for the interactions suggest that as the plasma clean oxidized the exposed areas of the glass the protected area of the glass remains untouched. This caused the exposed glass areas to be significantly more polar than the area of the glass under the stamp (Birch, 2003).

After being repeatedly used for various experimentation, the PDMS stamps used began to lose their adhesive ability. This skewed metallization results, particularly for one experiment (Figure 7(c)). The reduced adhesive ability did not allow the stamp to form an air tight seal on the surface of the glass, and this probably allowed the oxygen plasma to clean portions of amines from the protected area. It was concluded that the reduced effectiveness of the PDMS piece was due to an over-exposure of plasma cleaning which causes the chemical makeup of the protection stamp to change. Instead of the silanol molecules of the PDMS protruding from the surface of the stamp to form bonds with the glass, these groups became attached to the oxygen bound of other silanol groups on the surface of the PDMS stamp (Katzchenburg, 2005).

The variables that appeared ineffective were the ratio of formaldehyde to copper solution, functionalizing the PDMS piece, the use fluorinated silanes and the use of HF. However, that classification does not mean that the variables could never be useful in future experiments of selective metallization. While HF is an extremely effective etching agent, its use in this study produced no usable results. For both slides dipped in HF, metallization still occurred on the entire slide. The procedure followed was to immerse the slide for a few seconds, to prevent the acid

from changing the chemical nature of the PDMS stamp while allowing the HF time to eat away exposed glass.

While the fluorinated silane did not improve the metallization technique, it was a great diagnostic tool. The reasoning behind the use of the vapor coating of fluorinated silanes was to determine if hydroxyl groups were reacting with the palladium solution to produce metallization. The fluorinated silane reacted with the hydroxyl groups preventing them from reacting with the metallization. However, metallization still occurred in unprotected areas, suggesting not all amine groups were removed from unprotected areas of the glass.

By functionalizing a PDMS stamp, the goal was to stamp amine groups on the surface. However, for this experiment most of the slide metallized which suggests that amine groups began to spread all over the slide from the area where the stamp was initially placed. The strategy behind the increase of 1:5 to 1:1 of formaldehyde to copper solution was to reduce some of the hydrophobic interactions that were observed after the lengthy plasma cleaning. By placing equal amounts of non-polar formaldehyde and the polar copper solution, the hydrophobic interactions would not be observed. The result was that no hydrophobic interactions were seen and neither was any metallization. By increasing the formaldehyde in the solution the metallization time was slowed. This explanation was made after no metal deposits were observed in the copper and formaldehyde mixture even though the mixture was left standing for an excess of twenty minutes.

Recommendations

One of the parameters which could potentially improve the metallization technique is a reduction in the amount of amine functionalization. This approach can be applied by using a brush to coat the surface of the substrate, vapor deposition instead of submerging slide in an aqueous amine solution, or by placing a mask on the cover slip that leaves a space where amine functionalization is wanted. By reducing the amount of amine groups coming in contact with surface of the glass less amounts of amine groups will have to be cleaned or etch off the glass surface during the patterning. For instance, with the use of the mask, the step to remove amines would be eliminated all together.

HF is an effective cleaning procedure for the metallization process, so using HF etching to pattern amines may still be used, however longer immersion time in HF maybe required. According to Blalock (2003), "5% or less HF used at room temperature [normally requires an etching time] for [at least] 10 minutes" (p 5). HF can also be used to supplement, the plasma clean after the plasma clean has etched away most of the amine groups.

The vapor deposition of fluorinated silanes on the slides still is an important diagnostic tool and a viable option to improve the technique. The silane could be selectively placed on the surface of non-functionalized glass in exposed areas after sufficient plasma cleaning; then the slide could be functionalized and finally metalized.

The use of a clamp to hold the PDMS was proven ineffective, yet the technique of making sure the PDMS stamp does not move during the plasma clean is still a logical argument. A technique to secure the PDMS stamp more securely to the glass slide so that the PDMS piece makes more contact with the slide can be devised based on methodologies proposed in “E-polymers” by Frank Katzchenburg. The technique would create the effect of using the clamp without inhibiting the efficiency of the plasma clean.

Through the creation of a more selective metallization technique for micron size amine areas on glass, new techniques for the creation of nano-microarrays or nanoarrays can be realized. This would allow microarray technology to expand, causing a revolution in detection systems, biotechnology, food and agricultural quality, health fields, RNA technology, genomics, and proteomics (Blalock, 2003; Schena, 2003; Schena, 2005). The overarching effects of this occurrence would be an increase in the living and health standards, which would impact every person in the world.

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Latino Fathers: Risk and Resiliency Factors Contributing to Mental Health

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Abstract

Latino fathers are at risk for mental health issues for many reasons. In general men utilize support services less than women, even though studies have shown men experience mental health issues like anxiety, stress and depression just as much as women (Lee and Owens, 2007). It is widely known that immigrants face extra hardships than puts a strain on them and their families. For example the language barrier, acculturation, a new culture, poverty, low-paying jobs, education and many more all play a role in why Latino immigrants, illegal and legal face adversity once in the United States (Flores and Carey, 2000). It is this reason why Latino men are in need of more support whether it is from the government, non profits, or at a local level. This study took 19 Latino fathers from Chicago and interviewed them. Using grounded theory two main ideas emerged from the interviews. They are unique risk factors of Latino fathers and unique resiliency factors of Latino fathers. With the information we already know about Latinos and mental health and the ideas on risk and resiliency factors, human service providers can support the programs geared to this population. A literature review will provide information that is already available about Latinos, men and mental health. Finally, implications are offered for programs, practice and research for the future.

Introduction

Latinos in the United States make up the largest and fastest growing minority population (R. Corona, pg1). For their large numbers, Latinos in the U.S. can have a strong influence on things that involve their community. Yet because they are one of the newer minority populations, Latinos have not been researched properly. Certainly in the last decade or so there has been an increase in research on Latinos but there is a long time before researchers catch up to the research of other populations. It is difficult to study Latinos in the United States for many reasons. Some are illegal and they are afraid of coming forth to answer any questions. Some Latinos do not speak English and others do not speak Spanish, this diversity can be associated with timing of immigration or generation status (G status). This is another difficult characteristic of Latinos as well, different times of immigration equals to different experiences and stories. Researchers have to be willing to look at all the different types of Latinos

there are. Lastly the word Latino itself is very vague, this population is one of the most diverse group of people. Latinos can be African American, Caucasian and any shade in between. Some Latinos are from tropical Islands while others are from snow covered mountains. There are indigenous Latinos who speak other native languages and there are Meztiso Latinos who are a mix of Spanish blood and native blood. It is difficult to group Latinos into one category because each subgroup, for example, El Salvadorians, and Dominicans, are extremely different in most aspects of their lives. Yet these groups do share several commonalities like language, food, culture, values, religion, dance, music, and history. Once a Latino enters into the United States they all face certain hardships like poverty, not knowing the culture, lower education, violence, prejudice, and not knowing the language, all makes the immigration experience a difficult one.

Purpose

The purpose of this study is to contribute to the research on Latino fathers and mental health and to bring awareness to this topic. This study is meant to find what are the causes of mental health problems in Latino fathers, what types of mental health issues are occurring and what can be done to support these fathers.

Significance of the Research

This research is significant because the population being discussed is at risk for mental health issues meaning there is an urgency to find what is causing the problem, and how can we prevent them from occurring. Yet no one is talking to these fathers and hearing their experiences to see where the problem is rooted. Moreover, a healthy father may mean a healthier family. For example if he is not depressed and knows how to handle his stress then he may be able to provide for his family emotionally. On the other hand if a father is too upset to even play with his children or be there for them this may have long term negative effects on his offspring and family. Research in this field is vital to the services that are already available and those programs that have not been created yet. Human services providers who deal with Latino fathers also can use this information to change their services to better cater to the needs of the men. They can educate the men and their families on how to support one another. The human services providers can also advocate for Latino fathers, the more information there is available the more support they will get and in the end the more fathers can prevent any crisis before it occurs.

RESEARCH QUESTION

What are the risk and resiliency factors that influence the mental health of Latino fathers?

Delimitations of Research

The research is not looking into the mental health of Latino women and children. It is not solely concentrating on one type of Latino, for example this study is not examining the mental health of Latino fathers who were only born in the United States. This research is not examining one age range of Latino fathers; it is looking at various types.

Definitions

To better understand this study the definitions of important words are included. Co-parenting is the relationship between the mother and father of the child, and whether or not they work together to parent their offspring. Familismo is describing how Latinos are very family orientated; it is a characteristic of the population. G1 is describing an immigrant who came to the United States after the age of 12, meaning most of their socialization occurred in their country of origin. G1.5 is someone who came to the U.S. before the age of 12, saying that they have had some socialization in the U.S. G2 is referring to people who were born in the states and all their socialization occurred in the U.S.

Literature Review

The literature on men's health and mental health is not as extensive as the research done on women's health. There are many reasons why this is true, Christina Lee and R. Glynn Owens wrote in their 2002 book entitled *The Psychology of Men's Health* that men are less likely than women to make use of health care and screening services and are slower to acknowledge symptoms of illness (pg14). Maybe it is because men are, "less likely than women to express an interest in making health related lifestyle changes (Lee and Owens, 2002)" Another reason for this could be because, "stigma is attached to help seeking for men as well as counseling theories and methods are more appropriate for traditionally feminine than for traditionally masculine individuals (Levant, 1997)." For whatever reasons men are in need of more services from the health departments, especially when it comes to depression. Sam Cochran and Fredric Rabinowitz wrote in their 2002 book, *Men and Depression: Clinical and Empirical Perspectives* that men suffer from and are diagnosed with depression about half as frequently as women. Clinical experiences soon bears out the reality that men do get depressed, many suffer from longstanding and unremitting depression (pg.1)." Needless to say many men also face traumatic situations that can affect their mental health and even parenting skills. T. Real spoke about trauma and the consequences with men in his 1997 book called *I don't want to talk about it: Overcoming the legacy of male depression*, "active trauma involves obvious and dramatic violations of trust such as physical violence, or a death of a parent, passive trauma situations involve subtle breaches of trust such as a parent not meeting a child's need to be loved, seen or valued. Although not as obvious, passive trauma can have a profound effect." Men who have been through traumatic experiences sometimes

express their feelings in different ways, one of them being aggressive behavior and addictive behaviors. “Another form of masking depressive states is mood alteration through alcohol, drugs or other addictive activities, we know that men suffer from alcohol and drugs abuse in significantly greater numbers than women (Cochran and Rabinowitz, 2000). It is known that men commit suicide more than women, there are many explanations for this, one being that, “lack of communication of feelings, loneliness, isolation, and a resulting inability to elicit sympathetic responses from others may be contributing factors to the disproportionate suicide rate (Toomer, 1980).”

Now Latino men also have their own characteristics or stereotypes about them. For example Joseph M. Cervantes said in his 2004 book entitled *Mexican-Americans: A prospective analysis and counseling paradigm* that the, “defining characteristic among Latino men based on some combination of myth, stereotype or anthropological observation had been the label of macho or machismo, this description makes reference to a culturally expected and stylized set of actions from Latino men with respect to hypersexual and aggressive behaviors.” Pena (1991) said that, “the concept of machismo has been identified in several studies as a contributing factor to heavy alcohol consumption and its subsequent destructive consequences include domestic violence and child abuse.”

Furthermore Latinos in general face many hardships when first coming to the United States. Gonzalez (2000) writes, “...mental health problems of Hispanics living in poverty and undocumented Hispanic immigrants are often exacerbated by socioeconomic stressors, racism, and political oppression. Effective mental health treatment for the population must encompass case advocacy, community outreach and the mediating of complex social systems.” Moreover acculturative stress is yet another challenging hurdle many immigrant Latinos must face. Miranda and Matheny (2000) stated that, “acculturative stress experienced by Latinos relates to the efficacy of stress-coping resources, degree of acculturation, cohesion of the family, language use and length of residence in the United States.” Acculturative stress can greatly impact a Latino's life, for instance Smart and Smart (1995) wrote that acculturative stress can lead to, “decreased self-efficacy expectations, decreased career self-efficacy, depression, suicidal ideation, low social interest...yet the family environment tends to buffer Latino from the stress.” Besides stress Latinos are at risk for other difficulties such as, “poverty (Prelow and Loukas, 2003), low educational attainment (Prelow and Loukas, 2003), mental health concerns (McGowan, 1988), substance abuse (Hernandez and Lucero, 1996), ill health and exposure to violence (Peacock, McClure and Agars, 2003).

It is quite evident that Latino fathers are in need of extra mental health support. Furthermore the research on this population is little yet the need is great especially since Latinos are such an influential population in the United States. It seems that Latinos are at risk for many circumstances and if not addressed properly, generations and generations of Latino families may be negatively affected by the consequences.

Research Design and Methodology

The purpose of this study is to find what unique factors influence the mental health of Latino fathers and what can be done to provide better support services for the men and their families. Furthermore it is to contribute to the research that already exists on Latino fathers and mental health. The research question is what are the risk and resiliency factors that influence the mental health of Latino fathers?

Data Collection and Data Sources

In 2004 total of 19 interviews were conducted by Dr. Kevin Roy and his two staff members, one female and one male who were both bilingual. Originally the interviews were part of a greater study that included fathers of all races. But for the purpose of this study only the interviews on Latino fathers were considered. Kevin or the staff members made in home visits to interview the participant. The semi structured life story interviews took place in the homes of the Latino fathers in Chicago, Illinois. Semi structured life story interviews meant that the interviewer had probing questions but the point was to allow the father to speak about his entire life in different stages. For instance, the interviewer asked the father to speak about his childhood, adolescence and adulthood. Most of the fathers lived in a town in Chicago called Pilsen, this is because the fathers were recruited from *El Valor*, a head start program for children with low income families, it first started in 1973 to support the fast growing Latino community in Pilsen (2003, El valor). All of the 19 men interviewed had at least one child, for this was a requirement in order to be interviewed. The interviews were conducted in either language to help make the father feel more comfortable, and then later they were transcribed to English. Each interview lasted around one to two hours long.

Data Analysis and Data Quality

This study uses a qualitative approach to examine the interviews and discuss the information. This was the best approach because I was interested in the men's experiences rather than the cause and effect. Also this is an exploratory study because the topic being examined is fairly uncharted territory, the literature review covered Latinos, men and mental health.

This research utilized grounded theory to review the interviews. Grounded theory is comprised of three types of coding, open, axial and selective coding. Open coding was conducted by first reading through each of the 19 interviews and underlining ideas, and themes that I saw reoccurring. Axial coding was more specific, it was reading through the interviews a second time but going through and highlighting main findings and other information relative to them. At the end of this stage I had each interviewed color coded for different themes and I began to see a pattern and an over all idea form. Selective coding was looking at the interviews and asking myself what did all the highlighted green say about Latino fathers? What

did all the highlighted pink say about Latino fathers? I looked at this information with a mental health lens.

There are more than one ways of looking at this information and using grounded theory has its advantages and disadvantages. Some advantages of utilizing grounded theory are I felt very comfortable with the information because of the fact that I had reviewed it so many times. I was able to better understand the fathers and their personal stories. A disadvantage of using grounded theory is that I was unable to get another perspective of the information. Every theory has a unique aspect to it and if given more time I could be able to compare other theories and see which ones fit better or work with the population better than grounded theory. Regardless, grounded theory suited this study and the time frame that was allotted.

Strategies for Minimizing Bias and Error

I had several ways for minimizing bias and error in this study. One of them being that I used triangulation, which is having a team evaluate and debrief the findings with me. I had three mentors and another student researcher who was also using the same data source. As a team we reviewed the interviews for our topics and findings, we talked about the ideas that emerged from the data, and we spoke about how to structure this information into a research paper. I was in consistent communication with my team and they were in consistent communication with me. We met once if not twice a week to update ourselves on our progress. I was able to have mentors who were very diligent and corrected my paper, presentation poster and who prepared me to defend the research I had done.

Ethical Considerations

There are some ethical considerations to reflect on, for example the interviews did receive the permission from an I.R.B. which means it fulfilled a certain level of requirements from the university. The Latino fathers gave permission to Dr. Kevin Roy to be interviewed, everything the father talked about was voluntarily said and there was no pressure to continue with the interview if the person felt uncomfortable. Again, the interviews were done in Spanish or English to allow each father to speak in whatever language they feel most comfortable in.

Limitations

This study had several limitations; one being that the interviews were not conducted by my self. This made it more difficult to interpret the interviews. Especially when some of the men spoke in Spanish and then the interview was transcribed into English. What this means is that some of the true meanings of the interview was lost in the translation. The actual interviews themselves were at times complicated to read because the person interviewing the fathers could not understand what they were saying. There were many reasons why the interviewer

could not understand the interviewee, some were there was back ground noise, the man spoke too softly, the interviewer could not comprehend because of the accent, and lastly in some of the interviews the tape recorder cut of, abruptly ending the conversation. For these reason I was forced to interpret or speculate what the father meant to say or what he was going to say.

Furthermore the study is not a representative sample of all Latinos in the United States. Latinos are so diverse and this makes for difficult research because getting an appropriate sample size of each type of Latino is complex. The sample included in this study is mostly Mexican fathers from Pilson, Chicago which is a very specific sample, when the study is trying to incorporate all Latino fathers. Also fathers from one state have a completely different experience from fathers at another state. Again this study is looking into the lives of fathers from Pilson, the outcomes could vary if it had taken place in Texas or New York.

Another limitation of this study is that because of the time constraint I was unable to further my research on topics that related to this study. For example the timing of immigration or G status is very important yet I was unable to dive deeper into the meaning and literature to see the connection with mental health. Once research on Latino fathers and mental health has advanced then maybe scholars can figure out the differences in each generation status. For this study and the amount of time I had allotted which was six weeks, I was unable to concentrate so much on details but more on the overall needs and concerns. Time was limited and all the necessary topics had to be covered before I could go back and elaborate on other ideas.

Reflexology

In order to understand this study, the reader should note the reflexology of the writer; this is the personal background of the author to better understand how the paper is written. I am 21 years old born and raised in Wheaton, Maryland. I am Latina, my father is from El Salvador and my mother is from Mexico. I am a senior Family Science major at the University of Maryland, College Park. I am a born helper and I exemplify this through my activities, future academic and career goals. For example I volunteer at the Montgomery County, Abused Persons Program (APP). I participate in community services through different organizations that I am a member of like, Lambda Theta Alpha Latin Sorority Incorporated, Phi Upsilon Omicron Family Science Honors Society, Latino Student Union, and the Pan Hellenic Counsel. All the services are geared toward minority populations in the D.C., Maryland and Virginia metropolitan area, specifically the Latino community. My future career goals are to become an LCSW-C which stands for license certified social worker clinical. With this certification I will be able to practice therapy and social work. I would like to work for the Latino community in the metropolitan area. A long term goal I have is to open up my own non profit geared toward supporting Latino families in need.

Findings, Recommendations and Conclusions

Age	
18-25 yrs	n=4 (21%)
26-34 yrs	n=7 (37%)
35+ yrs	n=8 (42%)
Relationship Status	
Married, residential	n=12 (63%)
Unmarried, transitory	n=7 (31%)
Race/Ethnicity	
Mexican or Mexican-American	n=17 (89%)
Puerto Rican	n=2 (11%)
Children	
Average #/ father	2 children
Biological only	n=18 (95%)

Generation	
1st	n=9 (47%)
1.5 (<age 12)	n=4 (21%)
2nd	n=6 (32%)
Employment	
Full-time	n=13 (68%)
Part-time	n=3 (16%)
Unemployed	n=3 (16%)
College	
1 year or more	n=8 (42%)
< than 1 year	n=3 (16%)
No secondary education	n=8 (42%)

Demographics

The above chart looks at the demographics of the 19 interviews. The men's ages range from 18 to 35 plus years. The majority of the men are married and are also Mexican. They have an average of two children and the bulk of the Latino fathers are first generation. Most of the men have full time jobs and most of the men interviewed had one or more year in college or no secondary education at all.

Unique Risk Factors that influence the Mental Health of Latino Fathers

This theme is about risk, which means different things, but for the use of this study, risk is anything that can put the father or family at a disadvantage. For example the majority of the fathers are immigrants from Mexico. This is a risk because they have to learn how to speak English, get use to the American culture and work long hours for little pay, all while still having a family. Another risky topic is working; most of the fathers being interviewed have been jumping from job to job. Not having a steady income is dangerous especially when he is the main provider for his family. This puts an enormous amount of stress on him to make sure he is coming up with the bread and butter.

Each father had their own experience when it came to having a role model or not. It was harder for the father being interviewed when he did not have someone to look up to, especially a male figure. For example when asked who taught you to be a father, this particular participant answered, "I don't know, I guess just my own experiences, my dad he lived with us all my life but he was doing some not so good stuff, drank a lot, you know did drugs here and there. And I guess that's the only thing that affected me is that I used to see my dad...when I was seven he put a gun to my mom's head, we were all there...hugging my mom telling him to stop."

Alcohol and drugs was a topic that some fathers spoke about in their interviews. Whether it was having a parent/family member who was addicted, it was prevalent in their neighborhoods or they themselves were addicted to drinking or using drugs. Either way it was a topic frequently discussed.

Most of the fathers had issues with gangs, again it had several different meanings but gangs and gangbanging was a common problem. Some fathers use to be in gangs, have friends who were in them, or just hung out with a gang. Other fathers were never affiliated but did have them in their neighborhoods and could speak about the huge threat they were to the neighborhood and the children. There were some significant stories of how certain fathers got shot. I was surprised to see how many fathers actually got shot, some more than once. Here is one personal story, "the guys that came from Mexico suck together and we formed a gang, we started fighting and one fight got to another one, next thing I know I have to leave school because of too many fights, I had to start working, I was 17, it was my junior year, I didn't get my GED." The quote shows that for some, gangs were the only form of protection especially for immigrants.

Crime was another reoccurring theme in the interviews. A couple of fathers had a history or record of committing a criminal act. Some never were involved but they did speak about crime in their neighborhoods. In addition to crime, they also talked about how the police force in their neighborhoods was not enough to scare off the gangs, crime and violence.

Many fathers had a history of moving around, whether it is from Mexico to the United States, state to state or neighborhood to neighborhood, there was a significant trend in fathers consistently moving. There were many reasons why some fathers were not settling down in one place. A couple of the main reasons were, dangerous and unsafe neighborhood for their families, more affordable housing, moved to were there was work, family, better schools, retirement. Living in several different places throughout a lifetime is difficult and can be stressful under certain circumstances. The unstableness can create strain on a family and especially on the children. The children have to go to different schools, make new friends and familiarize themselves with new surroundings. Parents are looking for new jobs, trying to find someone to provide daycare, and trying to fit in into their new location. An example of this occurrence is Augusto, he has a wife and two daughters. This is what he has to say about why he had moved around several times, “gangs...so that’s why we are just jumping from house to house. Well, we’ve moved three times, in the same area, trying to check that there is no gangs ...but still in the same neighborhood. This is one of the reasons that we just moved (from) one place to another.” Some of the fathers are moving around because they are the main providers for their families. This title and responsibility of being a provider has forced them to look for jobs outside of Chicago or at least outside of their city.

Unique Resiliency Factors that Influence the Mental Health of Latino Fathers

There were many reoccurring topics that influenced the way each Latino father parented their child/children. One of the questions asked was who taught you to be father and who was your role model? The responses were very mixed with the majority of the Latino fathers all wanting one main goal; to provide a good life for their family and children. Some fathers had parents to look up to but they may not have been there emotionally, for example Carlos says “the relationship with my father there was no communication, no involvement with him, uh no family time, mostly he was (spending) most of the time working so he didn’t have that much time with us.” This has influenced the way he parents his son, it is not a surprise when he says “my attention is more to my son all the time, so he gets all the attention, in other words spoiled.” Then there are the fathers that did have a position role model, whether it was their mother, father, brother, uncle or any one else. These Latino fathers have a different outlook or definition of what it means to be a father. This has an impact on how they treat their children. For example Martin has two daughters and when asked about his role models he said “I was with my brothers (and) we were very attached to my grandfather, he was patient with us,

I was spending time with him, so he would always talk with me about what (not) to do and all (those) things.” Martin’s relationship with his children and wife is strong, healthy and it is partially with the help of his role models that he knows how to parent so successfully.

Another strong factor that has an influence in how these Latino men raise their children is the Latino culture. Many men spoke about how they want their children to learn how to speak Spanish. This quote touches upon some Latin traditions, like passing on the Spanish culture and having a relative babysit. Antonio says “Well, my mother watches him while I go to work or go to school, she’s been the babysitter from the moment he was born cuz I didn’t want to put him in a day care because I want him to speak Spanish. My mom speaks nothing but Spanish to him and at daycare they’re more likely to speak nothing but English to him.” Language is a resilient factor because being bilingual opens doors to more opportunities while still maintaining that Latin tradition and culture.

An important aspect of the Latino culture is familismo which illustrates how family orientated Latinos are, this helps families stay unified. This is beneficial for many reasons, the father feels support from his relatives, he can feel safe especially if he is a G1 or G1.5 father, and they will always help out a family member in need. Cultural influences are important for Latinos and this is very evident through each interview.

Lastly every single father wanted a better life for their children and family, no exceptions. The fathers were adamant about working hard to provide for their children and being a “good father”. They talked about being there emotionally and physically for their families.

“She never keeps me away from my kids...she would never take them away from me...I would never do that to her either.” This is the over-all attitude that the 19 Latino fathers vocalized when asked about the relationship with their baby’s mother. Not one father said that the baby’s mother does not allow him to visit his children. The fathers that were either married or living with the baby’s mother has similar feelings. The mothers were encouraging their husbands/partners/baby’s fathers to spend more quality time with their children. For instance Sergio is married with a three year old son and when asked if his wife encourages him to be involved with his child he answers, “ yeah, she encourages me like uh...play sports, and she usually tells me you gotta spend more time with him, spend more time (on the) playground, get out of work, pick him up from school, and have him all day. Everyday is like that.” The fathers were very responsive to the encouragement; many of them agreed that they liked how their partner pushed them to develop a stronger relationship with their child/children. Although the relatives of the mother were not always as supportive, in two cases the father of the baby’s mother did not have a good relationship with her baby’s father. In those cases the Latino father being interviewed did say that because of the tension and feelings they stayed away from that specific in-law, even as far as saying they were not allowed in side the house. This naturally discouraged the fathers from visiting that side of the family

and it may have discouraged the father from taking his child/children to go visit their relatives.

The parenting was split between the mother and father; most of the fathers were the bread winners in the families, a few mothers also worked. The fathers felt that it was their duty to provide financially even if the baby's mother was working.

Implications for Program and Practice

After reviewing the findings, there are implications for programs and practice. The human service providers should be culturally competent and aware of the diversity that comes along with Latinos. A human service provider is making a big mistake by assuming all Latinos have similar backgrounds therefore they can approach them all the same. In fact it is the exact opposite, it is essential that a provider be able to know the difference between Mexicans, Puerto Ricans, and Costa Ricans. That is they should know the difference between G1, G1.5 and G2 Latinos because like the research has shown each status has different experiences. They should also be familiar with the gender roles associated with Latino men and women. Traditional and modern views among parents are significantly distinct, for this reason providers must be able to talk about their client's views and work with them to still provide the initial services.

Most of the fathers in the interviews were the main providers for their children and/or families, many of them work long hours a week. This is an example of just how much one of the fathers is working, "(I was) working 80 hours a week for two or three years...(I would) spend two hours or three hours (with my child)." In order for them to be able to participate in the services being provided, the hours of operation should be very flexible to cater to the father's availability.

I also noticed that a couple fathers said they did not drive for whatever reason, this is important because location can deter a father from attending an event. Especially for families living in the city were they rely on public transportation to get around. This quote shows why this father is not driving, "I don't have a license cause I don't drive, I've never driven, basically it's because of all these accidents that I'm there to see, since I'm always on my feet walking or riding the bus, you always get to see a lot of things, I'm afraid of other drivers."

Being that certain fathers spoke about being single fathers and its difficulties, another implication is to have some form of day care or childcare for when the father is receiving services. Once the father is receiving services, it would help tremendously if the providers knew basic Spanish; this will help the communication for both parties.

Another important aspect to consider is the promotion of services available for the Latino fathers. The immigration status may confuse fathers who are able to receive services, in order to prevent this government services and non profits should highly promote their services, especially in English and Spanish and in areas were the ads can reach the targeted populations.

Implications for Research

Research also needs to be furthered in the area of mental health and Latino fathers. Some questions to start with are what are the mental health needs of Latino fathers? How does depression and stress in Latino fathers affect their parenting skills? What are some mental health factors that influence the parenting styles of Latino fathers? These questions are just starting points for researchers to take into consideration while conducting their future studies. It would be ideal to see more qualitative and quantitative research on the mental health of Latino fathers.

Discussion

Concentrating on the positive and negative aspects of Latino fathers and families is a different way to approach the mental health concerns of Latino fathers. For example, “the Mexican cultural value of collectivism and communal orientation has the potential to serve as a protective factor in mitigating distress (Cabrera and Padilla, (2004).” As noted in the literature review men have a very different psychology than women and theirs is more unknown than women’s. It is harder to study men’s mental health when they are less likely to seek help for symptoms. Put on top of that the fact that these men are Latinos, makes for even more at risk health. Latino men’s mental health is dangerous if left untouched because they are, “the fastest growing group in the United States, thus it is imperative that social workers and other mental health practitioners be knowledgeable about the current literature on how to effectively serve this population (Furman, Negi, Iwamoto, Rowan, Shukraft, 2009).” This is why more qualitative and quantitative research must be done on this group. It is important to make a distinction between when the Latino got to the United States or if they were born in the U.S. because this factor seems to make a big difference in how mentally stable a father is.

Conclusion

The main idea of this study is to bring more awareness and support to Latino father’s mental health concerns. It is clear that this specific population is at risk. Yet they influence their children, spouses and families which make Latino fathers a population that is imperatively in need of mental health support through organizations, therapy, advocacy, research and programming. This study is shedding light to the resiliency factors to support these methods of help intended for Latino fathers.

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Analyzing the Dream

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Abstract

The Development, Relief, and Education for Alien Minors Act, otherwise known as the DREAM Act, is a proposed bill under consideration in the US Congress that would give undocumented immigrant minors greater access to higher education opportunities while also providing them with a path to achieving full and legal citizenship. The bill was first introduced in 2001 and is now being reintroduced with new amendments in 2009. My research will center on questions regarding the social and economic effects that this proposed bill would have on the undocumented students if it were passed. Specifically, I plan to investigate the potential consequences of this bill in the country by examining case studies of California, Maryland and Virginia with respect to: a) increases in higher education levels and admissions, and b) economic opportunities. My research will center on a policy-analysis in a non-empirical format. I will mostly use qualitative methods of research, although I will collect and analyze some data and statistics on the undocumented community in the aforementioned states.

Problem Statement

The Development, Relief, and Education for Alien Minors Act, also known as the DREAM Act in the senate or the American Dream Act in the House of Representatives, was recently reintroduced to congress on March 26, 2009 (U.S. Congress, 2009). The Dream Act would give undocumented students the opportunity to acquire temporary legal status while attaining a higher education or enlisting in the army for at least two years (National Immigration Law Center, 2009). The DREAM Act has been under scrutiny since 2001 when it was first introduced. This year, the bill has new and omitted provisions that affect its ultimate impact on the people it aims to help. It is these amendments that I plan to investigate in order to see whether they will improve the situation of the qualified undocumented population. A better understanding of the bill in question is necessary so that a greater number of people can be informed, people can see the bill's opportunities and threats, and so that actions can take place to fix the threats.

Research Question

Given the aforementioned purpose statement and the problem, my research seeks to answer this fundamental question: If it were passed, would the amendments in the DREAM Act of 2009 really ameliorate the situation of undocumented students nation-wide? The most fundamental change in the bill is the provision of leaving financial aid to the states, giving them the decision to provide in-state tuition to the students in question. By focusing on specific states- California, Maryland, and Virginia- I will attempt to predict the overall possible effects of the law. These states were chosen because of how they perceive the DREAM Act and other related statutes as well. California, for example, is a state that currently offers undocumented immigrants in-state tuition under A.B. 540 (Krueger & Zaleski, 2008). The state of Maryland remains in question on whether to pass the bill under H.B. 6 (Krueger & Zaleski, 2008), and Virginia under H.B. 2169 has “considered legislation that would ban undocumented immigrants from receiving in-state tuition” (Krueger & Zaleski, 2008). The aforementioned states exemplify three varied viewpoints on the issue. It is important to see the state’s decision-making and implementation process in order to apply their actions if the DREAM Act was passed.

Limitations and Delimitations of Research

In conducting my research, I was bound to have the limitation of time. This policy analysis was organized under a period of one month which limited the amount of research I could accomplish. However, knowing that I had this constraint, I tried to compensate time by constantly and readily working to achieve a good-quality product.

Moreover, my background makes me biased towards the research analysis. I am a first generation Latina immigrant in college. Although I am not undocumented, I have a connection with all immigrants regardless of their legal status. I will implement as much of the information I find on the Dream Act from both opposing and supporting views, and I will acknowledge and criticize them also. Furthermore, I decided to investigate Virginia to provide an opposing view to alleviate my possible bias.

Delimitations of my research includes that it will not attempt to discuss the second option of legal documentation which is the choice of enlisting in the uniformed services for at least two years. My analysis will also not discuss letter (c) and (d) of Section five which informs the qualified undocumented students of the procedures the student must follow in order to apply for permanent residency. Furthermore, my research will primarily focus on the undocumented population of three states- California, Maryland, and Virginia- and therefore cannot speak for the legal procedures in any other state unless it is as a general characteristic.

Definitions

Undocumented Alien: “A person who has entered the United States without inspection or surreptitiously, or a nonimmigrant (such as a visitor or foreign student) who has stayed beyond the time granted on his or her nonimmigrant visa. Such persons are sometimes derisively referred to as illegal immigrants,” (Hing, 1999, p. 303).

Plyler v. Doe (1982): “The Supreme Court held that the Equal Protection Clause of the Fourteenth Amendment was violated by a Texas statute that withheld from local school districts any state funds for the education of children who were not “legally admitted” into the United States and that authorized schools to deny enrollment to such children... The Court ruled on the [behalf of the unauthorized children] finding that the statute imposed a lifetime hardship on a discrete class of children not accountable for their status. These children could neither affect their parents’ conduct nor their own undocumented status,” (Hing, 1999, pp. 246-247).

Lawful Temporary Resident: “Under the legalization (amnesty) provisions of the Immigration Reform and Control Act of 1986, a person who qualified first became a lawful temporary resident. After a qualifying period of time (eighteen months for general legalization, and one or two years under the agricultural worker program), the temporary resident could then apply for lawful permanent resident status” (Hing, 1999, p. 189)

Conditional Permanent Residence: “In two important situations, the lawful permanent resident alien immigration status of individuals is considered to be conditional for a two-year period. In other words, a particular status must be maintained for two years until the permanent residence is actually permanent,¹” (Hing, 1999, pp. 85-86).

Illegal Immigration Reform and Immigrant Responsibility Act (IIRIRA 1996): “Section 505 of IIRIRA prohibits states from offering higher education benefits to undocumented students without offering those same benefits to U.S. citizens and nationals who meet certain criteria. AB 540 and similar legislation was drafted in such a way so that all students who meet specific requirements are eligible for its benefits” (UCLA Center for Labor Research and Education, 2008, p. 3)

Summary

Based on the federal law and case studies conducted, I was able to conclude that I still had many concerns to answer after this study. Firstly, the decision of in-state tuition left to the states does not assure that in-state tuition will be provided. This would limit the overall effect of the law, since each state has its own opinion on the law. This also leads to a question of political lines, for example how ex Maryland and Virginia governors vetoed the DREAM Acts for their respective states and aligned with their political affiliations. This leads to a bigger question of whether the in-

¹ The difference stated in the Dream Act is that the status of lawful status is only valid for six years. (UCLA Center for Labor Research and Education, 2008)

state tuition will depend on politics and a most important question of how can it be assured that all undocumented students have the chance of receiving some financial aid without running into political battle within the state? Furthermore, financial aid the legislation could provide would not be enough for prospective DREAM Act students based on the barriers they face such as the fact that 39 percent of undocumented children live under the poverty level (Frum, 2007).

Literature Review

History of Education Laws

The DREAM Act of 2009 is the latest form of a higher education bill that aims to address an issue of a minority group. Previous laws that have shaped the access of education of undocumented students have helped shape and form what the DREAM Act currently proposes. The historical timeline of similar education laws is important to evaluate because not only have they attempted to address the issues regarding education, they also resonate when future laws are made.

In the past, there was legislation that helped benefit and hinder the undocumented students' availability to a higher education. According to Leisy Abrego (2003), the law in the 1980s admitted undocumented students attend "colleges and universities as state residents so long as they could prove that they had lived in the state for at least a year and a day" (p. 12). In 1980, the Uniform Residency Law of from California provided an exemption to long-term California residents to pay in-state tuition at all California public colleges and universities, (UCLA Center for Labor Research and Education, 2008). Following in 1985, the California case of Leticia A. v. UC Regents and CSU Board of Trustees further improved the situation for undocumented students by providing them access to Cal Grants (UCLA Center for Labor Research and Education, 2008). However, this ruling was repealed in 1990 in the case of Bradford v. UC Regents and the County Superior Court determined that undocumented students should be "charged out-of-state tuition and lost all eligibility to receive state or federal financial aid" (UCLA Center for Labor Research and Education, 2008). In 1986, the Immigration Reform and Control Act (IRCA) "was the last comprehensive federal immigration law passed" that provided "amnesty for undocumented immigrants that could prove residency for a number of years" (UCLA Center for Labor Research and Education, 2008). The federal law also disbursed \$4 billion to "state and local governments for welfare and education programs" (UCLA Center for Labor Research and Education, 2008). Proposition 187 of 1994 called for the denial of access to public education, and some health and social services to illegal aliens and their children (Lehrer, 1996). The bill passed with a 58.93% approval from Californians (Bill Jones, 1994, p. 26), however this law was repealed by the Supreme Court in 1995 (UCLA Center for Labor Research and Education, 2008) on the grounds that California designed Proposition 187 in order to regulate illegal immigration, which is a federal domain (McDonnell, 1997).

Higher education for undocumented Californians became more attainable with the passing of Assembly Bill 540 of 2001. In light of the Illegal Immigration Reform and Immigrant Responsibility Act (IRIRIRA) of 1996 which stated that in order for an undocumented student to receive in-state tuition, the same tuition must be available to any other American student (UCLA Center for Labor Research and Education, 2008), the AB 540 created a way for undocumented students to obtain higher education by sorting out qualifying students (Abrego, 2003). Thus far, 1,483 University of California students received AB 540 non-resident fee exceptions; however 1061 of the total were number of students who applied for the out-of-state fee exemption were documented students (Frum, 2007).

Based on the literature analysis of the bill and related documents, many states had already implemented legislation regarding similar aspects to those of the DREAM Act. As of June 2007, approximately 32 states had attempted to pass legislation that would address the in-state or out-of-state tuition provision for undocumented students (Zaleski, 2008). Out of the total, ten passed legislation allowing undocumented students to receive in-state tuition. Correspondingly, 10 states have attempted or succeeded in passing legislation restricting undocumented students from receiving in-state tuition (Zaleski, 2008).

The DREAM Act of 2009

The DREAM Act of 2009 was introduced in congress on March 26th of 2009 as a bipartisan legislation by Senator Richard Durbin of Illinois and Representative Howard Berman of California (U.S. Congress, 2009). The legislation would provide conditional permanent residency for six years to undocumented students who meet the following criteria (Dream Act Portal, 2009):

- (A) The alien has been physically present in the United States for a continuous period of not less than 5 years immediately preceding the date of enactment of this Act, and had not yet reached the age of 16 years at the time of initial entry;
 - (B) the alien has been a person of good moral character since the time of application;
 - (C) the alien--
 - (i) is not inadmissible under...the Immigration and Nationality Act (8 U.S.C. 1182(a)); and
 - (ii) is not deportable under paragraph...the Immigration and Nationality Act (8 U.S.C. 1227(a));
 - (D) the alien, at the time of application, has been admitted to an institution of higher education in the United States, or has earned a high school diploma or obtained a general education development certificate in the United States;
 - (E) the alien has never been under a final administrative or judicial order of exclusion, deportation, or removal, unless the alien--
 - (i) has remained in the United States under color of law after such order was issued; or
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- (ii) received the order before attaining the age of 16 years; and
- (F) the alien had not yet reached the age of 35 years on the date of the enactment of this Act (U.S. Congress, 2009).

The bill also denotes the fact that the “The Secretary of Homeland Security shall terminate the conditional permanent resident status of any alien who obtained such status under this Act” if the secretary determines that the undocumented alien did not fulfill the requirements of the bill, has become a “public charge”, or “has received a dishonorable or other than honorable discharge from the uniformed services” (U.S. Congress, 2009). Hardship exceptions may apply but are not always applicable to undocumented beneficiaries of the bill.

In regards to the provision of in-state tuition and financial aid eligibility to undocumented students, section 11 of the act establishes that the undocumented student is only eligible for student loans and federal work-study programs, and college advising services (U.S. Congress, 2009). The act does not include any language about in-state tuition as it did in previous Dream Act bills. There are also financial aid statutes that would restrict students from receiving Federal Pell Grants and Supplemental Educational Grants (The Library of Congress, 2009).

The omission of “in-state” language in the bill means to say that each individual state could determine the amount of financial aid given to the undocumented students (NILC, 2009). It would also repeal section 505 of the Illegal Immigration Reform and Immigrant Responsibility Act of 1996 (IIRIRA), which currently discourages states from providing in-state tuition or other higher education benefits without regard to immigration status (NILC, 2009).

Proponents of the Act such as the Dream Act Portal and the Dream Act 2009 websites have assembled petition lists in order to “ask congress and the president to enact the DREAM Act in 2009” (Dream Act of 2009, 2009). According to the Dream Act 2009 website, 16,989 thousand supporters have signed the petition and some have donated for this cause (Dream Act of 2009, 2009). Both the websites mention high achieving students who call the United States their home and who “want nothing more than to be recognized as American citizens” (Dream Act Portal, 2009).

Opponents of the bill have also mobilized against the bill mobilizing to derail the bill (Friedman, 2007). Lisa Friedman’s article “Opponents Mobilize Against the ‘Dream Act’” exemplifies the opinions of those who are against the bill. For example, Dario Cafuentes from San Diego expressed his disagreement, “the uneducated are coming in from Mexico by the millions. They’re making it difficult for the law abiding people to get in, but they’re making it easier for illegals” (Friedman, 2007). Other opinions as expressed by Kris Kobach in “The Senate Immigration Bill Rewards Lawbreaking: Why the DREAM Act Is a Nightmare,” condones the bill as a violation of the federal law (IRRIRA) and excuses undocumented students by giving them a special amnesty (Kobach, 2006). Very different opinions emerge from different interest groups regarding the act in question. There is no question that the fate of the DREAM Act of 2009 is still uncertain.

Affected Population

According to the U.S. Department of Homeland Security (DHS) in 2008, the number of undocumented immigrants consists of 11.6 million (Hoefler et al, p. 3). In the same study, the DHS determined that 1,540,000 undocumented students were under the age of 18 was people, comprising 13 percent of the total undocumented population in the country (Hoefler et al, p. 5). The legislation could also make 715,000 undocumented children, between the ages of 5 to 17, eligible for legal status and it would immediately make about 360,000 young people eligible for conditional legal status (Friedman, 2007). Every year, around 65,000 undocumented students graduate from U.S. high schools. It is estimated that only five percent of these students will ever attend college (Frum, 2007). The vast majority of the undocumented population stipulated to qualify for the bill face major barriers to postsecondary education, for instance, 39 percent of undocumented children live under the poverty level (Frum, 2007). Furthermore, even though an undocumented student is accepted to a public college or university, that student will have to pay 140 percent more than the resident tuition in 40 states of the nation (Frum, 2007).

The DREAM Act, if passed, would attempt to ameliorate their unauthorized situation. On 2006, the Migration Policy Institute estimated that 360,000 undocumented students would be immediately eligible for the DREAM Act legal residency status (Batalova & Fix, 2006). Nonetheless, this does not mean that all of the qualified students could or would choose the option of a

Case Studies

California

California has over 25,000 undocumented students graduating from California high schools each year. According to the Immigration and Naturalization Service (INS) , over “40 percent of the unauthorized immigrant population in the country resides in California” It is one of the few pioneer states that have implemented an in-state tuition provision allowing undocumented students to pay resident tuition in public universities and colleges. To many, the state law A.B. 540 of 2001 defied federal law. In 2008, the state was sued in the case of *Martinez v. Regents* where non-resident students challenged A.B. 540 stating that it violated section 505 of the federal law, IIRIRA. The state law was upheld with the holding that equal protection of the laws was not violated because the plaintiffs could receive in-state tuition benefits in their home states (Russell, 2007). Furthermore, out of the 1,483 University of California students that received A.B. 540 non-resident fee exceptions, 1,061 were undocumented students.

Maryland

In the state of Maryland, undocumented immigrants form 5 percent of the total population of the state (Aizenman, 2007). The 268,000 unauthorized immigrants have tempted the state to pass immigration reform legislation. Up to date, the state has attempted to pass legislation twice that would provide in-state tuition to undocumented students. The legislation H.B. 253 (2003) was close to provide in-state tuition, however it was vetoed by republican governor Robert L. Ehrlich. His veto states as follows:

“The Department is unable to determine what the cost of this law would be. State aid under the formula would be approximately...\$2,176 in 2008. The General Assembly is well aware of the fiscal crisis...Now is not the time to enact laws that could cost the State potentially large amounts of money.” (Ehrlich, 2003)

Virginia

In the state of Virginia, there are approximately 259,000 undocumented immigrants and form three percent of the total population of the state (Aizenman, 2007). This case study is different because unlike the aforementioned cases, Virginia has attempted to pass legislation that would deny undocumented students from receiving in-state tuition eight times. The closest one to passing was H.B. 2339 of 2003 which would have provided the state the power to deny in-state tuition on undocumented students;

“An alien who is unlawfully present in the United States within Virginia for any postsecondary educational benefit, including in-state tuition, unless citizens or nationals of the United States are eligible for such benefits in no less an amount, duration, and scope, without regard to whether such citizens or nationals are Virginia residents” (Drake, 2003)

The bill passed the state legislature but was vetoed by the democrat governor Mark R. Warner:

“My amendment was designed to expand opportunity to deserving students, allowing them to live the American Dream...The House of Delegates rejected even this modest amendment...Indeed, this bill would have done nothing at all, other than score a political victory against “illegal aliens” and contribute to anti-immigrant sentiment in this country...I will not attach my signature to legislation which has no substantive effect and is designed solely to score political points and divide people, rather than unite them in a common purpose” (Warner, 2003)

Conclusions

Based on the research conducted, the DREAM Act of 2009 proposes a path to citizenship but does not assure higher education for undocumented students. The legislation would provide two options for undocumented students, however, the provision of leaving in-state tuition up to the states and the disadvantage they

would have by not being eligible for federal financial aid, ultimately will affect the possible effects of the law. The DREAM Act of 2009 is weaker than its forefathers by establishing stricter qualifications and striking out the in-state tuition provision altogether. Nonetheless, based on the history of the bill and the challenges it faces because of the anti-immigration sentiments, the bill needed to have these provisions in order to have a good chance at being passed. To date, it is estimated that eight votes are pending on the decision that will decide whether the bill will become law (Dream Act Portal, 2009). For the lowest-income families without access to student aid, the average price of public four-year colleges and universities would comprise nearly 29 percent of their total household income and the price of two-year institutions would make up about 11 percent (Frum, 2007). What are the possibilities of a low-income family to take advantage of the postsecondary education option? Is a postsecondary education really an option for undocumented youth seeking to be legalized? Is the military service option of the DREAM Act more plausible for the undocumented youth seeking to be legalized? Does the DREAM Act really provide a choice for the undocumented youth in states that could or already have restricted in-state tuition?

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Latino Fathers' Experiences of Parenting in the Context of Immigration

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Abstract

This is a qualitative study that explores how the immigration experiences of Latino fathers shape their parenting practices. For the purpose of this study, 19 life long story interviews of Mexican, Mexican American, Puerto Rican fathers were collected by a case manager researcher. The interviews were analyzed using three waves of coding: open, axial, and selective. Four narrative themes gave meaning to the fathers' immigration experiences and involvement with their children: turning point, immigration, role models, and partnering and parenting practices.

Introduction

Latinos are the largest minority in the United States and they are growing rapidly. As of July 1, 2006, there were a total of about 44.3 million Latinos equal to 14.8% of the total population (U.S. Bureau of the Census, 2002). Even though the Latino community is growing at a fast pace, there has not been much research done in the areas of fathering. The research shows that there is not enough literature showing father involvement, particularly Latino fathers' involvement (Campos, 2008). In order to understand the experiences of Latino fathers living in the United States and to become more cultural competent when implementing programs, it is important to investigate more about this group of the Latino population.

Purpose of the Study and Research Question

The purpose of this study is to contribute to the research that has been already done on Latino fathers and concentrate on how immigration has shaped their parenting experiences. This is an exploratory study and its main focus is to analyze how their immigration experience has affected the lives of fathers from three different generations. The three generations that were present in the study are: first generation (G1), generation 1.5 (G1.5), and second generation (G2). The research question that was used to guide this research was: How does timing of immigration shape Latino fathers' parenting experiences?

Significance of the Study

The importance in this study is that it tries to understand the process of Latino fathers and how their parenting is affected by their immigration experience. There is some understanding on the demography of Latino fathers but lack of father experiences. This study aims to explore different generations of Latino fathers and understand how their unique experiences have influenced their lives in respect to their fatherhood and towards their children and family beliefs.

Delimitations of the Proposed Study

The study is not about Latino families and their immigration experience and it is not about Latino fathers and mental health either. The focus of this study is not on Latino parent involvement and it does not try to understand the process of Latino parenting in general. The study does not include all groups of fathers from Latin America; it only studies two groups of Latino fathers from Mexican, Mexican American, and Puerto Rican descent.

Literature Review

Latino Families

To understand who Latino families are, it is important to know that Latinos have come to the United States from many countries of Central America, South America, and the Caribbean. All the people that are called Latinos come from different cultural and historic backgrounds, and even if they come from the same country they have different demographic factors that make them unique (Cauce & Domenech-Rodriguez, 2002).

Parenting Values and Beliefs

Latino families are often portrayed to have strong cohesiveness which leads to the beliefs that they have strong sense of support (Miranda & Matheny, 2000). This cohesiveness is known as familismo, which is the importance of family closeness and support from extended family (Cauce & Domenech-Rodriguez, 2002) such as grandparents, aunts, uncles, etc. Familismo can be one of the reasons why Latino families show resiliency because they tend to rely on each other when they have problems. Traditionally, it is believed that Latino that in Latino families, the man is the main provider and the one that shows discipline and rules at home. This is known as machismo (Becerra, 1998).

Migration and Immigration Experience

Latinos are the largest and fastest growing population in the United States (U.S. Bureau of the Census, 2002). Many Latino families move to the United States for different reasons. Everyone as a different experience either on moving to a different country or state. In his study, Parra-Cardona et al., (2006) shows that migrant families face different challenges such as discrimination, lack of services,

but they also show resiliency due to their cultural values of familismo. When looking at different generations, experiences of discrimination are different as well. Research shows that first generation and second generation face different types of discrimination, and the even though second generation are born in the U.S. and do not have the language barrier as the first generation do, they still face some challenges because of where their parents come from (Parra-Cardona, Cordova et al., 2008). Regardless of the generational status, Latinos can face discrimination. Also there is the belief that first generation immigrants fare better than second generation despite their struggles. This is known as the “immigrant paradox” (Zehr, 2009). This means that first generation fares better than second generation even though they have to adapt to a new culture and learn a new language. In regards to Latino fathers, immigration can affect fathers moving to a new country; however their fathering does not change significantly upon crossing the border (Taylor and Behnke, 2005). When fathers cross the border and have children here, it can create conflicts with their generation experience because fathers are from one generation and children from another (Garcia-Coll and Magnuson, 1997). That means that they have different experiences in the way they socialize but still live in the household.

Fathering and Father Involvement

There are few studies on Latino fathers (Campos, 2008). The studies that have been done on fathers in general show that Latino fathers compared to other ethnicities are more involved with their children (Coltrane, Parke, & Adams, 2004). Also Latino fathers have strong family values that influence their involvement with their family (Coltrane, Parke, & Adams, 2004). This is due to the familismo belief in Latino families. One way fathers are involved with their children, is by providing. In one study of Mexican origin fathers (Behnke, Taylor, & Parra-Cardona, 2008), one of the main findings was that being the provider was the most important role of the father. In this particular study, fathers who identified themselves with more traditional gender beliefs showed to be less involved with their children, but fathers who identified themselves as more egalitarian, showed to be more involved with their children in different ways such as emotional and social support. Co-parenting is also an understudy area in the Latino population, but one study shows that when non-resident fathers remain friends or in a romantic relationship with the mother of the child, they tend to be more involved with their children (Cabrera, Ryan, Mitchell, Shannon, & Tamis-Lemonda, 2008).

As mentioned before, there is not much research on Latino fathers, and this qualitative research aims to contribute to the body of literature analyzing Latino men’s timing of immigration and how it shapes their fathering experiences.

Theoretical Framework

This research utilizes two theories to understand the experiences of the fathers that were interviewed. The theories are the ecological theory (Bronfenbrenner, 1979) and the symbolic interaction theory (Winton, 1995). The ecological theory studies the role of different environments and how they shape the individual. The

four basic systems are microsystem, mesosystem, exosystem, and macrosystem. This system helps to have a good understand of the individual's development in relation to their environment (Indoldsby, Smith, & Miller, 2004). In this study, the microsystem is the relationship the fathers have with their children. The mesosystem is the role models for fathering and their family beliefs. The macrosystem is their immigration experience, or their experience crossing the borders for better opportunities for their children. Symbolic interaction focuses on the "acquisition and generation of meaning" (White and Klein, 2002). In this study, symbolic interaction relates to the idea of fathers having a role model, in other words being a father based on their interaction with role models. This means that fathers act according to the way they were thought by the role model but according to symbolic interactionism, there could be deviance from the norm (White and Klein, 2002). Therefore if fathers had bad role models when they were growing, they can choose not to be like them by looking at their example. For the purpose of this study, ecological theory and symbolic theory help us understand the experiences of Latino fathers.

Methods

Site and Sample

For the collection of the data, a Head Start and community center in the South Side of Chicago was chosen. The center is called El Valor, it has different programs such as the Early Head Start and Head Start programs, S.T.A.R.S. which is a mentoring/tutoring program, and a program that helps strengthening families by having support groups, father's initiative, parenting classes. The fathers that were chosen to participate in this study were recruited from El Valor and lived around the Pilsen area in Chicago. Pilsen is Chicago's largest Latino community. In the late 1990's about 93.5% was Latino mostly of Mexican heritage. The sample consists of 17 Mexican American men and 2 Puerto Rican men. (21% 18-25 yrs; 37% 26-34 yrs; 42% 35 yrs and older). In the sample, there were different generations, almost half of the sample (47%; n=9) was first generation, less than a quarter (21%; n=4) were 1.5, that means people who entered the United States before the age of 12, and 32% (n=6) were second generation. The average children the sample had were two and 95% of them had biological children only.

Data Collection

The data were gathered by a case manager researcher. He utilized semi-qualitative structured long life history interviews collected in Pilsen, Chicago. Each interview lasted 90 minutes and were taped and transcribed. The interviews were conducted in either English or Spanish depending on the language the fathers felt more comfortable speaking. These interviews were conducted by three researchers focusing in five main areas of father involvement: father, child and co-parent interaction; experiences with family of origin; residential changes; employment; and education.

Data Analyses

To analyze the 19 semi-structured, qualitative life history interview transcriptions, grounded theory was used. Grounded theory is an approach to qualitative research and it is useful when analyzing interview transcriptions (LaRossa, 2005). To give meaning to the data and findings I used the three waves of coding: open, axial, and selective. With open coding, I named different concepts for all the interviews. Some of the concepts found in open coding were involvement, first born experience, education, and best age to become a father. After open coding, I used axial coding to go back to the transcriptions and give meaning to the concepts that I found during open coding. During axial coding I was able to see that some concepts such as first born reactions and the best time to have a child were similar across all the interviews while there were many differences on other concepts such as immigration experiences given there were three different generations of fathers and their experiences were unique. Finally the last step of the analysis was selective coding. With selective coding, I was able to get four themes to the findings that emerged from the data and make sense of the interviews. The four themes relate to fathers' experiences of turning points in their lives and crossing various borders for reasons of health, safety and opportunity, as well as role models in their lives, and beliefs about partnering and parenting.

To enhance the quality of the data, triangulation was used where a three person team evaluated each finding. During triangulation and peer debriefing, the three person team talked about the findings from the transcribed interviews and discussed different codes.

Reflexivity

My background as a Salvadoran female who now lives independently in the U. S. and who was raised by a mother, who served the role of mother and father, and a step father, influenced my research question and analyses. Also because I am from the 1.5 generation I understood some of the experiences while reading the interviews and coding the data, I could relate to some of the beliefs and influences the individuals in the sample mentioned, while learning about the different ways they interact and get involved with their children. My immigration experience and the way I grew up with my mother taking charge of both roles helped me see the fathers' experiences in a different way and understand that everyone has their own immigration experience. Because I lived in a Latin American country, I understand some of the struggles some of the fathers talked about like facing poverty and not getting a good education in their native country. At the same time analyzing their parenting beliefs gave me a sense of what fathers feel towards their children and their families and how they act according to those beliefs. I was not able to listen to the interviews though I am bilingual, I think it would have been interesting to hear the fathers' tone of voice and the way they told their stories to have a better sense of their experiences but in a way I think that just reading the interviews was good because as I have my own immigration experience I could have bias towards it.

Findings

For all the men in this study, becoming a father was a turning point in their lives, whether they were involved in the life of the child's mother during the pregnancy or not. Most fathers agreed in that their lives changed from the moment they knew their child was born and their partner was safe. Fathers remarked on the experience of their first child's birth in varied ways. Some fathers only said they were happy when their child was born and did not discuss too much emotion, while other fathers expressed their happiness by celebrating and showing a lot of emotion. Javier, a G1 father remarked in the following way regarding his experience when his son was born:

When they told me that my wife had already given birth, and that it was a little boy, I remember I started jumping and running in the hospital, and my nephew hugged me while I would say to him: A boy, a boy and they are okay!! [the wife and the son]...and I tell you this because it was a beautiful situation when I was going to be a father...it felt good, I don't have the words to say what else, but it felt good, it was a very nice experience)

A second common experience among the fathers in this study was possessing ideas regarding provision for their children and timing of fatherhood. All of the fathers thought that providing for their children was a priority in their lives. Most of them said that it was important to have enough money to provide the necessary things such as food, shoes, and clothing, but at the same time mentioned that it was not everything they had to give to their children. They said that children need to feel safe, loved, supported, and needed time. Even though the fathers in this study thought that providing material things was important, they also mentioned that emotional provision such as helping their children feel safe was important as well. Fathers also related their ability to provide to the best time to have children. When they were asked what age was the best time to have a children, regardless of their generation, most of them said that when the father is ready. Martin (G1) describes this as "when they are emotionally stable because when they want to have girlfriends and be all in their friends, they are not ready. To be a father is a big responsibility". For most fathers age was not necessarily considered important in relation to preparedness for fatherhood in terms of maturity; however some remarked that in terms of physical health later in life age mattered. For example some fathers commented that it was good to have children at a younger age so that one has strength to play with their children and their grandchildren while others specifically mentioned it was good to have them after 25, like Rodrigo, who said "I think some younger men are very well prepared. But I think financially and in terms of your emotions, in terms of what you want out of life...it's a lot easier if you wait". Overall fathers in this study agreed that beyond age, it was fathers' readiness to provide and support their children that is most important.

Crossing Borders for Health, Safety, and Opportunity

Immigration played a role in the lives of all the fathers that were interviewed for the present study. For first generation (G1) fathers or men who were born outside of the United States and migrated after 12 coming to the United States enabled them to provide better resources for their family finances and health. The difficulty of migrating to the U.S. varied for fathers. Miguel a Mexican father who has been in the U.S. for 18 years tells the reason why he came to the United States:

I am here [in the U.S.] because of economic reasons. I say, well, here, as an immigrant person, here you can achieve dreams that if I were in Mexico I would not have been able to accomplish.

Juan a computer programmer from Mexico, also a first generation immigrant told his story about how important his decision to move to the United States was, given that his son had an illness and he needed better doctors to treat him. However for Juan it was not as difficult to come to the U.S. because his wife was born in Chicago, he says:

My life changed because my kid had a problem with his health and I paid to doctors over there. It was work because I owed money to everybody and I must sell everything...One day I remember I was told, "take your family to North America...we have good doctors over there. Maybe he will have a better opportunity to better health. That's why I moved here.

The experiences of these two Latino fathers, who were first generation immigrants illustrates that part of being a father is providing resources for one's family and thus a main motivations for immigrating the United States. These men want to be able to provide their children with a good future and some even sacrificed their own careers for the wellbeing of their children.

Second generation fathers also had unique experiences and reasons for immigrating. However in contrast to first generation fathers, because they were born in the U.S., these second generation fathers tended to migrate to Mexico at some point in their life which also affected their fathering experience. Most of the G2 fathers in this study grew up around violence and where involved in gangs. In turn, either their parents took them or they decided to go back to Mexico for a period of time in order to improve their lives. Hector, G2, tells his story about going to Mexico for two years to a very small town because Chicago was "too wild". He said they came back to the U.S. because the town where they stayed "Its calm and its nice but its too calm, to quiet." Also Sergio (G2) a 31 year old father with a stepdaughter and a daughter, tells his story of moving to Mexico to improve his life:

Right after high school before the marines I sidetracked. I had a run in with the police. The judge gave me the option of one year probation or go to jail. So I took a year off and went to Mexico...I ended up getting better and staying more than a year.

G2 fathers were born in the U.S., however they used their parent's immigration experience to their advantage because they were able to move between Mexico and Chicago for reasons of safety as well as opportunities to improve their own lives. Since most of them were involved in gangs and had their children very young, younger than the first generation immigrants in this study, once their children were born they changed for the better because their focus was to provide financially and emotionally for their children, became more responsible and were able to terminate their involvement in gangs.

Fathers who migrated to the U.S. as children under age 12, or 1.5 generation fathers, presented another type of experience. The movement of these fathers was characterized by limited experiences of crossing country borders, rather these fathers tended to move among the neighborhoods of Chicago and across various state borders in the U.S. However similar to other fathers in the study migration among G1.5 fathers happened because of violence and need to find quieter neighborhoods. Others moved across state in order to be able to provide financially for their families and so that their children could grow up in a safer neighborhood than the one they had when they were growing up like the case of Ignacio, who was laid off from his job and decided to go to Florida to work for a few weeks. He says, "I am the provider and I am the one that is working and that is why I went to FL to get some money..."

Even though the immigration experience of each father is unique, they share a common motive to move from one place to another, and that is the well being of their children. They moved from one country, state, or neighborhood to another in order to provide safety for their children and to find better jobs in order to provide their families financially.

“Recycling the good from the bad”: Role Models for Fathering in the Context of Immigration

Most of the fathers in this study indicated that they learned how to father on their own, and that this is something that came naturally. However many fathers referred to the role model such as a family member including parents and older siblings, as well as friends who were like a father figure and mentored them in ways that influenced their fathering. The fathers in this study discussed learning to respect their elders, providing for their children, and being responsible from these role models or mentors. Similar to the immigration or migration process of these fathers, these man's experiences with mentors varied across generation in terms of who was the important figure in their lives related to fathering and how they are raising their own children now.

For the most part fathers who were first generation immigrants to the U.S. had a family members present in their lives who taught them values and skills, which these men are now using to teach and raise their children. For example Martin, who has two daughters eleven and four years old, says "I can say some part of my fathering comes from my grandfather," referring to his patience and willingness to be involved with his children. Juan also talks about his grandmother teaching him

how to read even when she did not know and being like the mother and the father for him because his parents were separated. Fathers who did not have parents or extended family members to act as role models mentioned other individuals who impacts on their lives. For example Miguel, who married when he was 19, tells of how he started working when he was eight with a farmer, he says, “He gave me a lot of love, he taught me respect, all of that. He would teach me a lot of things. A lot good things... values, respect, respecting other...” Now he says that the most important characteristics of him being a good father are “to teach them love, respect, respect to their parents and to people who are older than them.” Even though he is raising his children in a different country and different cultures, he is teaching them what he learned when he was young.

The experiences of 1.5 and second generation fathers are different to the experience of the first generation in that few had good relationship with their parents. For example Ignacio, a father who came to the U.S. when he was a child says,

“My parents both worked while I was growing up and my grandma would take care of us. We didn’t really know our parents. When she passed away... when my dad and mom got into the picture it was like uhhhhh”

This shows that many of the fathers who came to the United States when they were younger did not have their parents as role models because they came here to work and were never present in their lives, but had extended family as Ignacio stated with his grandmother. Luis, who arrived from Puerto Rico when he was nine, had similar experience “Oh I really didn’t have nobody important. I would just be with my friends all the time. I smoked weed when I was about 14 years old. I used to drink. But now I don’t do any of that.” Luis is now a father of six children, and because he has a disability spends a lot of time at home with them talking and listening to what they have to say as a way of being involved in their lives. These fathers want to give their children what they did not have. In many ways they want to do the opposite of what their parents did. Jessie’s comments illustrate this notion of compensating for what their parents were not able to provide to them,

I was looking and listening and seeing that my dad was just not setting a good example, through the years been a very irresponsible person... I was recycling the good from the bad in terms of using it for my own good and not

Second generation fathers’ experience were unique from first generation fathers because their parents had spent some time in the U.S. prior to giving birth to them; in turn their parenting was influenced by immigration as well as the U.S. cultural context. In other words second generation fathers’ parents were G1 so these fathers applied what they were taught as children growing up in the United States. Second generation fathers looked up to their parents more than the other fathers in the study even though these same fathers were more involved in gangs and got in more trouble than other fathers, Hector explains it like this, “my mom

was always pushing me, come on, she was always there. Any trouble and she was always there, incarcerated and what-not.” Antony mentioned that even though he is not with his partner, he has joint custody of his son, and he has been influenced by his parents because they worked hard to accomplish all the things that they have now and were involved in his life and he is working hard to provide for his child and to be there for him like his parents did for him. Even though second generation do not refer to their parents as role models they acknowledge their sacrifices to provide for them even when they were in trouble and they try to do the same with their own children.

The experiences that these fathers had growing up had influenced on their parenting practices. If they had good role models, they tried to implement and teach the same values to their children. However, if they did not have good role models or their parents were never present, they were “recycling” the good from the bad, or compensating for what they did not have and becoming more involved with their children.

It takes two to tango: Beliefs about Partnering and Parenting

To better understand this finding about partnering and parenting experiences differ as different generations were analyzed, table 1 is illustrated. In the table traditional partnering beliefs are defined as being married and nontraditional beliefs, as fathers who are cohabitating or have split families. The traditional parenting beliefs are defined as the father being solely the breadwinner and being involved with the children. For the nontraditional parenting beliefs, fathers are more egalitarian, take care of the children and help around the house.

Table 1

Partnering Beliefs		
Parenting Beliefs	Traditional	Nontraditional
Traditional	G1	G1.5 G2
Nontraditional	G1	G1.5 G2

Co-parenting is an understudied area in Mexican and Puerto Rican families. Some of what is discussed in the literature regarding these families’ traditional experiences is that men are the breadwinners and women are the house wives, and that familismo, or the extended family is extremely important to parents’ experiences of raising children. Also when talking about partnering, traditional beliefs are that in order to raise a family parents are married and are present in the house. However the experiences of the fathers in this study indicated that for them this was not necessarily the case. Again these experiences varied based on fathers’ experiences and timing of immigration. All the fathers’ who were first generation were married and some had been with their partners for as long as 20 years. Most

of the first generation fathers were fairly egalitarian and progressive in their beliefs regarding raising their children. Augusto who has two daughters says and also has a good relationship with his own parents says, “They [referring to his extended family] can give all the advice, but only me and my wife, we raise our kids.” This means that even though the extended family is important to him, when it comes to raising his daughters, he and his wife make the decisions.

Another way of raising the children was illustrated by Mario, a father of three adolescent boys. In order to keep his sons out of trouble he says “My wife, me, and my children...we do social work,” referring to how their involvement in the community helps him raise his children in a safer environment. Mario also talked about how he practices a tradition, a way to pass on his children, which are second generation, a family tradition and also a way of to communicate with them when he says,

I try to bring all my family together at lunch time. We, as Hispanic people, the majority of Mexicans have a tradition, for us, lunch time, sharing together is a ritual, is a way of asking each other: What have you been doing, how are you, what are you doing...

Some fathers held on to traditional beliefs regarding mothers’ and fathers’ roles. For example, Edgar noted that when his son was born, his wife did not work so she could take care of their son. He says that he does not worry much about his son because his wife is there for him to feed him but when he is sick, he is there for his son. Fathers had different experiences about the way they share the parenting responsibilities with the mothers of their children, but most of them showed that they wanted to be equally involved in their children’s lives.

Among 1.5 and second generation fathers, there were more children born out wedlock, a fairly non-traditional practice among Mexican and Puerto Rican fathers. However these fathers’ beliefs regarding, parenting and gender roles were seemingly more traditional. These fathers have different ideas regarding co-parenting and their family beliefs from first generation fathers. For example, Ignacio, a G1.5 father says the following about his partner and children, “I don’t want her to work, I would rather have her with my kids. It’s a tough world I would rather have the mom with kids than anyone else.” He was a gangbanger before having his first daughter and his experience of growing up in violence makes him feel that it is better for his partner to be with the children. About disciplining the children he says “I am the enforcer in the house if mommy say something and kids doesn’t listen daddy got come in.” Co-parenting for split families is not an easy task either but mothers did not keep the fathers from being part of their lives. Orlando lives in New York and has 5 year-old daughter that lives in Chicago. He got separated from his “ex” and the only one that keeps their communication is their daughter. In order to see his little girl and be able to be part of her life, he works close to his mother’s house in Pilsen and spends three days of the weeks with her. He says that the mother of the girl has never discouraged him from seeing or spending time with his daughter and that he has even taken her on vacation to Mexico so that his family can meet her.

Similar to G1.5, the second generation was less traditional in regards to their beliefs about marriage because most of the fathers were cohabitating and one even had a step daughter, the only one out the 19 fathers that were interviewed. They showed to be more involved with the care of their children and the chores around the house. Antonio has joint custody of his son and after more than a year of separation with his girlfriend, they are back together, he says that his father is proud of him because he is a good dad. He says the following about his son, "He knows who his father is. You know he is happy that I'm his dad. I took initiative myself. I just heard him crying, get up to feed him, change his diaper, whatever needs to be done". Hector, a father of a five month old daughter, also tells how he helps his girlfriend around the house; he says "It ain't going to hurt to help around the house. It's been easy to wash the dishes, vacuum...Cook, I cook for my girl. When she is home she cooks for me".

Overall, fathers show some differences about the way they raise their children and their beliefs among generations. Even though they had unique experiences, it is clear that first generation fathers valued their beliefs about marriage but for most of them their beliefs about raising their children were fairly egalitarian. For the majority of G1.5 and second generation fathers, their beliefs about marriage were not strong, but some G1.5 fathers had more traditional beliefs towards raising their children than the other two generation. In contrast, second generation fathers had more egalitarian beliefs about raising their children and their gender roles.

Discussion

The fathers in this sample have unique experiences about immigration and parenting. Because there were three different generations involved (G1, G1.5, & G2), there were differences across generations. The conflict between generations that Garcia-Coll & Magnuson (1997) talked about, saying that there are conflicts between generations because the process of socialization is different was present in this study. Most fathers from G1 were more traditional in their beliefs and values while G1.5 and G2 differed at least in one that was analyzed (parenting or partnering).

Also the "immigrant paradox" that refers to the belief that first generation fair better than second generation was illustrated in this study, given that many of the G1.5 and G2 were more involved in gangs and violence when they were younger and that affected their parenting. Some G2 fathers had an immigration experience going between Chicago and Mexico to better themselves at some point because they were having problems. On the other hand most G1 fathers moved to the United States because they were looking to provide for their families. In this particular the reason of why G1 fathers moved to the U.S. could be the explanation of why they fair better, because they are crossing with the main purpose of providing for their families.

Research also shows that Latino fathers have strong family values. In this study, almost all fathers were living with their partner and children even if they were cohabitating, which proves that they have strong sense of familismo or family cohesion. When talking about how the beliefs and values change from generation to generation, it is interesting to see the changes that happened across generations in this study. For the most part G1 fathers were traditional partnering (being married) and their parenting practices (breadwinner, involved with the children) but it was interesting to see a progressive shift towards more egalitarian beliefs in parenting, but their partnering beliefs remained because all of them were married. On the other hand, G1.5 and G2 fathers were different. Their views towards marriage and parenting was changing towards nontraditional meaning that more of them were cohabitation or co-parenting because they had divorced or just separated from their partner, and helped more around the house and with the children than G1 fathers. Behnke, Taylor & Parra-Cardona () talked about this in their study. Something that is different from their study is that even though G1 fathers were traditional or progressive egalitarian on their partnering and parenting beliefs, according to the interviews, they were very involved with their children as G1.5 and G2 were. Even though the fathers in this study had different immigration experiences, and had different generational status, important findings that can be applied to different ethnics can be utilized for future research.

Limitations

Two of the main limitations of this study were data collection and time constriction. The data was collected a few years ago and was used by a case manager researcher. The interviews were transcribed and translated to English if they were conducted in Spanish. I only had access to the transcriptions. When the interviews were translated from English to Spanish, there was some information lost but overall the transcriptions were complete and informative. Due to time constraint, I could not collect the data. The research summer program only lasted five weeks. It is not enough time gather data and analyze it to complete the research. Another limitation of this particular research is that it is not representative of all Latino fathers' culture and ethnicities. The only groups present in the study are Mexican, Mexican American, and Puerto Rican fathers. Despite of the limitations, there were relevant findings that helped answered the question that lead this research and provides information for future research on Latino fathers.

Implications for Research and Practice

Research

Most researchers that have worked with the Latino population agree that there needs to be more studies on different cultures and ethnicities. To have a better understanding of Latino fathers in general, fathers from different cultures and ethnic backgrounds need to participate in this type of research. In this study there were only Mexican, Mexican American, and Puerto Rican fathers. To get a better

representation of the Latino population, Central and South America fathers need to be included in this type of research. The immigration experience of each father is unique even if they are from the same country of origin or belong to different generations. Also there needs to be more studies on Latino fathers and different socioeconomic backgrounds within cultures because there is the possibility that the immigration experience shapes their parenting in a different way depending on the resources they have. Many of the studies on Latino fathers are of low-income fathers, but it is important to see the different levels of their socioeconomic status and see if they differ there could be different results on fathers living in the metropolitan D.C. area compare to the fathers that live in Pilsen, Chicago. Like it is mentioned before, the immigration experience of a person differs from one another depending on the time they enter the United States, how they came, and the reasons for coming. More studies exploring the immigration process of individuals are needed to better understand the growth of Latino population and become culturally competent towards them. One of the main findings in this study was the changes in partnering and parenting beliefs across generations. This means that co-parenting in the Latino culture needs to be explored because G1.5 and G2 are cohabitating or having more split families. Co-parenting in the Latino population is an area that has been understudied but there is a need for future research because more different generations of Latinos are practicing it more.

Practice

The findings in this research show that when creating or improving programs that provide services to the Latino fathers in the United States the following aspects need to be taken into consideration:

- Time of immigration needs to be considered
- Gender roles need to be considered
- Co-parenting needs to be considered

Time of immigration. The time of immigration is important because this study presents three different generations and each generation has different experiences depending on how long they have been in United States. Not all fathers need translation, and some fathers need more family support than others. Depending on the generation that they belong (G1, G1.5, G2) they have different experiences and changes in their values and beliefs.

Gender roles. The findings in this study showed that fathers are shifting from being just the breadwinner of the family to help around the house and to be more involved with their children. This is important to understand because the belief that Latino fathers are the main providers and the ones who discipline the children is changing. According to the sample in this study, as generations get more acculturated, fathers are becoming more egalitarian. Their traditional beliefs towards genders roles are changing to be more involved with their children and around the house.

Co-parenting. Co-parenting is an understudy area in the Latino population. In the sample for this research there were some fathers that were co-parenting because they had split families. For programs that serve Latino families, it is important to understand that there is a shift in this type of dynamics in this population and that it varies more according to generation and timing of immigration.

Conclusion

This research is important because it contributes to the research of Latino fathers and will help understand the process the experiences they face due to immigration. One conclusion from the findings in this study is that father readiness is an important factor in becoming a father and providing for the family. Fathers cross country and state borders for many different reasons but the main reason is to provide better opportunities for their children and for safety. Also the timing of the immigration influences of the beliefs and values of Latino fathers across generations. There is a shift from the father being solely the breadwinner of the house to being more egalitarian and help with the children and with the chores around the house. Hopefully there can be more representative studies of fathers in the Latino population to see the differences and similarities across cultural, ethnic, and socioeconomic backgrounds so that the programs that help them can understand better this group and implement strategies to effectively assist them.

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Appendix A

Code book

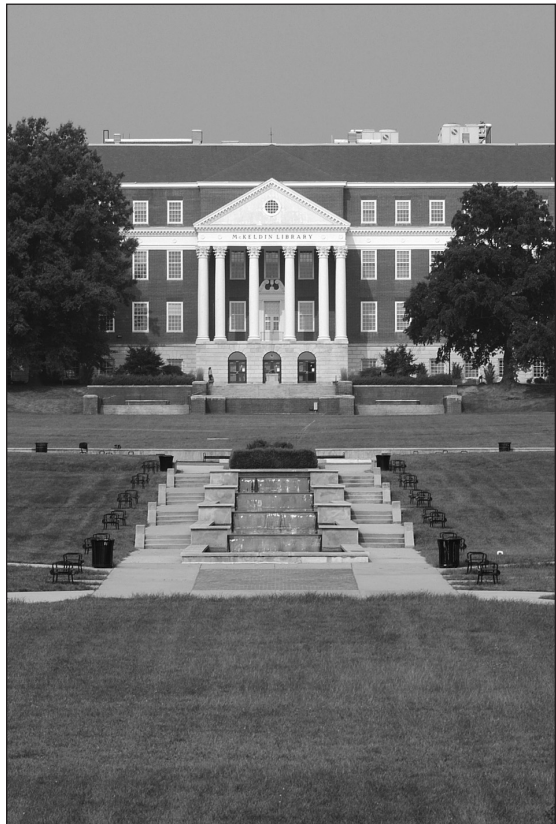
- Involvement:
 - School: doing homework, making sure they are doing well in school.
 - Sports: taking them to their sport activities
 - Talking: talking to the children, daily interaction
 - Playing: after work, during weekend, type of games.
 - Listening: to what they have to say
 - Taking care: feeding them, changing diapers.
 - Providing: being able to provide food, shelter, clothes, and security.
- Pregnancy: first reaction (surprised, happy)
- First born: delivery room (in or out), emotional reaction (magical, very happy, words cannot express)

Immigration/Values:

- Family connections: connecting children with family members, family that live around their area or their native countries (visiting, talking about them, talking on the phone)
- Role models: people that impacted their lives to be good fathers
- Learning to be a father: how they became good fathers

Father Education:

- College degree
 - High School
 - Drop Out
 - GED
- Best time to have children:
 - When they fathers are older... 30's
 - When fathers are ready, mature enough to have a family.



Low-Income African-American Fathers and their Feelings toward Fatherhood: In their Own Voices

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Abstract

Negative stereotypes of African-American fathers suggest that they are uninterested in, uninvolved with, and uncommitted to their children (Julion et al, 2007; Kismann, 1997; McAdoo, 1997). The research that exists on African-American fathers suffers from several limitations. It focuses more on their roles as breadwinners (Dubowitz et al, 2006; Rasheed & Rasheed, 1999) than on other roles they might play in their families (e.g., caregiver, teacher) and is based on information collected largely through mother's reports rather than from fathers themselves (Cabrera et al, 2000; Shears et al, 2006; Tanfer & Mott, 1997). The feelings that African-American fathers have toward fatherhood are not often represented in this research nor have they shaped a public narrative about African-American fatherhood. This study examines how African-American men perceive the role of fatherhood. The study is framed by Identity Theory which posits that individuals identify with the roles they occupy in life and act accordingly (Stryker, 1980). For the purpose of this study, I draw on qualitative data that were previously collected for the HAPPI father study. Fifteen fathers were randomly selected and the responses to four open-ended survey questions were reviewed and analyzed for themes and commonalities. Findings from this study will challenge the negative stereotypes of African-American fathers and highlight the diversity within this group.

Background and Nature of Study

Negative stereotypes are often placed upon African-American males as fathers. They have been viewed as absent or uninvolved (Coley, 2001; Connor & White, 2005) in the daily lives of their children. Low-income African-American fathers are cast as uninvolved by the media, society, and current public policy (O'Connor, 2006; Roy, 2005) and have been invisible in the study of child development, characterized negatively as "deadbeat" dads (Cabrera et al, 2000; Coley, 2001; Connor & White, 2005). This negative characterization has stemmed from the idea that African-American men are often unemployed (Coley, 2001; Connor & White, 2005) and the status of unemployment leads to the assumption of financial irresponsibility in the lives of their children (Coley, 2001; Connor & White, 2005). This negative characterization has also stemmed from the myth that African-American men are

undependable, prone to engage in violent, corrupt behaviors, and/or physically absent due to abandonment or incarceration (Fiske, 2003; O'Connor, 2006).

Low-income African-American males face barriers to parenting because of racism, oppression, financial problems, and the belief that African-American fathers do not matter (Dubowitz et.al, 2006). These barriers include the limited opportunities that African-American men are given and their lack of positive role models (Fiske, 2003; O'Connor, 2007). Many African-American fathers have grown up in single parent, female headed households within impoverished settings of the inner city (Anderson, 1999; O'Connor, 2007). African-American men often lack an appropriate adult male role model and grow up with a skewed sense of what it means to be a father (Fiske, 2003; O'Connor, 2007). African-American men frequently hear the negative stereotypes that surround them in society and fall victim to the stereotypes by self-fulfilling the prophecy.

This African-American father has fallen victim to the negative self-fulfilling prophecy and in a qualitative study expressed his views on being African-American in society. He felt as though the color of his skin immediately led to negative stereotypes of him as soon as he stepped outside of his home. This father's portrayal of society's perception of him is depicted here in his own words:

When you get up in the morning and walk out that door, you catch hell soon as you walk out that door, just because of this [pointing to skin color] and you a Black man. Mistaken identity... that's how it goes (Julion et. al, 2007).

Negativity reaches this father immediately once he enters society. According to this father, the psychological stress associated with being an African-American male (Julion et.al, 2007) negatively affected his daily life and his ability to properly parent his children.

Although these negative depictions and stereotypes of African-American fathers exist, they are often misleading. The confusion about fathering in the black community stems from misunderstanding the definition of what a father is or is not (Connor & White, 2005). The majorities of black men accept the breadwinner role (Connor & White, 2005) and understand their responsibility as a father to provide for their children. Most African-American men receive strong messages about providing for their families and the idea of fatherhood as an aspect of masculinity (Allen & Doherty, 1996). Research is characterizing these men negatively without diving deeper into the lives of the African-American father.

A deeper understanding of what it means to be a father in the African-American community can not be gained unless these negative depictions of African-American men are challenged. This study will explore how low-income African-American males identify with their roles as fathers and examine the feelings they have toward fatherhood. The study will be based on Identity theory and utilize a sample of low-income, biological, and residential African-American fathers to examine the feelings that these fathers have toward fatherhood.

Inquiry Questions

The study will revolve around a sub-sample of inquiry questions, which are as follows: a) Do African-American men perceive the role of being a father as beneficial or costly? b) Do African-American men receive satisfaction from being a father? c) How do African-American men feel about fatherhood?

Significance

This study is significant because African-American fathers are portrayed negatively in the media and in society. They are viewed as ineffectual and peripheral to the functioning of their families (Dubowitz, et.al, 2006; Rasheed & Rasheed, 1999). Findings from this study will show that some African-American fathers are committed to being fathers for their children and that not all African-American fathers fit this stereotype. Previous studies show that African-American fathers are more likely to be involved in social activities, play, and physical interactions (Shears et. al, 2006) with their children than Caucasian fathers. A study from a sample of low-income African-American fathers (Cabrera et al, 2004) showed that there are fathers who care about their children, are involved and present in their lives, and are making every effort possible to provide for them financially and emotionally (Dubowitz, et.al, 2006).

Identity Theory

Identity theory is a social psychological theory that is based on the principles of structural symbolic interactionism (Stryker, 1980). It links attitude of the self, or identities, to role relationships and role-related behaviors of identity (Desrochers, Andreassi, & Thompson, 2002). Identity theorists state that the self has an abundance of identities and each of these identities takes on a certain role (Stryker, 1968; Stryker & Burke, 2000). Identity salience is a vital aspect of identity theory (Burke & Reitzes, 1981). The salience that is attached to our identities influences how much effort we put into the roles that we occupy and how well we perform in the roles (Burke & Reitzes, 1981).

Identity theory examines the self and how the self attaches meaning to the roles it occupies (Carter, 2007). Identity theory also examines how identities are implanted within social structures and how these social structures influence what it means to be an individual (Carter, 2007). It explores the meanings that people create and maintain for themselves and others (Carter, 2007).

The self can be conceptualized in terms of different identities and each identity is tied to a different part of the social structure (Stets, 2006). According to Stryker (1980) who is the originator of Identity theory, an identity is an “internalized positional designation” for each of the various roles that a person occupies in society (Stets, 2006). The idea that people have role identities developed from this (Stets, 2006). A role identity is the meaning that people attach to themselves while participating in a role (Stets, 2006).

According to Identity theory, if questioning, “Who am I”, a father would most likely respond by saying “I am a father” because this is a role that he occupies (Desrochers, Andreassi, & Thompson, 2002). Assessing the identity of a father means assessing the importance of being a father or identifying oneself as a father (Maurer, Pleck, & Rane, 2003). While assessing the identity of a father, the male must also assess the importance of being a caregiver, teacher, or any of the other set role expectations associated with being a father (Maurer, Pleck, & Rane, 2003).

Summary of the Study

In this study, Identity theory will be used to examine how low-income African-American males identify with their roles as fathers. The expectation is that most men will identify with the parenting role. Upon transitioning to fatherhood, African-American men occupy the role as father as they begin to identify themselves as fathers. Through this new identity as a father, African-American males begin to change their behaviors, view the ways in which they approach life differently, and set higher expectations for themselves. Being a father “means” something to them. By taking on the role as father, these men realize that they have bigger responsibilities and recognize how these responsibilities have begun to shape their lives. They understand the importance of being a father and attach a high level of identity salience to the role. They put much effort into the role of father and perform well at their role.

The remaining chapters will discuss how literature shaped and formed the study. They will also discuss the research design and methodology used to conduct the study. The findings, conclusions and implications for future research will be discussed in the final chapter.

Societal Perceptions of African-American Fathers

African-American fathers have been portrayed as uninterested in, uninvolved with, and uncommitted to their children (Julion et.al, 2007; Kismann, 1997; McAdoo, 1997). These stereotypical views have been supported by the media’s representation of single, non-resident African-American men (Julion et.al, 2007; Mincy & Sorensen, 1998, p.44). The 1998 movie, “He Got Game”, directed by Spike Lee depicts a single, non-resident African-American father negatively. Denzel Washington stars as, Jake Shuttleworth, the father of a phenomenal high school basketball player. Shuttleworth is serving time in prison for killing his wife in a violent family feud and is released on parole to convince his son, Jesus, to sign with the governor’s alma mater university (Lee, 1998). In this movie, Washington is depicted negatively as a murderer who is using his son’s stardom to his own benefit. Washington has been away from his son since he was 12 years old because of murdering his wife and is released on parole only to convince his son to make a pressured decision. This negative depiction of Washington as a father can lead to the interpretation that all African-American men are “deadbeat” dads.

African-American men have been viewed as “deadbeat dads” (Julion et.al, 2007, p.596; Mincy & Sorensen, 1998, p.44) and “child support scofflaws,” fathers who fail to pay child support and consciously violate the law by doing so (Julion et.al, 2007, p.596; Reichert, 1999, p.3). Some of these men have been misinterpreted as uninvolved and absent fathers who fail to support their children financially. The development of social policies has stemmed from views that do not reflect the experiences of African-American non-resident fathers (Curran, 2003; Julion et.al, 2007). These social policies do not encourage support for helping African-American fathers engage in their children’s lives (Curran 2003; Julion et.al 2007).

African-Americans fathers are often given the short end of the stick. African-American men have been viewed as financially irresponsible (Coley, 2001; Connor & White, 2005) in the sense that they are unemployed and unable to provide economic means for their children. These supposed financial barriers have caused the belief that African-American fathers contribute to the development of their child in less measurable ways such as helping with homework and preparing meals (Dubowitz, et.al, 2006; Johnson, 1998). African-American fathers who do not live with their children have been portrayed as emotionally unattached from them (Coley, 2001; Dubowitz et.al, 1999; Gavin et.al, 2002; Rasheed, 1998). Studies have shown that non-resident minority fathers visit their children less, are less engaged, and pay less child support than non-resident Caucasian fathers (Cabrera et.al, 2008, Hofferth, 2003; King, Harris & Heard, 2004). Little research has reviewed why African-American fathers have this financial irresponsibility and why they are less involved. The obstacles faced by African-American fathers are not often depicted or reflected upon in parenting research.

African-American Fathers and the Obstacles They Face

The obstacles that African-American men face are not taken into consideration in research. Their children are being raised in neighborhoods that are unsafe because of crime and poor quality housing (Dubowitz et.al, 2006; Rasmussen, Aber, & Bhana, 2004). In a qualitative study, African-American fathers of adolescents stated that a part of guiding their children was to teach them about street culture (Dubowitz et.al, 2006). One African-American father who lived in a low-income dangerous neighborhood stated:

You got to be much more strong and hard on your kids now than back in the old days... I show my kids from my youngest boys to my daughters, I say, ‘That’s a crack head. That’s a prostitute. (Dubowitz et.al, 2006).

This father felt obligated to teach his children survival skills because of the harsh environment that they lived in (Dubowitz et.al, 2006). He could not hide the truth about the neighborhood that his children were growing up in. He had to inform his children about the dangers of their environment so that they were aware of anything that they encountered. This is the harsh reality that some African-American men and their children face daily.

Paternal involvement from their own fathers is often a factor in African-American men's ability to parent and is often an obstacle. One African-American father traced his difficulties in life to his inability to live up to his own fathers standards (Roy, 2006). During an interview one African-American male stated that his father worked at night and was never around during the day (Roy, 2006). He could not differentiate from his father "being there" (Roy, 2006, p.13) or "just visiting" (Roy, 2006, p.13).

Roy also found that in some instances, fathers who experience failure will project it on their sons. This causes the son to begin to lower his expectations of his father. In return, when the son becomes a father he lowers his expectations of his own parenting (Roy, 2006). In cases where the male's father was never around, he had to rely on his own instincts to parent. Without the presence of a father, some of these men began to rework their father's identities to fit their own (Roy, 2006). They take on the role of their father and assume "I am my father's son". They become absent in the lives of their own children because absence is all that they know. Parenting is strongly influenced by childhood relationships with their own father (Dubowitz et.al, 2006) and because of this men who never had a relationship with their father continue a cycle. Their father was not around for them and in return they are not around for their own offspring.

In a qualitative study, some African-American men revealed the obstacles they faced to paternal involvement. A study that examined African-American teenage fathers revealed that this group of men viewed their youth and money as an obstacle to paternal involvement (Paschal, 2006). These fathers wanted to enjoy their youth and the reality of being a father could not coexist with their identities of being a teenager (Paschal, 2006). Fatherhood and adolescence were mutually exclusive concepts to them (Paschal, 2006). For example, one African-American teenage father stated:

I love my child, I really do, but I got to be true to myself. How am I going to be a good father for him if I don't do what's right for me? How am I going to do right for him if I don't do right for myself? (Paschal, 2006).

This teenage father could not grasp the idea of being a father and a teenager all at once. In his eyes, he was still young and *he* was his first priority. Once he was able to obtain his personal goals he could then focus on his child.

During interviews with another group of African-American teenage fathers, it was discovered that these fathers viewed the mother of their child, their family, their friends, and social institutions as obstacles to their paternal involvement (Allen & Doherty, 1996). Family and friends were often hostile of the couple and the mother of their child was often hostile toward the father (Allen & Doherty, 1996) in ways that were not openly discussed. This set of fathers felt as though social institutions such as schools and hospitals hindered rather than assisted in their efforts to care for their child (Allen & Doherty, 1996). The social institutions did not offer these fathers access to the resources, such as daycare, that they needed to be better fathers.

Although these negative depictions of African-American fathers exist, research suggests that not all African-American fathers are uninvolved with their children. There are African-American fathers who care about their children, are committed to them, and are involved in their lives. African-American fathers have had a critical role in the development of their children. These men are stepping up and taking responsibility for their children.

African-American Fathers: Not As Bad As They Seem

The role of the father has been perceived as unimportant in early research (Dubowitz et.al, 2006; Lamb, 1975). Current research shows that paternal involvement may influence future development and behavior in children by improving the quality of the home through financial contributions, support, or nurturance (Black et.al, 1999). Fathers may make contributions to the family and to their children's development through relationships with their child (Black et. al, 1999). Research has shown that there are beneficial effects of father involvement on cognition among infants and preschoolers and reduced risk among teens (Black et.al, 1999).

Supportive father-child play has been noted to improve development in young children (Dubowitz et.al, 2006; Kelly et.al, 1998). Studies on African-American fathers show that their involvement has been linked to fewer behavioral problems and better cognitive skills in their children (Black et.al, 1999; Dubowitz et.al, 2006). A study that was conducted on African-American non-custodial fathers found that they stressed the need to spend time with their children, disciplining, and serving as a teacher, role model, and economic support (Dubowitz et.al, 2006; Hamer, 1997). Although some African-American men have been perceived as absent or uninvolved (Cabrera & Mitchell, In-Press; McAdoo 1993; Smith et.al, 2005) others have been noted to be responsible for their own children and for children that are not their own (Boyd-Franklin, 2003; Dubowitz et.al, 2006).

Most African-American men receive strong messages about being able to provide for their families and perceive the idea of fatherhood as an aspect of masculinity (Allen & Doherty, 1996). The majority of African-American fathers accept the role as breadwinner for their children (Connor & White, 2005) and many African-American men take pride in being able to provide financially for their children. Studies show that African-American fathers spent more time in the care giving role and were more likely to engage in the physical care, feeding, and soothing of their infants than Caucasian fathers (Housaain et.al, 1997; Shears et.al, 2006). In a standardized measure of paternal involvement, Caucasian fathers scored lower than African-American and other minority fathers (Cabrera et.al, 2008). Minority fathers were still noted to be romantically involved with the mother of their children and this explained the large variation in involvement between Caucasian and minority fathers on this measure (Cabrera et.al, 2008).

African-American men identify with the fatherhood role like any other group of men. Fatherhood is seen as a major adult role in the lives of men (Deinhert,

1998). It is a critical point in a man's life and it is central to the father's psychological growth and well-being (Connor & White, 2005). Men begin to form parent-child attachments and once their child is born, men experience changes in self-perception (Deinhert, 1998). They invest a great deal of themselves in their children (Deinhert, 1998).

Connor and White (2005) pair fatherhood with the term "fatherneed". Fatherneed is the physical, psychological, and emotional force that pulls men to children just as it pulls children to men to shape, enrich, and expand each others lives (Connor & White, 2005; Pruitt, 2000). Fatherneed is central to a father's growth and happiness. Fatherneed allows fathers to be changed by their children (Connor & White, 2005). The reciprocal transition between father and child stimulate their development and allow them to move forward with their relationship in life (Connor & White, 2005; Pruitt, 2000).

What Has Been Research's Focus?

Little research has investigated African-American fathers and their feelings toward fatherhood. Research has focused instead on their roles as the breadwinner (Dubowitz et.al, 2006; Rasheed & Rasheed, 1999) as well as African-American father's ability to provide financially for his family. This has led African-American fathers to define fatherhood in terms of being able to provide financially for their children. Half of the fathers in a qualitative study involving teenage African-American father's defined fatherhood primarily in economic and provider terms (Paschal, 2006). These men defined fatherhood in terms of "Doing what I have to do," which was defined as providing for their children financially and being self-sufficient (Paschal, 2006). African-American fathers have been led to believe that providing financially for their child is the key to fatherhood.

Much of what is known about fathers is obtained through mother's reports (Tanfer & Mott, 1997; Shears et.al, 2006). There are several concerns regarding the quality and utility of information obtained from mothers about the role of fathers in their children's lives (Cherlin & Griffith, 1998; Shears et.al, 2006). Reports from mothers can often be misleading. Information obtained from the mother can be collected during a period when the mother is dissatisfied with the child's father. This dissatisfaction can cause emotions to get in the way of the mother's accurate interpretation of paternal involvement.

The majority of research on paternal involvement and father-child relationships has come from married or divorced Caucasian fathers (Hawkins & Palkovitz, 1999; Julion et.al, 2007; McAdoo, 1997) who are often middle-class. The differences between the lives of African-American men and Caucasian men limit the effectiveness of this knowledge for African-American fathers (Julion et.al, 2007). These two groups of men have differing educational backgrounds, economic status, and employment opportunities (Hijjawi, 2006; Julion et.al, 2007; Roy, 2005). These two groups of men are living separate lives and the lives of one group can not be generalized to the other.

Research and policy interests increasingly focus on non-residential biological fathers (Jayakody & Kalil, 2002). Much of the research found during this literature review focused on non-residential fathers. The ways in which these men view paternal involvement and their roles as fathers can not be generalized to all fathers. These men do not reside in the same household as their children and have differing views on their involvement and roles as fathers than residential fathers.

Summary of the Literature Review

Focus has been placed on the negative depictions of African-American men as fathers. The image of African-American fathers being uninvolved, absent, and uncommitted (Julion et.al, 2007; Kismann, 1997; McAdoo, 1997) to their children continues to persevere over time. The obstacles that these men face to fatherhood are not often contemplated. They are raising their children in unsafe environments (Dubowitz et.al, 2006; Rasmussen, Aber, & Bhana, 2004) and are obligated to educate them about street culture and with the skills needed to survive (Dubowitz et.al, 2006).

African-American men are often raised without fathers. The absence of their own fathers has attributed to their inability to function as parents (Roy, 2006). Many African-American men enter into fatherhood early. The fact that they are still experiencing youth has taken away from their ability to parent (Paschal, 2006). In their minds, they are unable to properly raise a child because they are still developing themselves.

Social institutions are not offering programs that will assist African-American fathers in becoming better parents. The mother of their child, family, and friends are often standing in the way of African-American fathers and their involvement with their children (Allen & Doherty, 1996). The people and places in which they obtain the closest relationships are not willing to help these men become better fathers. Therefore, where are they to turn?

The role of the father in the lives of their children is extremely important and can not be ignored. Studies show that fatherhood is a critical point in a man's life as well as in his child's (Connor & White, 2005). Paternal involvement from African-American fathers has been known to contribute to the development of their children's cognitive, language, and behavioral skills (Black, Dubowitz, & Starr, 1999; Shears et.al, 2006). Fathers are more likely to be involved in social activities, play, and physical activities (Shears et.al, 2006) with their children. Even though this is the case, little research has focused on the feelings that fathers have toward fatherhood.

The majority of the research on fathers has been obtained from mother reports (Tanfer & Mott, 1997; Shears et.al, 2006). The feelings that mothers have towards the father of their children and how they perceive their paternal involvement is taken into account. The feelings that fathers have toward their children and how they perceive their paternal involvement has slightly been ignored.

Another large body of father research has been obtained from Caucasian fathers (Hawkins & Palkovitz, 1999; Julion et.al, 2007; McAdoo, 1997). This research can not be generalized to African-American fathers because they lead entirely different lives from Caucasian fathers. Research and policy often focuses on non-residential fathers (Jayakody & Kalil, 2002). Not all African-American fathers reside in different households as their children. The research and policy that focuses on these non-residential fathers can not be applied to all fathers.

Research Goals and Expectations

In terms of role identity, the expectations of the current study are that African-American males will identify with the parenting role and attach themselves to the role of fatherhood when they become fathers. They understand the significance of being a father and identify themselves with the role. Upon evolving into fathers, African-American males change their ways, step back, and re-evaluate their lives. They begin to set goals for themselves and for their children. The child begins to shape their lives and they put a lot of effort into being great parents. These men recognize their roles as fathers and perform well at their role. They are involved in the lives of their children by providing for them, caring for them, and loving them.

Using Identity theory, the study will explore how low-income, biological, and residential African-American fathers identify with their roles as fathers. These men occupy the roles as fathers and allow fatherhood to be the social structure in which they are implanted. The study examines what it means to be a father and explores how being a father influences their feelings toward fatherhood.

As previously stated, this study will revolve around a sub sample of inquiry questions, which are as follows: a) Do African-American men perceive the role of fatherhood as being beneficial or costly? b) Do African-American men receive satisfaction from being a father? and c) How do African-American men feel about fatherhood?

The goal of this study is to examine the feelings that African-American fathers have toward fatherhood. Based on the Identity theory's assumption that an individual will identify with the role that they occupy (Stryker, 1980), the *first expectation* is that African-American men will identify with the parenting role. The *second expectation*, based on the assumption that the role a person occupies contributes to their behavior (Burke & Reitzes, 1981), is that African-American fathers will attribute fatherhood to making them a better person. Guided by Identity theory, the *third expectation* is that African-American fathers will attach importance to the father role and act accordingly by being responsible for their children.

Method

Participants

To address the research questions, I drew on data that was collected from the HAPPI Father Study (Cabrera, et.al, 2005) by Dr. Natasha Cabrera. The term “HAPPI” is an acronym for Healthy Attachment Promotion for Parents and Infants (Cabrera & Mitchell, in press; Jones-Harden, 2004). The HAPPI Father Study consisted of 53 fathers (biological and father figure) and their toddlers who were enrolled in Early Head Start programs in Washington, DC (Cabrera & Mitchell, in press). These men were recruited from a study involving mothers and their children who were participating in an intervention program (Cabrera & Mitchell, in press; Jones-Harden, 2004).

Four out of the 53 fathers were not included in the study because their monthly incomes were two standard deviations above the sample mean ($M = \$2204.71$, $SD = \$2495.95$) (Cabrera & Mitchell, in press). The majority of the 49 remaining fathers were African-American (94%) and employed (78%) (Cabrera & Mitchell, in press). The majority of fathers were still romantically involved with the mother of their child (27% married, 31% cohabiting, 16% visiting) (Cabrera & Mitchell, in press). The remaining fathers were no longer in a romantic relationship with the mother (12%) or were relatives of the child’s mother (7%) (Cabrera & Mitchell, in press). The majority of the participating fathers (76%) were residing in the same household as their child (Cabrera & Mitchell, in press).

The ages of the fathers ranged from 17 to 58 years old (Cabrera & Mitchell, in press). Roughly 29% of the fathers has less than a high school education; 51% graduated from high school; and 20% had some college education and beyond (Cabrera & Mitchell, in press). The average monthly incomes of the fathers were low ($M = \$1,407$, $SD = 1,237$) (Cabrera & Mitchell, in press). The children’s ages ranged from 4.4 months to 36.3 months ($M = 20.8$, $SD = 9.2$) (Cabrera & Mitchell, in press). More than half of the children were male (55%) (Cabrera & Mitchell, in press).

Procedure

For this study, a sample of the 49 fathers was randomly selected. The study consisted of data that was collected from 15 fathers. Of the 15 fathers used for this study, 6 were currently married; 7 were never married; and 2 were divorced. Approximately, 4 of the fathers had some college education or beyond; 6 had graduated from high school; and 5 had not completed high school. Thirteen of the fathers indicated that their race was African-American; and 2 were other. Of the 15 fathers, 3 had one biological child; 3 had two biological children; 1 had three biological children; 3 had four biological children; 1 had seven biological children; and 4 had two children who were not biologically their own.

During the initial HAPPI father study, participating fathers were interviewed and videotaped with their children at a time and place that was convenient for the

family (Cabrera & Mitchell, in press). The interviews were held in a private area and the interviewer read all of the questionnaire and response items aloud and recorded the father's verbal responses (Cabrera & Mitchell, in press). The items from the interview were collected from national studies involving fathers such as the Early Childhood Longitudinal Study, the Fragile Families and Child Well-Being Study, and the Early Head Start Research and Evaluation Project (Cabrera et al, 2004; Cabrera & Mitchell, in press).

For the purpose of this study, qualitative data from the baseline interview was used. The father's responses to four open-ended questions that were located in Section 4.6 (Positive Aspects of Parenting) of the baseline interview were reviewed and analyzed. Unlike the majority of the questions in the baseline interview, the open-ended questions allowed the participants to express their opinion rather than choose from selected responses. After reviewing the answers to the questions, I looked for themes and commonalities across the responses regarding how African-American men reported feeling about fatherhood. I look for similarities and differences among the fathers' responses. The major themes that resulted from the participant's responses were then summarized

The open-ended questions that were used for this study reflected on what fatherhood had been like for the father. The study analyzed four open-ended questions, which were as follows: a) What are the primary feelings/emotions, both positive and negative, that you associate with fatherhood? b) What do you view to be the primary benefits of fatherhood? c) What do you view to be the primary costs of fatherhood? d) Overall, do you view fatherhood to be a positive or negative shaper of your life and why?

The answers to the questions provided the foundation of the father's feelings toward fatherhood. I reviewed all of the fathers' responses to the questions, located themes within the responses, and organized them according to those themes. The themes were organized around the questions and summarized as follows: a) Associated feelings with fatherhood b) Benefits of fatherhood c) Costs of fatherhood d) Positive or negative shaper of father's life. After summarizing the themes, I examined how they related to the study about father's feelings toward their role as a father.

Findings

This study is framed by Identity theory which posits that individuals will identify with the roles they occupy and behave accordingly. For example, men who identify with the role of being a father are more likely to act in a way that fulfills that role. In our culture, an involved father provides for his children economically and emotionally. Fathers in our culture play out many roles including economic provider, teacher, moral guide, caregiver, and provider of nurturance and emotional support. Applying this theory to African-American fathers, we expect that African-American men who identify with being a father will articulate what being a father means and how it has influenced their lives.

The results of this study are based on select sample of African-American father's responses to open-ended questions about fatherhood and the meaning of it for themselves. Fathers were asked to respond to the following four questions:

"What are the primary feelings/emotions, both positive and negative, that you associate with fatherhood?"

All the fathers included in this study responded positively and expressed good feelings and feelings of stress, love, and happiness. These complex feelings and emotions are generally felt by all parents. One father described his feelings this way:

Positive: Good feeling that I'm doing something to make a better world. Put a positive image because there are a lot of negative images. Negative: Aren't any. No appreciation of what I do. Don't get support all the time about good job. Sometimes it hurts no praise for my hard work. (36 years old)

This father associated a positive feeling with fatherhood. He felt as though he was doing something as a father to make a better world. He wanted to put a positive image out there for this child because he is aware of the many negative images of fathers in society. At times, he felt as though he didn't receive any appreciation for all that he did as a father and it hurt him because he received no praise for his hard work. Research suggests that parents who receive social support are able to be more positive parents than those who do not. It maybe the case, as this father says, that fathers, especially minority fathers, may get little social support to be better parents.

In addition to positive emotions about being a father, fathers often felt stress related to their role as fathers. Even though father's admitted that fatherhood could be stressful, they felt committed to providing support and love for their children. One father explained the stress and the joys of fatherhood this way:

Stress, patience, understanding, communication. Able to give solutions to children's problems. Try to give good advice in order for them to follow in the right direction and stay focused on life's goals. Knowing that you'll be able to share some love with someone and they'll be able to give it back. (42 years old)

This father is reflective and understands that fatherhood takes a lot of work. Despite this, he knows that he has to be there for his children and make sure that they follow the correct path in life. He knows that he can give his child love and his child will return the love.

"What do you view to be the primary benefit of fatherhood?"

The fathers felt as though fatherhood was very beneficial to them as persons. It gave them the opportunity to give things to their children that were not given to them by their own fathers. Fatherhood allowed them to be a good role model for their children and to be a better person. This father expresses what he views as the

primary benefits of fatherhood:

Learning how to be a father. Teaches you to be a better person, opens your sensibility to other human beings. Understanding of parenting. Very responsible. Impacting their lives. You could call it a role model. (36 years old)

This father is learning how to be a father while he is adapting to his fatherhood role and suggests that you learn to be a good father in “the job”. Fatherhood is making him a better person and he is beginning to understand the feelings of other people. He understands that he has to be responsible to be a parent and that he is making an impact on his children’s lives. He is aware that he has to try to be a good role model for his children.

Other fathers felt that watching their own children do well in life was a primary benefit of fatherhood. They gave their children love and could often see themselves in their children. This father expresses what he views as the primary benefits of fatherhood:

Sharing love with my children. Watching them be successful in life. Watching my influence through them project into their own children. Keeps me grounded. Keeps me out of trouble. (42 years old)

This father expresses his love for his children and points to the reciprocal nature of parenthood. Being a good parent can lead to having successful children and this in turn can encourage parents to try harder. The father quoted above enjoyed watching his children achieve and could see the influence that he had on their lives. His children kept him from getting into trouble. They kept him grounded and level-headed. Being responsible for the well-being of your children can then encourage men to be more responsible, more caring, and perhaps take fewer risks.

Other fathers said that satisfaction was a primary benefit of fatherhood. They were taking responsibility for their children and teaching them. This father puts it this way:

Satisfaction. Achievement. Taking care. Teaching. Fulfillment. Satisfaction when you help a child. (50 years old)

This father feels nothing but satisfaction and fulfillment from fatherhood. He views being able to teach his children and take care of them as an important benefit of fatherhood. Fatherhood brings him a sense of achievement and fulfillment. These positive feelings are important because they can be powerfully motivating men to do the “right thing” by their children.

“What do you view to be the primary costs of fatherhood?”

This question is important because it asks fathers to consider both the joys of fatherhood, but also the challenges. As we can read from the quotes below, some fathers recognized that fatherhood could be costly. These men understand the cost and what they have to give up to fulfill their roles. It also appears that given the joys

they experience, they are willing to pay the cost. In their own words:

Giving up livelihood. Lifestyle has changed. Don't go out with buddies. Self-time consuming. It costs me time. Costs a lot of attention. (36 years old)

Oh my God. Day care, child support, and rent. Those are the three majors. College of course. Less time for myself. I had to restructure my goals and my plans. (42 years old)

One father acknowledges that he had to give up a lot for his children. He can no longer go out with his friends anymore because his children are now his main responsibility. He realizes that children require a lot of time and attention and he has given up his prior lifestyle to provide that. Another father clearly articulates the major costs of fatherhood to him. Fatherhood did not allow him to have much time for himself. He had to re-evaluate his dreams to suit the needs of his children. He realized that life was no longer only about him. He had other human beings to be responsible for. These responses suggest that fathers are aware and recognize that being a father takes a lot of personal sacrifice, commitment, and selfless devotion. Putting children's needs before theirs, these men are invested in their children, appreciate the cost, and are willing to pay it.

Other fathers felt that fatherhood did not cost them anything. These fathers said it this way:

Nothing much because I wasn't really the type that went out. We can usually take them with us. (22 years old)

Nothing. You actually gain. (40 years old)

For these men, being fathers did not change their lifestyle all that much. Although taking your children with you is one way to adjust to life with children, this could be a positive or negative thing for their children depending on where the young fathers are taking their children. Young men, in particular, may love their children but maybe unaware of what it takes to provide for them an environment that can promote their well-being.

"Overall, do you view fatherhood to be a positive or negative shaper of your life and why?"

Of the 15 fathers interviewed, all of them felt that fatherhood had been a positive shaper of their life. They articulate their feelings this way:

Positive. It has challenged me to be a better person. More responsibility. Financially smarter. More caring. More focused. (36 years old)

Positive. Keeps me grounded by being a father. Kept me out of a lot of adverse situations than if it had been just me. If I didn't have her or any of my kids...it helped me make better decisions. Before it was just me and it didn't really make a difference. (42 years old)

Both men viewed fatherhood as a positive shaper of their lives. They say that fatherhood has changed their lives for the better. Fatherhood has caused one father to be a more responsible person. He realizes that he can't be financially irresponsible now that he has children. His children have allowed him to be more focused in life and to care for someone other than himself. The other father acknowledges that his children have prevented him from getting into trouble and have kept him on the right path. He realizes that he can not act foolishly as he had before. He now has his children to think of.

Other fathers said it this way:

Positive. Not I try harder to accomplish things. Having her changed my life. (26 years old)

Positive. Stepping stone to prove yourself. Keep myself out of trouble. (28 years old)

Positive. It made me think more about being a father and taking care of kids instead of being on the street. Oh it's a positive because it's a good thing that I can see him grow up and be around more than the average father and I want him to look up to me when he gets old. (27 years old)

Positive. My children build my morale. They motivate me. Give me a lot of self-worth, self-respect. (33 years old)

In summary, these findings suggest that fatherhood has been constructive to all of these fathers. They want to be more than the average father. They are trying to achieve things in life so that their children will have a positive role model to look up to. Fatherhood is helping them to build their own character.

What were their feelings toward fatherhood?

Overall, the fathers in this study expressed a variety of responses about their feelings toward fatherhood. Fathers expressed feelings of satisfaction, love, and happiness. Fathers even expressed feelings of stress and the amount of hard work they had to put into being good fathers. Some fathers had mutual feelings, while others had entirely different emotions. Their responses sound honest, thoughtful, and show that these men take fatherhood seriously. They are committed and invested in their children. They love them and want to provide for them and protect them. Themes and commonalities found across the father's responses are expressed below.

Associated Feelings with Fatherhood

Of the 15 fathers, 11 of them associated happiness, love, and/or a good feeling with fatherhood. Some of these fathers were just happy to watch their children grow up and to be around them. Others felt as though they were making progress in their lives to create a better life for their child. Several fathers recognized the love and closeness they felt towards their children and were proud to be fathers.

Of the 15 fathers, four of them associated stress, hard work, and/or the feeling of doing something wrong with fatherhood. These fathers recognized that raising children was hard work and that it could be stressful. It takes a lot of responsibility. One father was afraid that he might do something wrong. These fathers don't want to steer their children down the wrong path. They want their children to have someone to look up to and not to make the same mistakes that they did as children.

Benefits of Fatherhood

Of the 15 fathers, four of them expressed that being a role model was a primary benefit of fatherhood. Children need guidance and someone to look up to. One father expressed that he let his children know about the trials and tribulations that he went through in life. His children showed him a lot of respect and he just felt good being a father. Another father expressed that he wanted his children to look up to him and because of this he had to stay healthy so that he could be around to be a role model.

All participants expressed that a primary benefit of fatherhood was that it made them a better person. They were able to share love with their child, teach them right from wrong, and feel the ability to care for another life. Their children brought satisfaction and fulfillment into their lives. They had to better their lives because they were now responsible for another life. One father expressed that he could not wait until his son was old enough to play sports. He wanted to be able to sit in the crowd and yell, "That's my son!" Watching his son accomplish something would make him a proud parent.

Costs of Fatherhood

Of the 15 fathers, six of them expressed that giving up their personal time was a primary cost of fatherhood. These fathers could no longer go and hang out with their buddies as much because they now had children to care for. They also found it difficult to find time for themselves. They had to restructure their lifestyle to accommodate their children.

Of the 15 fathers, four of them expressed that money and having to pay for expenses was a primary cost of fatherhood. These fathers recognized that raising children was expensive. One father acknowledged that he worked more and had less money for himself because the majority of his income was granted to his children. Other fathers acknowledge the expenses, such as daycare, child support, rent, pampers, clothes, and toys, that they had to allocate for their children.

Of the 15 fathers, four of them expressed that they gave up nothing. There were no costs to fatherhood. According to these fathers, fatherhood did not take anything away from their lives. One of the fathers expressed that he had gained from fatherhood and another felt as though work took away from his quality time with his children.

Positive or Negative Shaper of Father's Life

All participants expressed that fatherhood was a positive shaper of their lives. All of them felt challenged to become a better person. They felt as though they had to prove themselves, try harder to accomplish things, make better decisions, and be responsible. All of the participants realized that someone else depended on them and they had to be there.

Discussion

Based on Identity Theory, the goal of this study was to examine the feelings that low-income African-American fathers have toward fatherhood. The findings support the expectation that some African-American men who identify with the parenting role feel committed and invested in their children. Upon transitioning to fatherhood, these men realized that they had to give up their old ways of behaving and thinking. There are several possible explanations. It could be that the fathers recognized the fact that they were now responsible for the life of another. In addition, it could be that the fathers did not want their children to live the same lives that they did. They wanted better for their children. The fathers recognized that it took a lot of time, money, and hard work to be a good parent. They were willing to pay the expenses and give up personal time to care for their children. These men genuinely loved their children and enjoyed being parents.

The findings paint a new picture of low-income African-American men: involved in their children's lives, invested, and committed to their welfare. Unlike negative stereotypes, the findings of this study highlight the diversity that exists in this group of men. Not all low-income African-American fathers are "deadbeat." The men in this study attribute fatherhood to making them a better person. All of the participants expressed that fatherhood was a positive shaper of their lives. Fathers felt challenged to become better men and acknowledged the strength they gained from being fathers. Fatherhood motivated them to do better. Some participants felt as though they had to prove themselves as men and be there for their children. Others wanted to try harder to accomplish goals in life and make better decisions for their child. They wanted their child to have a positive image to look up to and they wanted to be responsible. By occupying the role as father, these men changed their behavior and fatherhood was the contributing factor.

Finally, the findings support the expectation that African-American fathers will attach importance to the father role and act accordingly by being responsible for their children. All of the participants acknowledged that fatherhood was beneficial to them. The majority of the fathers wanted to see their children be successful in life. The fathers recognized that for their child to be successful they had to have someone positive to look up to. They were going to make sure that they were positive role models and able to instill good values in their children. One father acknowledged that he knew how important fatherhood was to the development of children. He recognized that raising children takes a lot of responsibility and he

wanted to be different than his own father. Some fathers admitted to paying for all of the necessary expenses, such as childcare, clothes, pampers, and toys, and giving up personal time to spend time with their children. These fathers recognized how important it was to devote quality time to their children and realized that they could no longer be selfish. They had to be responsible for their children.

There are several limitations to this study. A small sample size was a limitation of the study in that data from only 15 low-income African-American fathers was used. The participants are a select sample of low-income, biological, residential, African-American fathers. The small sample size does not allow findings to be generalized across a broad range of low-income African-American fathers or across cultures. Although this is the case, it is evident that this group of fathers has a close and loving bond with their children. These participants still held close relationships to the mother of the children and saw their children more than those who did not participate. This challenges the negative stereotype that all African-American fathers are uninvolved, absent, financially irresponsible, and “deadbeat” dads. While some fathers may be “deadbeat” dads, men in this study strongly identify with the parenting role and feel intense personal satisfaction about being fathers.

Another limitation of this study was the minimal amount of past research on low-income African-American fathers and their views on fatherhood. The majority of the research discussed the Caucasian male perspective on fatherhood and their paternal involvement (Hawkins & Palkovitz, 1999; McAdoo, 1997 as cited in Julion, et.al 2007). The opinions of mothers and their perceptions of paternal involvement also embodied a great deal of research on fathers (Tanfer & Mott, 1997 as cited in Shears et.al, 2006).

Difficulty in studying low-income families is also a limitation. Service providers frequently run into barriers when trying to reach out to low-income African American fathers (Dubowitz et.al, 2007). Some families may view the research as an invasion of privacy and may not feel comfortable providing data on their annual monetary income. Other families are generally hard to get in contact with in order to conduct the research. It is hard to track these families down and research must be done at their convenience.

Due to time and a small sample size, I relied on data that was previously collected. I was not able to ask about all of the feelings that African-American men have toward fatherhood. Overall, this select group of men held positive feelings toward fatherhood. All fathers may not feel this way. Longitudinal studies need to examine whether African American fathers’ early commitment to their children and belief in the importance of being a father translate into later behaviors that are beneficial to children. This could clarify the feelings that African-American fathers have toward their children at a variety of ages.

Another important direction that future longitudinal research could take would be to examine how African-American men’s feelings toward fatherhood effect the development and outcome of their children. More research needs to examine how the feelings that African American fathers have toward fatherhood

effect the development of their children as well as of themselves. For example, if African-American fathers have positive feelings toward fatherhood and reflect these feelings on their children, will their children develop into loving and happy individuals? If African-American fathers have negative feelings toward fatherhood and reflect these feelings on their children, will their children develop into angry and hostile individuals?

These men are low-income and because of this may have limited access and limited resources to always provide for their children (Julion et al, 2007). Even though these fathers appear to doing a great job as parents, they may benefit from a program that values the presence of father's in the lives of their children. Intervention programs need to be organized so that low-income African-American fathers have access to the resources they need to be better fathers. These programs need to recognize that these men are motivated to do right by their children and give them access to the resources they need to be better parents.

The findings from this study suggest that low-income African-American men have positive feelings toward fatherhood. They view fatherhood as a positive shaper of their lives. The findings also suggest that low-income African-American men view fatherhood as more beneficial than costly. In addition, the findings suggest that African-American men do not portray feelings toward fatherhood in the way in which they are negatively depicted. African-American men are not uninvolved, financially irresponsible, absent, and uncommitted to their children. Instead, these men are loving, responsible, present, and involved in the lives of their children. They want to be better people so that their children will have a positive image to idolize.

The focus in research has been primarily on *discussing* African-American fathers and not *listening* to their voices. The fathers in this study expressed fatherhood in their own words and their voices were heard. Hopefully, the African-American male perspective on fatherhood will be taken into account for future research.

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African American Mother-Son Dynamics and their Effect on the African American Marital Relationship

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Abstract

This conceptual paper investigates the difficulties African American married couples are experiencing in an attempt to maintain stable relationships. The following questions are analyzed and answered: (a) how are African American mother-son relationships characterized in the literature? and (b) how does the bond between African American mothers and their sons affect their sons' future relationship with their wives and marital satisfaction? The significance of this paper is to gain a broader perspective of the state of marriage in the African American culture. To identify and understand how African American mother-son relationships influence spousal unions and use the findings as an instrument to enhance African American marriages, and to gain a larger comprehension of African American male-female tension and provide a different perspective and knowledge in assessing the origins of the conflict. The Freudian psychoanalytical Oedipus complex will be used to discuss how African American men subconsciously choose a mate that resembles their mother. Olson and Olson's five typologies of marriage will also be used as a guide in discussing marital satisfaction among African American married men. The conclusions are that there are certain things only a mother can teach a son, many African American marriages are conflicted, an African American man will subconsciously pick a mate much like his mother, and the marital union will most likely resemble the mother-son relationship and many African American-mother son relationships are most likely conflicted.

Problem Statement

Inescapably, research on marriage in the United States suggests that the institution of marriage is rapidly declining (Dickson 1993; Johnson, 2007). Causes linked to the descending trend include "...an increase in the age of first marriages, high divorce rates, and economic variables such as unemployment and SES" (Johnson, 2007, p. 1; Koball, 1998). For many, these conditions may lead individuals to opt out of marriage altogether and resort to other lifestyles such as cohabitation (Johnson, 2007; Sassler & Schoen, 1998). Undoubtedly, it is important to recognize the divorce rates in the United States have been on a decline since the 1980's. From

22.1 per 1,000 women in 1980 to 17.1 in 2005 (Jayson, 2005); however, the USA still has the highest divorce rates among industrialized countries (Johnson, 2007). These findings have launched social concern and researchers speculate the drop is a product of fewer individuals marrying (Jayson, 2005); a different implication than if marriage rates were steady since 1980 and rates were declining as a result of increased marriage longevity.

Across racial backgrounds and ethnicity, there are differences in marriage rates (Dickson, 1993; Johnson, 2007; Sassler & Schoen, 1998). Recently, the marriage rate of African Americans appears to be on a slight upswing "...from 46.1 percent in 1996 to 47.9 percent in 2001 after a 40-year downward spiral" (Kinnon, 2003, p.1). Kinnon (2003) further conveys, although this is a positive change in trends, otherwise depressing evidence reveals African Americans are marrying at a much lower rate than Caucasian Americans. "The National Center for Health Statistics (1995) indicated that 85% of marriages in the United States involved heterosexual Caucasian couples while only 11% involved African American couples" (Johnson, 2007, p.2). A marriage rate with a massive gap such as this is an alarming discrepancy. Furthermore, Dickson (1993) stated that in the early 1990's 72% of all Blacks between the prime ages of 20-29 never married. The U.S Census Bureau (2000) indicated that 57% of Caucasian women married compared to 37% of African American women and 60% of Caucasian men married in contrast to 16% of African American men. The research verifies African Americans are less likely to marry and if they marry, are more likely to divorce or separate and less likely to remarry (Dickson, 1993; Sassler & Schoen, 1999).

History of the Problem

The instability of African American marriages is evident and has compelled researches to gain a more enriched understanding of the dilemma. Many have speculated different rationales as to why African American marriages are suffering and analyze the astoundingly low success rates compared to their Caucasian counterparts (Aborampah, 1989; Dickson, 1993, Johnson, 2007).

Numerous researchers suggest the institution of slavery as the main contributing factor for African American marriage instability (Aborampah, 1989; Dickson, 1993; Hill, 2006; Schwalm, 2008). Implying that it is a trap that began centuries ago when African Americans were valued only as merchandise, not allowed to marry and continually ripped away from their families. This caused disjointed and destroyed bonds and relationships (Schwalm, 2008). The repercussions of slavery such as oppression, discrimination and racism, have had lasting affects on African American's physical, mental, emotional health and employment status, even currently in the twenty-first century (Aborampah, 1989; Johnson, 2007; Schwalm, 2008).

Subsequently, some suggest the unequal men to women ratio and the decreasing pool of marriageable African American men plays a massive role in the decreasing rate of married African Americans (Aborampah, 1989; Kinnon 2005). Due to the imbalance in educational achievement among African Americans (Johnson, 2007),

this unfortunately decreases employment opportunities, resources and financial success. The disproportion may also be a result of African American males as the number one victims of homicide and that they make up 49% of inmates nationally (Mauer, 1999). In addition, studies reveal African American men and women are incongruent on marriage views and expectations which creates an environment for instability (Kinnon, 2005).

Much of the research on African American marriage investigates the perspective of women, and the majority of the work exploring African American men does not engulf much analysis on mother-son relationships. Most often focus is placed on the absence of fathers and its effect in single-mother households (Hill, 2006; Lawson Bush, 2004; Lawson Bush, 2000; Thomas et al, 1996; Weinraub & Wolf, 1983). Research calls for more emphasis on specifically African American mother-son dynamics. This may be a possible opportunity in understanding a different position of the instability of African American marriage. Because, the first female bond any man has is with his mother, there may be evidence that suggests conflicted relationships with the mother may perhaps lead to a conflicted relationship with the son's wife. Therefore, presuming specifically that the majority of African American men have conflicted relationships with their mothers, this most likely leads them to a failed marriage. This may be a possible piece to the puzzle in understanding the pitfalls of African American marriage and its low success rates.

Purpose of Proposed Research and Proposed Research Questions

This is a conceptual investigation of the difficulties African American married couples are experiencing in an attempt to maintain stable relationships. There will be an exploration of the bond African American men have with their mothers and how this affects the bond with their wives. A better understanding of these issues will shed light on possible ways to further improve and enhance African American mother-son relationships. An improvement of this specific bond may help progression in the stability of African American marriages. The following questions will be analyzed and answered:

1. How are African American mother-son relationships characterized in the literature?
2. How does the bond between African American mothers and their sons affect their sons' future relationship with their wives and marital satisfaction?

Significance of the Topic

Three essential reasons solidify the significance of this study. First, the institution of marriage in African American culture is suffering (Dickson, 1993; Hill, 2006; Johnson, 2007; Sessler & Schoen, 1999). Second, identifying and understanding how African American mother-son relationships influence spousal unions can be instrumental in enhancing African American marriages. Finally, the findings from

this inquiry may offer better understanding of African American marital tension and ways to possibly reduce the strain existing in those marriages.

Summary of Theoretical Framework for the Proposed Study

The noted and controversial oedipal complex theory, formulated by Sigmund Freud, has for centuries sparked an assortment of scholarly discussions based on the implications of its ideology. Warren (2008) defines the oedipal complex as the following:

... the inner representation of a constellation of familial relationships, including all the combinations and permutations that are possible among and between parents and their child. In earliest development, children fundamentally take in one person at a time. The basic paradigm for relationships is dyadic. Once they reach the age of about three, children begin to appreciate more complexity in relationships. They are able to see that their parents have an exclusive relationship with each other, that each parent has a relationship with the child, and that they as a unit have a relationship with their child. These children can now understand that relationships of different kinds are possible: e.g., that relationships between people can take the form of a unified dyad relating to a third person, as the parents do to the child. (Warren, 2008 p 331)

In reference to the philosophy of mate selection, based on the oedipal complex, simplistically Freud proposes that unconsciously sons will gravitate and choose a mate or wife who resembles his mother (Jedlicka, 1984; Levy-Warren, 2008). Many studies have tested Freud's theory and examine how it compares to tangible human life and relationships (Jedlicka, 1984; Levy-Warren, 2008; Poland, 2007).

Jedlicka (1984) did a mate choice study to test Freud's psychoanalytical theory which will serve as the first theoretical framework for this inquiry. The study prospectively investigates the hypothesis that a son will marry someone who resembles his mother (Jedlicka, 1984). The literature constructs a clear point of this assumption based on evidence performed on the other following nationalities: Hawaii, Asia, U.S. mainland, Europe, Pacific, British Commonwealth and Latin American. In Jedlicka's study the resembling factors included: (a) religion (b) race (c) national origin (d) nativity (e) occupation (f) political orientation, and (g) world views. These variables associated with how the mother's lifestyle is imprinted on their sons (Jedlicka, 1984). The results conclude that sons pick a mate with many of the same resembling factors as their mother. Based on the variables the results confirm the hypotheses that a son will indeed choose a mate much like his mother. This theory will be used to illustrate the concept of African American mother-son dynamics and the influence mothers have on their son's marital relationships. Assuming the mate has similar characteristics as the mother, then the spousal interaction will be similar to the mother-son relationship.

In addition to Jedlicka's (1984) study based on Freud's psychoanalytical theory, the second theory that will be used for formulating this investigation is a more contemporary framework on marital satisfaction. Olson and Olson (2000) surveyed 21,501 couples to gain an understanding of happy and unhappy married couples. From their research they propose there are five different types of marriages: (a) Vitalized (b) Harmonious (c) Traditional (d) Conflicted, and (e) Devalitized. They suggest that the scoring of the following ten different factors, will determine which category the married couple will fall. They include: (a) personality issues (b) communication (c) conflict resolution, financial management (d) leisure activities (e) sexual relationship (f) children and parenting (g) family and friends (h) egalitarian roles, and (i) religious orientation. Prior to Olson and Olson (2000), there have been other researchers who investigated marriage satisfaction and formulated typologies (Miller & Olson, 1990; Olson, 1993), as cited in Gottman (1979) and Snyder & Smith (1986). However, Olson & Olson's (2000) recent data is a perfect fit for this proposed research study because it is most current, more developed typologies, is based on a larger sample and can be directly tied into trying to explain the downfalls of African American marriages. A collaboration of both theories will justly serve as a concrete foundation in analyzing both the mother-son dynamics and marital satisfaction.

Analysis and Discussion of the Literature and Presentation of Theoretical Framework

The first interaction that any man has with a woman is his mother or a mother figure. If we can accept the idea that there are only some things a man can teach a man, there must also be some things that only a woman can teach a man (Lawson Bush, 2004). A man uses these experiences as one means to learn how to interact with women. In doing so, according to the oedipal complex, due to the unique relationship a man has with his mother he will unconsciously pick a mate that resembles her (Jedlicka, 1984). We can then speculate that the same discrepancies apparent in the mother-son relationship will also be evident in the marital union. For the purposes of this study Olson's ten factors will be used to identify generally the typology of African American marriages based upon the opinion of African American married men. A proposed empirical expansion of this study will use Olson's instrument solely on African American mothers and their married and divorced sons; to then develop greater responses of the research questions.

Conflicted/Impaired African American Mother-Son Dyad

A literary analysis done by Lawson Bush (2004) investigates four empirical studies of how African American mothers participate in the development of manhood, masculinity and identity. They include the following: *Black Mothers to Sons: Juxtaposing African American Literature with Social Practice* (King & Mitchell, 1990), *Can Black Mothers raise our sons?* (Bush, 1996b), *Beating the Odds: Raising Academically*

Successful African American Males (Harbowski et al., 1998) and *Black Sons to Mothers: Compliments, Critiques, and Challenges for Cultural Workers in Education* (Brown & Davis, 2000). These studies were chosen because they appear to be the “only texts where Black-mother son relationships [were] the primary focus (Lawson, 2004, p. 382).”

Lawson’s findings from the literary analysis are the following: First, mothers felt they were often too overprotective of their sons, wanting to protect them from the racist world but also teaching them how to manage. Second, great emphasis was made about the great men that came before their sons, such as grandfathers, uncles, fathers and African American men publicly in power; mothers are using these men as illustrations of dignity, strength and pride. Third, mothers were highly disappointed and blamed themselves when their sons were inconsistent with the values they were taught. Fourth, “Black mothers recognize the interrelationship of masculine and feminine experiences and expect Black males to contain in their sex –role identities a masculine and feminine self “(Lawson, 2004, p.383), more balanced qualities such as: compassion for everyone, believing in God, responsibility to his community and being true to self. Fifth, mothers desire to develop a broad philosophy of life and develop a relationship that encourages open discussion. Sixth, they teach specific ways to handle certain situations, (i.e. be weary of discrimination, be well employed, and maintain family rituals and religious beliefs) (Lawson 2004, 386). Finally, mothers prepare their sons to do works that may traditionally appear feminine, so that they are able to independently take care of themselves and if necessary their own family (Lawson, 2004).

The related conclusions suggest “(a) Black mothers play a significant role in the healthy development of manhood and masculinity, and, (b) it demonstrates how Black mothers participate in the healthy development of manhood and masculinity... (Lawson, 2004, p. 388).” Due to the implication that African American mothers have a great influence in the development of their sons growth into a man, this could directly affect the relationships he will have with other people, especially his future wife. Therefore, “inadequate socializations of black males...in the early years is claimed to produce...conflictual relationships in their adult years (Aborampah, 1989, p. 328)”, including the influences of the mother.

It is also important to recognize the impact on single mother parenting in regards to raising African American sons. Starker (2009) reports that fifty percent of African American households are headed by single mothers. Some research suggests that life in a single parent family is linked to children having adjustment problems (Hrabowski III et al., 1998). Due to the fact that there are such a large number of African American mothers raising sons on their own, it seems quite apparent that there will be difficulties in the relationship that may not exist in a contrasted two parent home (Weinraub & Wolf, 1983). Especially during the process of socialization in learning how to interact with women, there may possibly be a big disconnect in healthy modeled behavior and interactions (Thomas et al., 1996). It is important to recognize that there are many variables that affect a single mothers home and environment that will correspond to the relationship she has with her son and

that there will still most likely be some sort of absence in modeling a healthy African American male-female relationship. This does not put any blame on the African American single mother, but just an awareness of a possible disconnect in preparing her son to be a successful husband. As stated by Bush (2004), the mother plays a unique and important role in raising her son into a man. Therefore, there must be close attention paid to the mother son dyad, especially in a single parent environment, because inevitably this relationship will most likely be more impactful than others.

Many of the variables may be outside of the mothers control, however, it is possible for her to build and enhance the personal relationship she has with her son. Especially, if it is clear they already do not have a healthy relationship; improvement in this area may perhaps help build him with the necessary skills to be a more productive husband in the future. Even though this is not the only relationship that is responsible for socializing African American sons, it is still very important. Especially since the son will pick a mate much like his mother (Jedlicka, 1984).

African American Son and Partner Impaired Relationship

Mothers consciously and subconsciously influence male mate choice more than fathers and resemblance of a mans' wife occurs more frequently than chance. (Jedlicka, 1984). Therefore, as stated prior "inadequate socializations of black males... in the early years is claimed to produce...conflictual relationships in their adult years (Aborampah, 1989, p. 328)." Furthermore, there is tension between African American males/females and some men even resent their own mothers (Aborampah, 1989). There has been different speculation as to why, and some researchers believe it stems from slavery, oppression, discrimination and racism (Aborampah, 1989; Johnson, 2007; Schwalm, 2008). Also, African American men and women appear to have different expectations of relationships which makes their relationships unstable (Kinnon, 2005).

Nonetheless, due to the conflict between African American male-female relationships, African American marriages are suffering. Knowing that African American men have a divorce rate of 66% (Lawson & Thompson, 1995) may have possible connections with an unhealthy relationship stemming from the mother. In a 1995 article, *Black Men Make Sense of Marital Distress and Divorce: An Exploratory Study*, investigated by Lawson and Thompson. The results concluded that according to Black men there were there were four different themes that contributed to divorce. They include the following: financial strain, differences in spending practices, inability to negotiate conflict, and differences in religious beliefs.

In correspondence to David and Amy Olson's five types of married couples, many African Americans would fall into the Conflicted Couples category. The typology states that about 73% of these couples have thought about divorce. The divorce factors formulated by Black men are conducive to the factors that Olson and Olson suggest contribute to an unhappy marriage.

Conflicted Marriage

Olson and Olson (2001) extensive research study produced the definition of five marriage typologies.

1. **Vitalized** couples symbolize the happiest couple type and have the largest amount of strengths; only 14 % have considered divorce (Olson & Olson, 2000).
2. **Harmonious** couples are also happy and tend to have much strength as well; however scores are lower in child and parenting because they more likely do not have children, only 28 % ever considered divorce (Olson & Olson, 2000).
3. **Traditional** couples are overall happy but have higher scores in traditional views, including parenting, roles, religions and family and friends. Of these couples 37% considered divorce (Olson & Olson, 2000).
4. **Conflicted** couples are overall unhappy, they disagree in many areas such as communication and conflict resolution. They have numerous growth areas and 73 % of these individuals have considered divorce (Olson & Olson, 2000).
5. **Devitalized** couples are extremely unhappy and in the greatest need to revamp their marriage. In this category 69 % of both spouses are dissatisfied with their marriage and 90% have considered divorce (Olson & Olson, 2000). Figure 1 illustrates the five married couple dynamics.

This literature will be utilized as a foundation for assessing the mother-son relationship satisfaction and marital satisfaction among African Americans. In the future the same survey questions that were used to determine the five typologies will be used on African American married and divorced men and also their mothers, (minus the survey on sexual satisfaction for mother and son use), the data collected can be compared and contrasted.

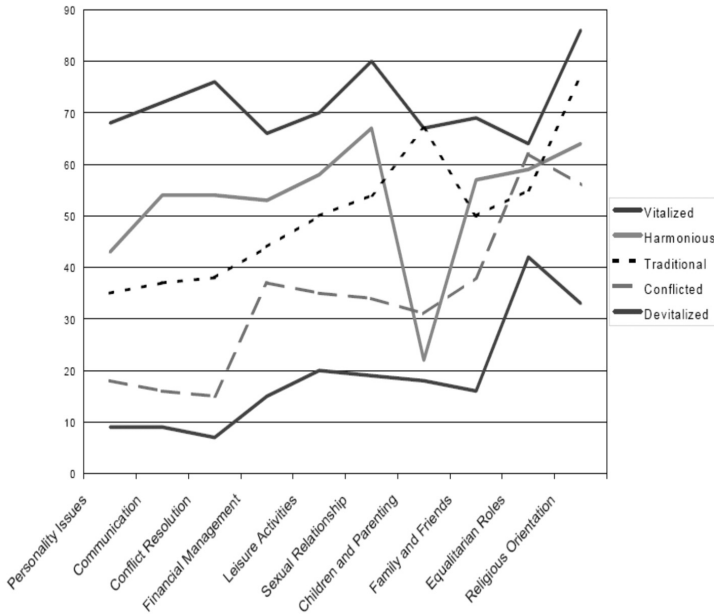
According to Olson and Olson (2000) the top three enablers that hinder a conflicted marriage are personality issues, communication, and conflict resolution. For example, focusing on the communicational aspect, In *The Form and Function of Quality Communication in Marriage*, Montgomery (1981, p. 21), declares:

Quality communication in marriage is... the interpersonal, transactions, symbolic process by which marriage partners achieve and maintain understanding of each other...[contribution] to quality marriage are described: openness confirmation, transaction management, and situational adaptability... these components functionally linked to marital satisfaction.

Specifically, addressing the level of importance of communication in any relationship, if the communication in the mother-son relationship is flawed, it is most likely that the communication in the marital union will also be flawed. Therefore, suggesting the same pattern will occur for personality issues and conflict resolution. Olson's top five communication "stumbling blocks" of couples who have problems are: (1) I wish my partner were more willing to share feelings, 82% (2) I have difficulty asking my partner for what I want, 75% (3) My partner does not

understand how I feel, 72 % (4) My partner often refuses to discuss issues/problems, 71%, and, (5) My partner makes comments that put me down, 67%. See Figure 1. Further research will measure the differences between mother and son, husband and wife.

FIGURE 1 ENRICH PCA Means for Couple Types



Olson and Flowers (1993)

Strengths, Limitations and Implications of the Literature

The literature suggests that African Americans are more prone to fall into Olson’s conflicted typology. African American marriages appear to possess many of the issues that are associated in a conflicted marriage. In addition, from Jedlicka’s (1984) research, mothers have a great influence in who their sons will pick as a mate. Because the mate is most likely similar to the mother, the marital relationship will mirror many of the characteristics of the mother-son relationship. The two positively correlate; therefore, if the mother-son dynamic is pleasing than it is possible that the marital relationship and satisfaction rates will most likely be pleasing.

Although, the literature and secondary analysis provided data to formulate answers to the research questions, this conceptual inquiry is constrained by the following limitations: First, there will be no primary empirical data collected. However, preparation and discussion will be made for future research study. Finally, literature research was gathered in a constrained time frame of eleven weeks.

Presentation and Discussion of the Theoretical Framework

According to Jedlicka (1984), testing of the Oedipus complex, the results show that males tend to be especially influenced by their mothers. "Resemblance between a man's wife and his mother...occur more frequently than expected by chance (Jedlicka 1984, p. 68)." In relationship to African American marriages we can possibly speculate that the majority of married men have a wife that resembles their mothers. If many African American marriages are conflicted, then we may also speculate that many African American mother-son relationships are conflicted as well. Future studies will be conducted to further test this hypothesis.

Comparing and contrasting Olson and Olson (2000) typology research puts African American marriage in the category of conflicted marriage. This information is consistent with the research done on African American marriages and mother-son relationships. There is speculation that perhaps a single mother African American mother-son relationship will be more impaired than a two-parent household. However, there will always be exceptions.

Research Design and Methodology

Literature Sources/Methods for Analyzing the Literature

Majority of the information gathered was from peer reviewed scholarly journals. These journals were obtained from *Journal of Black Studies, Marriage and the Family, Family Relations, Negro Education, and The Family*. An article from an *Ebony* magazine was also used in the data collection as well as *Empowering Couples* by David and Amy Olson. The university library was the primary where the data was searched. The books collected in the fields of Marriage and Family were least useful, because they lacked specifics pertaining to African Americans and much of the printed literature was outdated. However, the librarian was tremendously helpful in guiding me to different databases that would contribute useful amounts of literature closely related to my research topic. Specific databases that were utilized are the following: SocIndex, PsycINFO, Family and Society Studies Worldwide and JSTOR. Key words that were used to help retrieve information are as follows: African American marriage, men and marriage, Black mothers, Blacks and marriage, mother-son relationships, African American mothers and sons, and black male and female relationships. Before completely delving into the literature, the topic and research questions were open for discussion to individuals who fell into my category of research. Black mothers and sons were asked their opinions about the theories and hypotheses. This process, although unstructured, provided a small piece of validation to the study. Each article was read at least twice, some called for much more attention. Generally, the first time through was to obtain a general overview of the information and the second to closely uncover deeper meanings of the text. Additional content review and continual analysis were specific articles or books that supplied a greater contribution in answering the research questions. While

reading the literature words that were unfamiliar were researched as well as statistics. Reoccurring themes were noted and given individual concentration. New questions developed were used to challenge the primary research predictions. Generally the studies researched were qualitative. Use of focus groups, longitudinal studies, surveys and observations were highly prevalent amongst the articles. However, many of the samples were small and did not exactly measure the research questions. Studies were molded for the purposes of this study.

Data Collection Strategies and Data Sources

Essentially, the greatest significant data source in the future will be empirical data. This will consist of focus groups, surveys, interviews, observational studies/longitudinal studies and secondary analysis of other previous works done in this field. Studies will be specifically intended and directed towards Black mothers and their son(s). If the son or mother has siblings it will also be interesting to get different perspectives of their relationship from others who are close to them, i.e. siblings or a relative living in the same household. However, there will be certain constraints on those who are eligible to contribute, such as an individual who has lived with both parties for more than fifteen years, who has seen the mother son –relationship from child to adult, who still interacts with both parties before and after the son was married. Research will be done in a variety of different libraries such as McKeldin Library at the University of Maryland and the Library of Congress in Washington D.C. More data will be gathered from additional journals, dissertations, articles, and videos.

Data Analysis Strategies

In the future there will be empirical data, therefore the direction and methods taken in order to analyze the literature and information will be more intense and offer a more deepened examination. Meaning, with the use of more allotted time the literature can be investigated on a larger scale and more information can be gathered. The data received from focus groups, observational studies, interviews/surveys and other secondary research can be given more attention to be intellectual scrutinized. In this process additional answers will be revealed related to the hypotheses and prediction of the study. This will enhance and strengthen my research and future studies. Finally, the substance and ideas of the research will be critiqued by other scholars and experts in this field which will be useful in effectively analyzing the data from fresh perspectives. It will act as a contribution in understanding the literature and the ability to unravel new information that may not have been evident previously.

The future study will survey happily married African American men and divorced African American men, then compare and contrast the relationships each man has/had with their mother and identify how their relationship with their mother affected the stability or instability of their marriage.

Proposed Strategies for Minimizing Bias Error

In order to help minimize bias and error for this paper a variety of journals were used and thoroughly analyzed. Credibility of the publications were taken into consideration as well as the year the documents were published. Biases of each author were noted and carefully explored.

To ensure minimizing bias and error for future studies data will be collected from a variety of African American demographics. There will samples taken from a range of ages, religion and socioeconomic classes. The data will be critically analyzed and peer reviewed by other scholars in the same field.

Ethical Considerations

During future inquiry in order to maintain ethical consideration, subjects used in the study will have a full understanding of the research assessment and what will be expected of them. Consent forms will be handed out and thoroughly explained and signed by both the subjects and administrator of the focus groups, survey or observational study. Subjects will also have an opportunity to ask questions. Confidentiality will remain with all parties involved. Each study will be taken seriously and honestly managed. Results will be carefully recorded and analyzed in complete context of the research.

Findings from the Literature Related to the Proposed Research Questions

In response to (a) how are African American mother- son relationships characterized in the literature it reveals that Black mothers play a vital role in their son's development of manhood and masculinity. There are special teachings that only a mother can give to her son, and (b) how the bond between African American mothers and their sons affect their sons' future relationship with their wives. Sons will subconsciously pick a mate who is similar to their mothers. The mother has more influence on who they decide to marry than their father. Therefore, the relationships with their wife will be similar to their relationship with their mother. The foundational knowledge, wisdom and lessons he learns from his mother will carry over into his adulthood as well as his understanding of how to properly interact with a woman. Not saying that this is his only means of learning how to relate with women but it defiantly one impactful predictor.

Conclusions Based on the Analysis on the Literature

After an extensive literary review, the literature suggests the following: there were no exact studies done on the relationship between African American mother- sons in comparison to their wives. However, other related studies were able to support results to the research questions. Mothers can be used as a guide to knowing the type of wife and marital relationship the son will have. Many African American

marriages are conflicted. There are certain affairs only a mother can teach a son. An African American man will subconsciously pick a mate much like his mother. The marital union will most likely resemble the mother-son relationship. Many African American-mother son relationships are most likely conflicted

Recommendations for Future Research

After analyzing the literature it has become evident that there is not much research done specifically on African American married men and also African American mother-son relationships. Furthermore, longitudinal studies should be done in generational strands of African American mothers and their sons. This will be a comparison and contrast of the changes between the different generations in the marriages from African American men and this will help put a new perspective on the different impacts during the life course of mother and son and will provide a record of characteristics that are passed down through generations. Also to use similar research questions, compare and contrast data from other ethnicities and finally, compare and contrast current research inquiry with African American interracial marriages mother-son relationships.

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Maternal Parenting Behaviors and Infants' Receptive Language In Immigrant Families

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Abstract

Receptive language is known as the ability to listen and comprehend, and has been found to be one of the biggest predictor for academic success. With the increase in the United States, incoming immigrant population it is important to address the issue of immigrant children entering school less prepared than native children. There is a lack of research examining the link between mother-infant interactions in relation to the promotion of infant receptive language within the immigrant population. This study examines the relationship between immigrant mother's early cognitive engagement and sensitivity with their infants, during mother-infant play and the infant's later receptive language and the influence of maternal education. A total of 19 immigrant mothers of Latino, African, Caribbean and Asian Pacific Island background were videotaped playing with their infants in order to determine the level of cognitive engagement and sensitivity provided. Data analysis of the coding scores revealed that there was a distinctive difference in the level of maternal education in relation to cognitive engagement and sensitivity. Results determined that receptive language was not associated with parenting behaviors: sensitivity and cognitive engagement. Indicators of cultural variations within the sample could have influenced the results. Future research needs to extend this study in order to determine the longitudinal effects of parenting behaviors of immigrant mothers and their children's receptive language.

Introduction

Problem Statement

The immigrant population in the United States is a drastically increasing population. (U.S. Census). Immigrant children are currently considered the fastest growing segment of the U.S. population (Hernandez, Denton & Macartney, 2008). There are one in five U.S. children under the age of six that are from immigrant families (Lahaie, 2008). The main purpose of the new educational reform policy, known as No Child Left Behind, is to diminish the achievement gap among all different groups of children. However it is becoming increasingly difficult for schools to achieve in the case of immigrant children as immigrant kindergarteners already enter school less prepared than their native born peers (Lahaie, 2008).

Research on immigrant children's lives before their entrance into formal schooling is important for understanding how the early life experiences contribute to their later educational achievement. Previous research has shown the development of early language plays a significant role in children's later school success (Morrison & Cooney, 2002 & Pungello, Iruka, Dotterer, Mills-Koonce & Reznick, 2009). Since mother functions as the first teachers in almost everywhere, in most interactions, one necessary approach is to examine the role of mothers in providing a teaching environment that influences young children's language development.

While mother-child interactions are often studied there has been limited analysis on how mother-child interaction effects children's development of receptive language. The majority of the studies about mother-child interactions are concern about the affects of parent-child interaction on children's social emotional development. Studies that do focus on early mother-child interactions and children's early language skills usually fail to investigate how, specifically maternal sensitivity and cognitive engagement play a role in the early development of receptive language. Furthermore, there is limited research on how maternal characteristics like education level are related to maternal sensitivity and cognitive engagement effect children's development. Instead, the studies tend to focus on how other demographics such as ethnicity, gender and income effect children's development. Since mother's level education is a stable, yet changeable characteristic there needs to be more research on its effects on parenting behavior, and ultimately on children's development. Since studies have found that immigrant children are less prepared at school, research should focus on the link between maternal cognitive engagement and sensitivity. This current study explores the relationship between sensitivity and cognitive engagement in children's mother-infant interactions and early language skills in a sample of immigrants. Such research provide a better understanding on maternal education and enhancing parenting behaviors can help young children develop important language skills before their introduction to formal education.

Purpose of Study and Research Questions

The lack of understanding of what parenting behaviors influence language in the immigrant population and the influence of maternal education on those behaviors has sparked this study. The current study was created to examine the relationship between early mother's cognitive engagement and sensitivity interactions and children's early receptive language abilities, among immigrant families. The study will address the following research questions:

1. What is the association between the level of education of immigrant mothers' and their cognitive engagement with their infants?
 2. What is the association between the level of education of immigrant mothers' and their sensitivity with their infants?
 3. What is the association between immigrant mothers' cognitive engagement with their infants and their children's receptive language ability?
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4. What is the association between immigrant mothers' sensitivity with their infants and their children's receptive language ability?

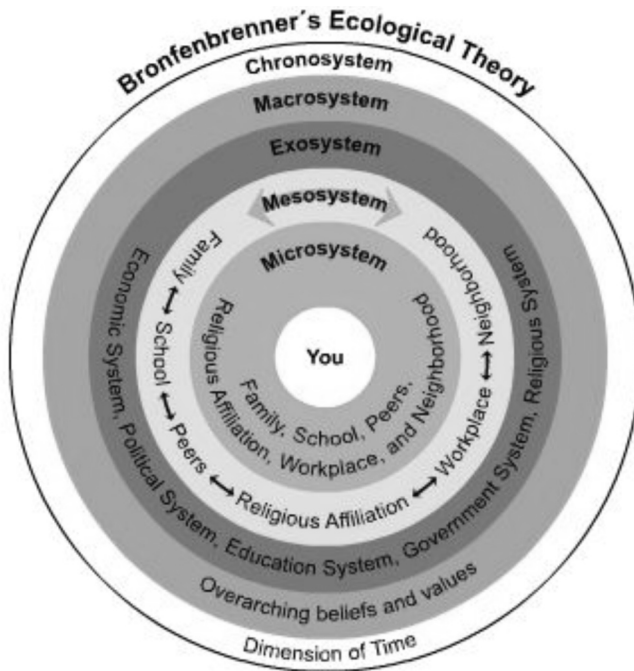
Significance of Research

The rapid increase in the immigrant population in the United States makes it important to understand the factors that enhance the development immigrant children. Currently there is little information available about the development of "school readiness" in immigrant children. This study is an important step in gaining an understanding of the factors that affect young immigrant children's language skills, which have been linked with school readiness. Such information may suggest ways to intervene with parents to enhance children's school readiness and avoid the developmental repercussions that can affect the public schools system.

Summary of Analytic Framework

For the purpose of this study Bronfenbrenner's Ecological theory will be used as a conceptual framework. This theory address how various interactions that are not necessarily apparent contributors to the development of a child. The interactions in relation to the child is not specific to one set of environmental standard in this theory and can be used to analyze interactions across various backgrounds, which is necessary in studying immigrant families.

The Ecological theory is a hierarchy four-stage system that contains various forms of social interaction that affects the development of a child: the microsystem, mesosystem, exosystem, and the macrosystem. In a bidirectional and reciprocal way each system interacts and affects the relationship between one another. The macrosystem are the beliefs, values and laws that affect child rearing, which affects all other layers. Development of a child specifically occurs through interactions in the microsystem that includes the child's immediate family. In the immediate family the parent's characteristics such as education, employment and religion in the mesosystem can indirectly affect a child through the interaction in the microsystem.

Figure 1 Bronfenbrenner's Ecological Theory

This figure is from WSU Human Development website

Within this system parental interaction is a specific social interaction necessary for the development of a young child. As stated by Vygotsky, "knowledge is situated in and shaped by a particular culture, and it is the interaction of children with adults that knowledge; the embracing of values, beliefs, customs and skills of a social group, is thus transmitted (as cited in VanderVen, 2008, p. 138). This is a dynamic process of interactions that continues society's values and ideas of knowledge. When analyzing immigrant families there maybe blending of values, practices and beliefs from their country of origin and mainstream U.S. culture. Immigrant parents may change their values and ideas to fit in with the new culture's ideas and values. Developing an understanding of the cultural differences of interactions among immigrant helps with analyzing the affects of different variables on the children's development of receptive language.

Key Terms

There are specific terms that are stated throughout this paper that have varying definitions based on the source. The meaning of following terms is grounded in the research literature and to be assumed throughout the entire read of this study for clarity.

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- **Sensitivity:** It is the mother's prompt, contingent responses to the child's signals, the degree to which the mother adapts to the child's needs and abilities and the degree to which the mother allows the child to explore their interests independently (Beackwith & Rodning, 1996; Bornstein & Tamis-LeMonda, 1989 & Paavola et al, 2009).
 - **Cognitive Engagement:** Characterized by developmentally appropriate verbal and cognitive stimulation that includes rich descriptive language, object exploration, focusing child's attention and encouraging the child to participate in more sophisticated play. The play must match the child's ability level (PCIRS: Sosinsky, Carter & Marakovitz).
 - **Receptive Language:** The ability to comprehend words, and able to refer to the representation of the word (Otto, 2002).

Assumptions, Delimitations and Scope

Assumptions. From an extensive literature review, it is predicted that immigrant mothers with higher levels of education will behave more sensitive and in cognitively engaging ways during interaction with their young children. Maguson, Sexton, Davis-Kean and Huston (2009) state that education enhances mothers' understanding about their children's educational needs and increase their ability to provide higher order thinking and create a better learning environment. Higher level of thinking and perceptions of their children's education may make immigrant mothers more aware of the necessary cognitive and sensitivity stimulation need for the development of their young children. It is also predicted that greater maternal education, cognitive engagement and sensitivity will increase the child's receptive language ability.

Delimitations. This study is not focusing on determining the differences of intelligence of infants and mothers. The social-emotional aspect of children's development is not being addressed in this study because it is specifically focusing on language development. Differences between immigrants from different countries of origins are also not directed in this study. The data in the study is categorized in a general group of immigrants rather than in specific groups of immigrants to provide an overall understanding of immigrants in the United States population. The overall assessment of parent-infants interaction is also not being assessed in this study. This is also not a longitudinal study that compares mother-child interaction and child's later school readiness.

Scope. This study is specifically focusing on parent- child interactions of immigrant mothers in the Washington, D.C. area. The immigrant mothers have different levels of education and are from the following countries: El Salvador, Mexico, Dominican Republic, Bahamas, Trinidad, Jamaica, Nigeria, and Ethiopia. The age of the children in the study range from 0 to 36 months old.

Analysis and Discussion of the Literature

Receptive language has been linked to children's later academic success (Bzoch, League & Brown 2003). Parent-child interactions with young children are believed to provide children with early experiences that support various developmental aspects, especially receptive language (Bornstein, 2002; Korat, 2009; Hamner & Turner, 1996 and Pan, Rowe, Singer & Snow, 2005). Studies have shown that the language development of young children is especially indicative to mother-child interactions. There are numerous factors that have been associated with promoting young children's receptive language, such as maternal education, sensitivity and cognitive engagement. However, little is known about what parenting behaviors influences children's receptive language among immigrants.

This chapter will review research on the association between maternal education, parenting, and young children's receptive language. First, this chapter will look into the links between maternal education and cognitive engagement. Second, there will be an analysis of the links between maternal education and sensitivity. Afterwards, the links between cognitive engagement and receptive language will be examined. Then, analysis of the link between sensitivity and receptive language will be addressed. The last section in this chapter will address any relevant research with immigrant families.

Links between Maternal Education and Cognitive Engagement

A mother's cognitive engagement reflects developmentally appropriate verbal and cognitive stimulation of her child. High cognitive engagement has rich descriptive language, joint attention, and a sophisticated level of play, between mother and child. Within the literature, there is a common theme that maternal education influences mothers' verbalizations, stimulating objects available, and achievement of joint attention, between mother and child.

Maternal education is often times not directly researched as an important variable in the cognitive engagement that immigrant mothers provide their young children. When maternal education is acknowledged in studies of cognitive engagement it is usually combined with other factors, such as family income, employment and race or ethnicity; and labeled as socio economic status (Dollaghan et al, 2001 & Bjorklund & Weiss, 1985). There is still less of an analysis on the specific relationship between maternal education and children's language development. It is possible that education, income and employment are so interrelated that it is hard to decipher which economic influences a situation more.

One influence of maternal education on cognitive engagement is that there is a difference in the ways mothers talk to their children and view strategies of stimulating their child, by education level. In both the Magnuson (2009), Korat (2009) study found that mothers of higher education provided their children with a higher quality of cognitive stimulation than mothers with low education.

Through home observations parents showed drastic improvements in responsiveness with an increase in talking and listening to their child more and

exposure to learning materials (Magnuson, 2009). More highly educated mother were found to be more verbal and have more high-level conversations with their children, than less educated mothers (Korat, 2009). The variation is the amount of highly cognitive communication among mothers of different education levels, effects children's auditory stimulation. This auditory form of infant stimulation is important in their intelligence and language development. Hamner and Turner (1996) examined how "the amount and type of language used in the home during the period of infancy" effects the child's language development (p. 37). Other forms of auditory stimulation can take place in vocalizing, music, reading and exposure to daily sounds in the environment (Hamner & Turner, 1996).

Mothers with increased education had a higher stimulation for cognitive development because they had more learning materials and better physical environment to engage in more learning activities (Magnuson, 2009). Having stimulating toys, language and overall environment gives more opportunities for mothers to build on young children's various stimulations. Parents are more able to attempt to focus their child on a specific task or object and/or focusing on specific characteristics of objects. The materials, environment and language are important aspects in providing young children with a cognitive stimulating environment because the level of cognitive stimulation is dependent on the mother's ability to foster attention focused on a specific object, high cognitive thinking and physical development (PCIRS). It was studied that children talked and comprehended more language, in English or in the mother's native language when there are join parent-child activities that consistently take place (Mushi, 2002). This development in the children's language skills was result of the mother's talking directly to the child, where the child would observe the parents reactions or would talk to themselves, while engaging in mother-infant activities of playing, going shopping, cooking, doing chores, etc (Mushi, 2002).

Links between Maternal Education and Sensitivity

Maternal sensitivity behavior provides an emotionally stable environment that allows young children to feel comfortable to interact and learn from their environment. During mother-infant interactions, where the mother is sensitive she is aware of the child's moods, interests and skills. This reciprocating social response is based on the mother's ability to not only notice the infant's signals accurately, but also respond to them promptly and appropriately (Paavola et al, 2006).

Higher levels of maternal education are significantly associated with responsiveness (Magnuson, 2009). A mother that continues her education after having children, she more likely to have a better understanding of the sensitive needs of her children based on these findings. A similar study determined that socioeconomic factors such as maternal education are one of the biggest predictors of mother-infant behaviors, such as their sensitivity (Mistry et al, 2008). The positive effect that these higher educated mother had was to engage their children in activities that interested their child, use more language, and congratulate their child's accomplishments (Mushi,

2002). Through these interactions the child received reassurance from the mother and monitored their mother's activity more (Mushi, 2002).

Links between Cognitive Engagement and Receptive Language

Cognitive engagement is when young children can learn from interacting with the world around them through verbal and cognitive stimulation and encouragement to participate in more challenging activities. The literature on infant stimulation revolves around the idea that infants are curious and have the capacity to learn. Hamner and Turner (1996) analyze the importance of parental cognitive engagement in leading the infants' curiosity to increase their capacity to learn. Hamner and Turner (1996), and Bornstein (2002) have examined how parental stimulation is a crucial aspect in children's languages development. The authors tend to use different terminology, but a common idea of social interaction during infancy development was determined as an important aspect for their language development. This time in the child's development is a crucial stage of developing the foundations in language because it is known as the critical period of developing language (Snow & Hoefnagel-Hohle, 1978). This can occur through an environment that has sensorimotor activities and through one-on-one interaction with the infant (Hamner & Turner, 1996). Overall the idea of infant cognitive engagement is to provide infants with a stimulating environment for them to explore on their own, while still having mothers provide them with verbal and cognitive stimulation. A study by Westman (2001) determined that the infant "self-initiated, independent activities are important for their receptive language skills (p. 40).

A child's receptive language abilities can be determined by the parents' ability to invest in their child (Mistry et al, 2008). Parents having the ability to provide cognitively stimulating materials such as books, educational toys and trips places outside the home has been linked to children's ability (Mistry et al, 2008). The higher cognitive engagement that higher educated mother provide to their young children, helps their children develop receptive language skills in a range of ways. In one study of parent-child reading sessions found more educated mothers labeled more objects, and had more conversations about the text and pictures, and engaged in more paraphrasing of the story than less educated mothers (Korat, 2009). More educated mothers also allowed the children to connect the text to their life experiences, thereby making it more relevant and comprehensible.

Links between Sensitivity and Receptive Language

Otto (2002) states that these sensitive mother-child interactions are important for children's language development. When parents are responsive and engaging in one-to-one conversations with their children they are establishing eye contact and shared reference. Turn talking conversations also allows young children to have a better understanding of more complex conversations. Also mother's understanding of their children's interests is important in developing these skills. Maternal understanding is important because "some infant thrive more with frequent stimulation from their caregivers while other infants need periods of free time to

explore the environment on their own, at their own pace, without constant adult interaction (Otto, 2002).

Paavaola, Kempine, Kumpulainen, Moilanen and Ebeling (2006) found that maternal behaviors, including sensitivity were a significant factor in the development of receptive language. Another study found that the quality of maternal behaviors during a book-reading task was related to children's receptive language (Dodici, Draper and Peterson, 2003).

Maternal Education, Cognitive Engagement, Sensitivity, and Receptive Language and Immigrants Families

There is a limited amount of research that is available about factors that influence the receptive language development of immigrant children. Of the immigrant children population in the United States, a majority comes from families where parents have lower levels of education and lower incomes in comparison to natives (Schleicher, 2006). Parents with limited amount of education beyond elementary school may provide their children with limited knowledge needed to do well in school (Hernandez, Denton, & McCartney, 2008 & Magnuson et al, 2006). Similar to that, documented studies have determined the importance of maternal education for parenting that enhances development of their children's language ability, a small amount of research has documented similar links among immigrant mothers (Mistry et al, 2008).

Since 40% of the immigrant population is composed of families from Mexico and other Latino American countries and most studies do not focus on a general category of immigrants, some of the studies included in this review use Latinos as the sample for the immigrant population (US Census). Analyzing the way immigrant mother's education affect their cognitive engagement and sensitivity in relation to their child's receptive language is important in determining a main contributor in the development of immigrant children's language.

Maternal education level is an important contributor to the mother's cognitive engagement of their young children. Among an immigrant sample of low socioeconomic status, mothers with the most education provided their children with the most cognitive engagement, assessed by the *Home Observation for Measurement of the Environment*. Another study, found mothers with lower education provided their child with less verbal communication during book reading times (Yarosz & Barnett, 2001). There was high percentage of 69 percent, of less the less educated mothers, which did not read to their child at all in comparison to the 39 percent of mothers that had at least a college degree (Yarosz & Barnett, 2001).

The quality of parental stimulation that is provided in immigrant homes varies in the relationship with children's language skills. In various comparison studies sensitive and cognitive engagement looks differently between immigrant and native US mother; immigrant mothers tend to be viewed as less sensitive to their children. Fracasso, Lamb, Scholmerich and Leyendecker (1997) determined that immigrant mothers left their children alone more, when their children were awake, more than native mothers. This is known to provide a less responsive stimulating

environment for their children receptive language development. Another study by Mistry, Biesanz, Chien, Howes and Benner (2008) and Mistry (2008) had similar results, which determined that children living in immigrant homes received low levels of language, literacy and cognitive stimulation in the home. Fracasso et al (1997) contradicts this idea of low cognitive engagement with the findings that immigrant mothers had relatively high amount of time having mutual engagement with their child, verbal communication, and directing infants interests. Throughout various studies there are contradicting ideas on the level of sensitivity and cognitive engagement of immigrant mothers. Despite the varying of opinions there are numerous studies that indicate the children from immigrant households have low levels of receptive language skills (Schleicher, 2006; Magnumson et al, 2006 & Mistry 2008). There were also no studies found that examines maternal education with mother sensitivity and cognitive and sensitive engagement with receptive language skills.

Summary, Limitations and Implications of the Literature

A few studies provide preliminary evidence for a relationship between maternal education and children's receptive language. An increase in maternal education increases the likelihood that the mother will provide more cognitive engagement and also increases their level of sensitivity towards their child. Both cognitive engagement and sensitivity in mother-child interactions are linked with a higher level of receptive language.

Throughout this literature review it was apparent that there was a lack of research that specifically looked at all the links addressed in this study, in relation to immigrant families. The majority of the studies available only assessed one specific link, such as maternal education and cognitive engagement. But they failed to address all aspect of this study, even though it is possible to determine intervention strategies with conclusive results.

Research Design and Methodology

Participants

The participants in this study consisted of 19 English-speaking immigrant mother-infant pairs drawn from a larger research project on infant –mental health in children enrolled in an Early Head Start program in the Washington, D.C. area. Beyond meeting the Head Start qualification of 100 percent below the poverty line, eligible families had to be currently experiencing risk factors: family with 3 or more children under the age of 5, teen mother, substance abuse, and/or mother scored above the cutoff for depression on the Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977).

Table 1 Demographics of Participants

	Percentage	Range	Mean	Standard Deviation
Ethnicity: • Latinos • African • Caribbean • Asian or Pacific Islander • Mixed				
Marital Status: • Single • Married	73.7% 26.3%			
Mother's Education: • In years		4-16	11.47	2.611
Mother's Age		15-43	25.11	7.249
Infant's Age		3.5-24.9	16.477	6.2516
Infants Gender • Males • Females	31.6% 68.4%			

$N = 19$

Procedures

Two researchers working with the University of Maryland conducted two home visits with mothers that were approximately 9 months apart. During the home visit the researchers observed and videotaped mother-infant dyads playing with toys for 20 minutes and mothers were interviewed about their background and children's development. The participants received \$50 for each visit.

Measures

Family Information The mothers answered various questions on the *Baseline Family Information* survey. This survey asked questions in order to get information about the mother's education level, income, child characteristics, mother's partners, neighborhood qualities, family health and day-to-day activities. For the purpose of this study, the maternal education level (in years) is used as a study variable.

Cognitive Engagement and Sensitivity The first 10 minutes of free play between the mother and child, was provided with various toys, and the mothers were told to play with their child as they normally would. The toys that were provided were the same for each dyad and consisted of a ball, picture books, puppets, puzzle, etc. During the home visits mother-child interactions were videotaped and coded with the *Parent Child Interaction Rating Scale* (PCIRS). This cognitive engagement code was a composite variable of cognitive stimulation and language quality. Indicators of cognitive stimulation included: sophisticated play suggestions, teaching concepts and principles and focusing the child's attention on unique attributes (PCIRS). Language quality was defined as providing rich descriptive language. The sensitivity code assessed the degree to which mothers acknowledged child's affect, have contingent vocalizations, facilitated the manipulation of an object or child movement, used appropriate methods to focus child's attention and demonstrating awareness of child's interests and arousal level (PCIRS). Both cognitive engagement and sensitivity was rated on a scale of 1-7 based on the characteristics on the observed behavior. In order to decrease bias the author coded the 19 dyads after first reaching 85% agreement level with the master coder.

Receptive Language The *Receptive and Expressive Emergent Language* test (REEL: Bzoch, League & Brown) was used to measure the current language ability of the infants, during the second home visit. This mother self-report test assesses receptive and expressive emergent language of young children. Mothers answered a series of yes and no questions about their children's skills, and behaviors. Some examples of the questions used are as followed; "Does your baby enjoy hearing words that name familiar objects?" "When people ask your baby to give them toys or other things, will she or he usually do it?" and "Does your toddler enjoy listening to nursery rhymes, finger plays or songs?" (REEL).

Data Analysis

With the data that was collected this study analyzed the data by using correlations in SPSS. In order to answer the research questions correlations were run using SPSS. Descriptive statistics were generated for the variables of maternal education, sensitivity, cognitive engagement, receptive language, mom age and infant age. Given the assumption that maternal education positively affected cognitive engagement and sensitivity and cognitive engagement and sensitivity positively affected children's receptive language a one-tailed correlation was used. Given the small sample size the alpha level of less than .1 will be used to indicate statistical significance.

Findings, Conclusions and Recommendations for Future Research
Findings

Table 2 Intercorrelations of Research Variables

Variables	1	2	3	4
1. Maternal Education	--			
2. Cognitive Engagement	.367*	--		
3. Sensitivity	.295	.872*	--	
4. Receptive Language	.129	.098	.121	--
M	11.47	6.32		
SD	2.61	3.20		

Note: N= 19 * $p < .10$

Maternal Education and Cognitive Engagement A one tailed Pearson correlation revealed a positive statistically significant association between maternal education and cognitive engagement. ($r = .37, p < .1$)

Maternal Education and Sensitivity A one tailed Pearson correlation revealed a positive trend between maternal education and sensitivity. ($r = .30, p = .11$)

Cognitive Engagement and Receptive Language A one tailed Pearson correlation revealed the relationship between cognitive stimulation and child’s receptive language, was not statistically significant. ($r = .10, p > .1$)

Sensitivity and Receptive Language A one tailed Pearson correlation revealed that the relationship between maternal sensitivity and child’s receptive language was not statically significant. ($r = .12, p > .1$)

Conclusion

This study examined whether specific parenting behavior of immigrant mothers promotes children’s receptive language. It was expected that the higher the mother’s level of education the higher the probability that she will be able to provide a higher level of cognitive engagement and sensitivity. The higher the quality of cognitive engagement and sensitivity the more it would promote the child’s receptive language. Examining these relationships, this study observed 19-immigrant mothers level of cognitive engagement and sensitivity during a free play

activity and used the REEL to test the child's receptive language abilities. The findings supported the assumptions that maternal education did have a positive association on the parent's ability in providing more cognitive engagement and sensitivity with their infants. But the findings did not statistically support that there was a relationship between cognitive engagement and sensitivity in the development of receptive language skills.

Limitations

The limitations of this study included a small sample size, the sample selection process, time and aspects of the data collection process. Since the participants were a sub sample from another study on infant mental illness in high-risk families, the participants were selected based on the specific criteria of immigrant status to meet the needs of this study. Due to the lack of time to complete this study during the six-week summer program and the limited amount of usable participant data, there was only a small sample size in this study. The size is also a contributor to the variations of immigrants used in the study. The multiple countries of origins of participants force the study to generalize results, when it may be more ideal to look at a specific set of immigrants. There is a high possibility of cultural variance within the group of immigrants studied. Because of this small sample size the use of correlations was most appropriate for this study, but limited the significance of statistical analysis.

Bias is also a contributing limitation throughout various aspects of this study. The REEL test that is used to measure the children's receptive language was self-reported by the mothers. Self-reported data has the ability to be skewed based on the person's responses, which can dramatically impact the findings of this study. Videotaped observation of only 10 minutes could have also altered normal parent-child interactions, which can provide an altered reflection of actual interactions between the mother and child. The reliability process of observation coding can have bias because it is subjected to person beliefs. Overall the observation method is still more reliable than being solely based on mother's opinions.

Maternal Educations and Cognitive Engagement

Studies have reported that there is a significant correlation between parental education and the level of cognitive stimulation they provide their children (Dollaghan et al, 2002, Korat, 2009 & Magnuson, 2009). As stated in the assumptions it was predicted that immigrant mothers that have a higher level of education would have more cognitive engagements than mother with less education. It is apparent from this study's results that maternal education does have a positive relationship to the quality of cognitive engagement.

Maternal Education and Sensitivity

The results of this study affirmed early assumptions that the more maternal education an immigrant mother has the more likely she will have a higher sensitivity. The moderate size significance in the correlation also supports other research that has been done that states education could be a factor in determining sensitivity (Magnuson, 2009; Paavaola et al, 2006; & Mushi, 2002).

Cognitive Engagement and Sensitivity link to Receptive Language

It was anticipated that the factors, cognitive engagement and sensitivity would have a positive association with children's receptive language scores. This anticipation was supported with studies that examined how American mothers' levels of sensitivity and cognitive engagement during play helped their child in language development (Dodici et al, 2003; Hammer and Turner 1996; Mistry et al, 2008; & Mushi, 2002). Despite the previous research and assumptions this study's results did not show there was any correlation between cognitive engagement and receptive language and sensitivity and receptive language.

Examining the nature of this study there are a few factors that could have impacted the results of these two correlations. There are specifically three possible implications that could have specifically affected the results of this study, which all revolves around a cultural aspect.

The REEL test that was used to determine the level of receptive language of the immigrant children had limitations when used within the study's sample demographics. Even though the REEL developed a sample test to determine the reliability of its use in the United States there is still a difference in the sample use in this study. While the REEL sample tested Native Americans, Hispanic Americans, Asian American, African Americans and other, this study specifically looked at immigrants. The unequal distribution of demographics across both study's sample makes it clear that the REEL may not be as valid for this study's sample of Caribbean and African immigrants. "It cannot always be assumed that because a test is reliable for a general population it will be equally reliable for every subgroup; especially with unique characteristics: racial, ethnicity and linguistic differences" (REEL, p. 30).

During the videotaped observations parents may have been placed in unnatural situations that could have also affected their level of parenting. Since the parents knew there were being observed by two researchers and being videotaped, there may have been changes in the way that the mother naturally acts with her child. The changes in the parents' behaviors would then affect the coding scores, and provided an unbalanced set of results.

Within this very diverse population of participants it is difficult to equate Western standards of interactions on the participant of this study. While this study measured mother's interactions in correlation to the child's receptive language there may be some differences among less educated mother with low cognitive engagement and sensitivity scores. In the participant cultures mothers may not be viewed as the

primary caregiver that interacts with the child specifically in cognitively engaging and sensitive ways. It is possible that other family members that were not involved have more interactions with the child that affects the receptive language than the mother, which could have altered the results of the correlation.

Recommendations for the Future

In order to readdress the question of “does maternal cognitive engagement and sensitivity affect a child’s receptive language?” there are few designing changes that would be made in a future study. There would be a greater amount of participants the subgroups within the immigrant sample and overall, in order to provide more statistically meaningful data. The different immigrant groups would have their data analyze separately in order to avoid culturally differences between the various groups. The future study would be a quantitative study that would have more culturally sensitive measures of parent-child interactions. Instead of parents being rated solely on the observation with them playing with their child, the adapted study will have parents rate what qualities do they feel are important in developing receptive language and providing a cognitive engaging and sensitive environment, what their role is in fostering receptive language, cognitive engagement and sensitivity and if they do foster it how do they do so.

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Metabolic Profiling of *in vitro* Cultured Medicinal Plants: *Actaea racemosa* L

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Abstract

The use of *Actaea racemosa* L., black cohosh, as an herbal supplement has dramatically increased over the past decade. The rhizome is used for a variety of medicinal purposes involving premenopausal symptoms. This project involved the development of a protocol for establishment of *in vitro* callus cultures from excised tissues of racemes and leaves. Explants were grown on Murashige and Skoog medium (MS) with a variety of concentrations of growth hormones TDZ and NAA. The production of secondary metabolites by these callus cultures is being analyzed by ultra high pressure liquid chromatography coupled with mass spectrometry UHPLC/MS. The first inoculation of racemes was observed after one week with a large growth of fungi in twelve of the sixteen plates. The project is ongoing and awaiting further results of callus growth in the plates.

Introduction

The wide spread increase of use of *Actaea racemosa* L., black cohosh, has caught the attention of researchers. This species is a perennial that is found from Southern Ontario to Georgia and Arkansas; Missouri to Wisconsin (Foster & Duke, 2000). Black Cohosh has a long record as a medicinal herb used by Native Americans to ease in childbirth and as an antidote for rattlesnake bite. Its antispasmodic, sedative, and anti-inflammatory properties treat menstrual cramps, rheumatism, childbirth pains, headaches, coughs, and asthma. (Bremness, 1994) The rhizome is used for medicinal value. The primary means to collect black cohosh relies on harvesting from the wild. This has raised concerns that the plant may become rare or endangered in the wild. The discovery and implementation of sustainable methods of harvesting and cultivating black cohosh will help reduce demands on wild populations. Propagation of this species has been found to be a difficult undertaking. A host of researchers collaborating through the Appalachian Center for Ethnobotanical Studies (ACES) are researching a variety of aspects of black cohosh in order to determine aspects important for medicinal uses and sustainability of the plant in the wild. ACES is a collaborative program with Frostburg State University, West Virginia University and the Center for Advanced Research in Biotechnology (CARB) at the University of Maryland Biotechnology Institute (UMBI). Dr. Eisenstein's group at CARB is interested in identifying the groups of genes and biosynthetic pathways responsible for the production of the medicinally

potent secondary metabolites. Determining methods for effective tissue culturing will result in the ability to propagate on individual genetic plant in order to aid in various aspects of research. Tissue culturing of the species will allow genetic and environmental variables to be held constant while research explores concentrations and presence of secondary metabolites.

Purpose

The usage of a callus culture system is a valuable tool that will aid in furthering the ongoing research taking place by the Eisenstein group at CARB. This route of inquiry required the experimental development of a protocol for *in vitro* growth. The experiment called for the inoculation of leaf tissue and racemes under sterile conditions. The profiling of the secondary metabolites produced by callus growth will provide an avenue for the opportunity to manipulate the genetic material to trace the metabolic pathways. The use of micropropagation in this regard has revolutionized the science of modern botanical inquiry. A number of species have been successfully propagated *in vitro*, which has contributed to conservation of these species. (George, 1996b)

Methods

Plant samples were taken from racemes and leaves of black cohosh, sterilized with a bleach solution, and placed on plates with growth medium. They were then inoculated with plant growth hormones and then monitored at the end of one week to determine if there were infections of bacteria or fungi. After three weeks, if the plants show no infections of bacteria or fungi, the plates will be observed for development of callus growth. This differentiation of plant cells indicates that the plant can be cultured *in vitro*. Indication of infections of bacteria or fungi would result in changes in methods development to ensure sterilization. Specific methods were developed to determine the concentration of bleach needed to effectively sterilize the plates.

Extensive method development resulted in the adaptation of the following procedure. This procedure is the proposed protocol for *in vitro* tissue culture of black cohosh, after various laboratory trials. First iterations of this experiment resulted in the growth of fungi, resulting in an increase in the concentration of bleach.

Results

The following procedures were developed and are the results of the experiment. Abbreviations are as follows: NAA: 1-naphthaleneacetic acid, TDZ: thidiazuron, MS: Murashige & Skoog. The growth media was prepared according to Murashige and Skoog (MS) with varying concentrations of TDZ and NAA. The concentrations varied from 0.5 μM to 5.0 μM . The media was prepared, autoclaved, and poured into the plates in the Laminar flow hood. Racemes are aggregations of flowers on

the stems of plants and these were taken from flowering plants located outdoors and young leaves were taken from non-flowering plants from the greenhouse. The plates were stored in the dark at room temperature (23 degrees Celsius). All glassware was rinsed with ultra purified water and all stock solution bottles were sterilized in the autoclave.

Iron Stock (200X)

1. Add 40 mL ultra purified water to a 100 mL beaker. Heat in a microwave for 20 seconds.
2. Dissolve 556 mg $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$
3. Add 40 mL ultra purified water to a separate 100 mL beaker. Heat in microwave for 20 seconds.
4. Dissolve 744 mg $\text{Na}_2\text{EDTA} \cdot 4\text{H}_2\text{O}$
5. Add the 2 solutions to a 100 mL graduated cylinder and fill to 100 mL with ultra purified water.
6. Filter sterilize the solution.
7. Protect from light by storing in an amber bottle or wrap with aluminum foil. Store at room temperature.
8. Use 5 mL 200X Iron Stock solution per liter of MS medium.

Micronutrient Stock (100X)

1. Add 400 mL ultra purified water to a 1 L beaker.
2. Add and dissolve the following nutrients into the 1 L beaker, allowing each compound to completely dissolve before adding the next compound.

2,230 mg	$\text{MnSO}_4 \cdot 4\text{H}_2\text{O}$
860 mg	$\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$
620 mg	HBO_3
83 mg	KI
25 mg	$\text{NaMoO}_4 \cdot \text{H}_2\text{O}$
2.5 mg	$\text{CuSO}_2 \cdot 5\text{H}_2\text{O}$
2.5 mg	$\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$

3. Transfer the solution to a 1 liter graduated cylinder and fill to 1 liter with ultra purified water.
4. Filter sterilize the solution. Store at 4°C
5. Use 10 mL of 100X Micronutrient Stock solution per liter of MS medium.

Vitamins Stock (1000X)

1. Add 50 mL ultra purified water to a 100 mL beaker.
2. Add and dissolve the following nutrients into the 100 mL beaker, allowing each compound to completely dissolve before adding the next compound.

200 mg	Glycine
50 mg	Nicotinic Acid
50 mg	Pyridoxine•HCl
10 mg	Thiamine•HCl

3. Transfer the solution to a 100 mL graduated cylinder and fill to the 100 mL line with ultra purified water.
4. Filter sterilize the solution. Store at 4°C.
5. Use 1 mL of 1000X Vitamin Stock solution per liter of MS medium.

Macronutrients & Completion of MS medium

1. Add 400 mL ultra purified water to a 1 Liter beaker.
2. Add and dissolve the following nutrients into the 1 L beaker, allowing each compound to completely dissolve before adding the next compound.

1,650 mg	(NH ₄) NO ₃
1,900 mg	KNO ₃
440 mg	CaCl ₂ •2H ₂ O
370 mg	MgSO ₄ •7H ₂ O
170 mg	KH ₂ PO ₄

3. The stock solutions must be kept sterile. The pipet tips must be sterile and great care must be taken at this step to avoid contamination.
4. Ignite the Bunsen burner. Unscrew the cap of the stock reagent, aiming the neck of the bottle towards the flame. Place the cap down on the bench right side up to avoid contamination. Insert the pipet tip into the solution only enough to withdraw the necessary volume. After removing the pipet tip, re-flame the tip of the bottle for a moment and then replace the cap securely.
5. Add the Stock Solutions according to the following concentrations:

5 mL	200X Iron Stock
10 mL	100X Micronutrient
1 mL	1000X Vitamin Stock

6. Add 100 mg myo-inositol to the medium.
7. Add ultra purified water up to about 900 mL.
8. Adjust the pH to 5.7 with 1N NaOH and/or 1N HCl.
9. Add 30 g sucrose.
10. Add 7 g clean agar for plates.

11. Transfer solution to a 1 L graduated cylinder and fill to the 1 L line.
12. Transfer into a 1 L bottle with a loose fitted cap.
13. Sterilize in the autoclave.

Preparation of Growth Hormones

TDZ

1. Utilize sterile techniques for all steps.
2. Add 11.0 mg TDZ to a new falcon tube using a small boat.
3. Add 200 μ L 1 M NaOH to the boat to rinse any remaining residue of the TDZ directly into the falcon tube. Put the cap on the falcon tube quickly.
4. Add ultra purified sterile water to the falcon tube up to the 50 mL mark.

NAA

1. Utilize sterile techniques for all steps.
2. Add 9.31 mg NAA to a new falcon tube using a small boat.
3. Add 200 μ L 1 M NaOH to the boat to rinse any remaining residue of the NAA directly into the falcon tube. Put the cap on the falcon tube quickly.
4. Add ultra purified sterile water to the falcon tube up to the 50 mL mark.

Preparation of Plates and Pouring of Plates

1. Label plates according to the specific concentration of the growth hormones TDZ and NAA used. The following concentrations are for a matrix of auxin/ cytokin supplements:

TDZ \ NAA	0.5 μ M NAA	1.0 μ M NAA	2.5 μ M NAA	5.0 μ M NAA
0.5 μ M TDZ	0.5 μ M TDZ/ 0.5 μ M NAA	0.5 μ M TDZ/ 1.0 μ M NAA	0.5 μ M TDZ/ 2.5 μ M NAA	0.5 μ M TDZ/ 5.0 μ M NAA
1.0 μ M TDZ	1.0 μ M TDZ/ 0.5 μ M NAA	1.0 μ M TDZ/ 1.0 μ M NAA	1.0 μ M TDZ/ 2.5 μ M NAA	1.0 μ M TDZ/ 5.0 μ M NAA
2.5 μ M TDZ	2.5 μ M TDZ/ 0.5 μ M NAA	2.5 μ M TDZ/ 1.0 μ M NAA	2.5 μ M TDZ/ 2.5 μ M NAA	2.5 μ M TDZ/ 5.0 μ M NAA
5.0 μ M TDZ	5.0 μ M TDZ/ 0.5 μ M NAA	5.0 μ M TDZ/ 1.0 μ M NAA	5.0 μ M TDZ / 2.5 μ M NAA	5.0 μ M TDZ/ 5.0 μ M NAA

2. Setup the labeled Petri dishes in a Laminar flow hood. Always spray everything thoroughly with ethanol before it goes into the Laminar flow hood.
3. Setup all necessary equipment into Laminar flow hood, including pipettes, stand for pipettes and pipet tips.
4. Run the UV light for a short duration (5-10 minutes) as a precaution. Make certain that no UV sensitive compounds are in the hood while the UV light is on. The growth hormones are UV sensitive.

5. Turn the UV light off, spray down the outsides of the growth hormone tubes with ethanol and then place them in the Laminar flow hood.
6. Heat the MS medium in the microwave to liquefy the agar. Start with 10 minutes on level 4. Watch the medium and make sure it does not come to a boil and flow out of the flask.
7. Ignite the Bunsen burner and pour the MS medium into four 50 mL falcon tubes near the flame from the Bunsen burner. Prepare only 4 tubes at a time.
8. Heat the falcon tubes in a water bath at 50°C for 8-10 minutes to equilibrate the temperature.
9. Remove the falcon tubes from the water bath and wipe away all water droplets on the outside of the tubes.
10. Quickly transport the falcon tubes to the Laminar flow hood.
11. Do not allow pipet tips to come in contact with anything while they are being used to add growth hormone to the MS medium. Do not shake falcon tubes to mix, avoid producing bubbles in the tubes. Do not allow medium to come in contact with the top of the plate.
12. Add the growth hormones to each falcon tube according to the concentrations of the chart below, which is equivalent to the micro molarities in the chart above. Each falcon tube must have both growth hormones added to it.

25 μ L TDZ 25 μ L NAA	25 μ L TDZ 50 μ L NAA	25 μ L TDZ 125 μ L NAA	25 μ L TDZ 250 μ L NAA
50 μ L TDZ 25 μ L NAA	50 μ L TDZ 50 μ L TDZ	50 μ L TDZ 125 μ L NAA	50 μ L TDZ 250 μ L NAA
125 μ L TDZ 25 μ L NAA	125 μ L TDZ 50 μ L TDZ	125 μ L TDZ 125 μ L NAA	125 μ L TDZ 250 μ L NAA
250 μ L TDZ 25 μ L NAA	250 μ L TDZ 50 μ L NAA	250 μ L TDZ 125 μ L NAA	250 μ L TDZ 250 μ L NAA

13. Gently invert the falcon tube 5 times. Do not allow air bubbles to form.
14. Pour 25 mL into one plate and 25 mL into the other. Quickly replace cover of plate.
15. Once the medium has solidified, flip the plates over so that the medium is upside down and then transfer the plates to the refrigerator.

Explant

Racemes

1. Racemes were collected from plants located outdoors. Specimens were collected in the afternoon. The flowering parts of the raceme were not used. The portion where the peduncles were not opened was used. The tips of the racemes were not used; about 5 cm was cut off and discarded. The raceme pieces ranged from 5-9 cm in length. The peduncle balls were cut off of the

stem before bleaching was administered.

2. Transfer all necessary equipment to the Laminar flow hood.
3. Sterilize plant material in 0.5% NaOCl and 0.1% Tween-20 in a 50 mL falcon tube.
4. Transfer the falcon tube containing plant specimens and the 6 falcon tubes being used to wash plant material to the Laminar flow hood. Spray with ethanol before entering into the hood.
5. Wash plant material 3 times in ultra purified sterile water for 5 minutes each time.
6. Inoculate small (0.5 cm) pieces of tissue onto the agar plates. Each plate was dated and labeled R for raceme.

Leaf

1. Young leaves were taken from specimens in the greenhouse.
2. Transfer all necessary equipment to the Laminar flow hood.
3. Sterilize plant material in 0.75% NaOCl and 0.1% Tween-20 in a 50 mL falcon tube.
4. Transfer the falcon tube containing plant specimens and the 6 falcon tubes being used to wash plant material in the Laminar flow hood. Spray with ethanol before entering into the hood.
5. Wash plant material 3 times in ultra purified sterile water for 5 minutes each time.
6. Inoculate small (0.5 cm) pieces of tissue onto the agar plates. Each plate was dated and labeled L for leaf.

The following calculations were used to determine the amount of volume to prepare specific concentrations.

Preparation for 1 mM concentrations

$$(220.3 \text{ g TDZ} / \text{L}) (1\text{L} / 1000 \text{ mL}) (1000 \text{ mL} / 50 \text{ mL}) = (11.00 \text{ mg TDZ} / 50 \text{ mL})$$

$$(186.21 \text{ g NAA} / \text{L}) (1\text{L} / 1000 \text{ mL}) (1000 \text{ mL} / 50 \text{ mL}) = (9.31 \text{ mg NAA} / 50 \text{ mL})$$

Preparation of 0.5% NaOCl solution

$$(50 \text{ mL} / 12.5) = (V_2 / 0.5) = (50 \times 0.5 / 12.5) = 2 \text{ mL of } 12.5\% \text{ NaOCl}$$

solution diluted to 50 mL = 0.5 % NaOCl

$$(V_1 / 50 \text{ mL}) = (0.1 / 100) = (50 \times 0.1 / 100) = 0.05 \text{ mL} = 50 \mu\text{L of } 100\%$$

Tween-20 diluted to 50 mL = 0.1%

M16 & A39 genotypes were used from the greenhouse. M16 was mostly used.

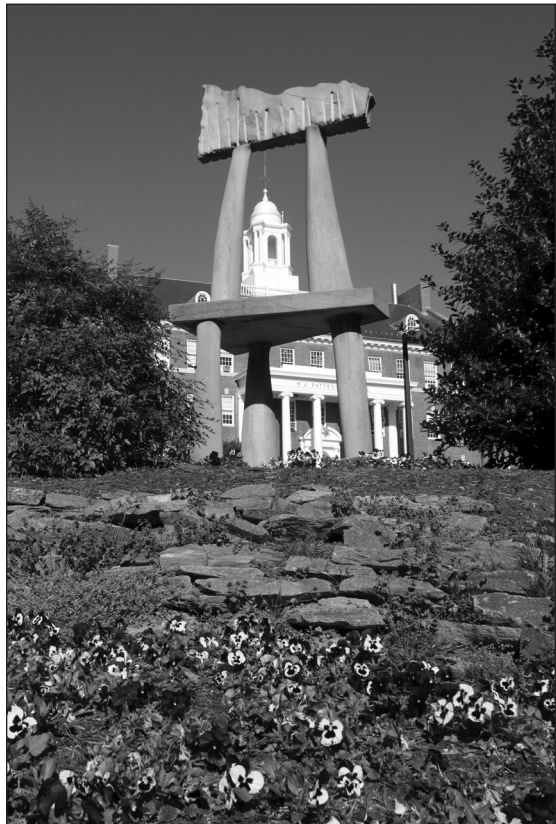
Conclusions

This project resulted in potential development of appropriate methods development for sterile culturing of black cohosh. Final results will aid in *in vitro* culture of this medicinal herb, which will allow liquid suspension sub-culturing for future research projects for this species. The plates with racemes were observed after one week with fungal growth in 12 of 16 plates. An attempt was made to remove the infected area from the plates. After two days, the plates were observed again and still contained exponential fungal growth. The uninfected racemes were transferred to new plates. These plates were labeled R for raceme and with the date they were originally inoculated, along with the date they were transferred. The procedure for inoculation of the racemes was repeated with 1.0% NaOCl solution because of the severity of the infection of the other plates. The plates with leaf tissues showed no infection after 2 days. Insufficient time was available to document formation of callus growth in the plates as it normally requires 3 weeks. The project is ongoing and final results will be obtained by the research group.

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Music of the African Diaspora: The Historical Reception of African American Concert Music

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Abstract

African American concert music (AACM) has made one of the largest contributions to the establishment and development of American music. Black composers (and musicians) of this genre played a vital role in achieving the goals of the Harlem Renaissance, which were racial vindication and “re-representation.” Leaders of the Renaissance believed that African American composers would bring these goals to fruition because composers would remove barriers in education, and they would replace the negative images of Black people with the genuine, positive picture. Today, however, AACM is seldom heard, performed or studied in performances, academia, and in recordings. The lack of knowledge of this genre is a problem because only part of history is being told. This study will use the historical method of inquiry, and it seeks to explore how AACM was initially received and why it is marginalized today. The researcher will locate primary sources that will be analyzed first hand to find meanings and relationships that can provide answers to the research questions.

Introduction

Music of the African Diaspora is one of the most influential and unique styles of music in the world because it combines the racially exploitative experiences of peoples of African descent with the cultures of their enslavers. African American concert music is of particular interest because the experiences of Black culture are being conveyed through the means of European culture. The focus of this study is on the historical reception of African American concert music by both the black community and mainstream America. Through this historical study, the researcher hopes to explore how this genre, which made large contributions to American music, came to prominence in order to find out why this music is in a state of unpopularity and marginalization in today’s world of music.

Problem Statement

When a reference to music by Black composers is made, it is usually assumed that the references are to jazz, gospel, spirituals, and blues (Keith, 2008). The lack of awareness of the large quantity of concert music by Black composers can, according to Keith (2008), be attributed to the lack of “exposure on recordings,

the concert stage, [and/or] the educational musical curricula (2008, 71). The lack of knowledge about African American concert music (AACM) is a problem because as a large contributing force to American music, it should be preserved and practiced to achieve greater insight about American culture. If AACM is not adequately recorded in history, many will think African Americans did not make any important contributions to American music other than those genres in the popular styles (Keith 2008.)

The lack of knowledge about AACM is also, ironically, found in music academia. Sam Perlman's (of Grinnell College) 1989 study concluded that music of Black composers "has been ignored in the schools in the United States" (Wyatt, 1996, 241). The researcher of that study examined the music history books used in various music schools, and he was able to draw a conclusion based on the lack of basic information on black composers found in those books. As stated by Wyatt (1996), the lack of knowledge of AACM in academia is problematic for students and musicians are being limited inside of the "European circle," and are, therefore, not being given the "full story of musics that have played major roles" in contributing to the development of American culture (1996, 240). Consequently, many African American students, in addition to students of other backgrounds, elect not to enroll in traditional music classes because of the Eurocentric curricula (Lundquist & Sims, 1996). If students of a diverse background are not enrolling in music classes, than the "socio-cultural environment is negatively impacted" as institutions are only receiving the talented individuals from one cultural background. In addition, if the socio-cultural environment is negatively impacted, than the nation's overall health and vitality will diminish (ibid).

Studying the reception of concert music may be able to provide solutions for why this music is lesser known today; consequently, the gaps in performances and integration of Black music in academia as well as in the musical world may be ameliorated.

Significance of Inquiry

Researching the initial reception of Black composers and musicians of the classical genre is important because it may be able to provide insight as to why this music is not adequately known today. History is often researched in order to provide information necessary for preventing and resolving future problems. Hence this research may be able to provide information to establish a reconstitution of AACM. Additionally, this study contributes to the history and development of American music. At the 2007 conference that commemorates the founding of the African American Art Song Alliance, several professionals in music conveyed that studying Black concert music is needed to have "a sense of completeness" in telling the American story (Thompson, 2007, 13.) Expansion of music to include Black concert musicians could provide as a role models to students for many of the composers endured hardships as doors did not open even when musicians proved their competency and potential for success (Thompson 2007; Southern, 1983).

Studying AACM is worthy of attention because it not only “represents a body of works that is a part of American music,” but it also requires that educators examine how they present music to students of various backgrounds (Wyatt, 1996, 242). The music of Black composers also has value, which can be demonstrated through the many awards, commissions, prizes, and, at one time, frequent performances of the music. Lastly, it is important to study the history of this genre because the beliefs, ideas, and customs of a society are derived from its history (McDowell, 2002).

Purpose of Inquiry

The purpose of this research is to explore how African American concert music was initially received by both the Black community and mainstream America during the twentieth century. The findings from this exploration will then be used to discover reasons for why AACM is not well known today. Because it may be assumed that AACM is synonymous to traditional European classical music, this proposal will briefly examine what distinguishes AACM from traditional European classical music. Furthermore, this research will show how this genre contributed to the struggle for racial vindication during the early half of the twentieth century. The following questions will be addressed by this inquiry:

1. How was African American concert music historical received:
 - 1a. by the Black community
 - 1b. by mainstream America
2. What accounts for the disparities in African American concert music?

Delimitations, Limitations, and Scope

This research is not about the reception of jazz, blues, spirituals/gospel, or any other form of popular Black music; moreover, this research does not discuss Black composers of these popular genres. Although the time periods may overlap, this study is focuses on the Harlem Renaissance (1917-1940). There will be exceptions to this time frame as many of the composers and artists of Black art music did not start nor stop composing at the exactly when the Harlem Renaissance began or ended. Harlem Renaissance composers and performers of classical art music such as Harry T. Burleigh, Florence Price, Marian Anderson, William Dawson, etc. will be the focus of this research. The aforementioned composers and performers in addition to others were the most important figures as they helped realize goals of the Harlem Renaissance. This time period has been selected because it was the time when African American musicians and composers came to prominence and began creating a unique music. Expected limitations of this study include limiting the amount of African American composers and musicians discussed. The composers and musicians discussed will be confined to those who were most active and influential during the Harlem Renaissance. Even though there are more composers and musicians than those discussed in this research, the musicians chosen are representative of all Black concert composers during this time period.

Review of the Literature

The founders of the Harlem Renaissance felt that African Americans needed a way to ameliorate their image, which had been defiled by minstrelsy and caricature. The derogatory images displayed African Americans as either, lazy, docile, hyper-sexual, animalistic, sensual, or dense (Riggs, 1987). Locke (1925) wanted to move African Americans from the subject of “moral debate and historical controversy” to that of the “New Negro” (1925, 984). Realizing that to progress in America, the image of African Americans needed vindication, the leaders of the Renaissance called for visual, performing, and literary artists to create works that would glorify African Americans and their culture. The Washington Conservatory of music, the first institution created specifically to train Black classical musicians, was also established in seeking vindication, and it made large contributions to achieving this goal (Schmalenberger, 2004)

Racial Vindication

New Image: Nationalism, Elevation, and Imitation In the spirit of vindication and elevation of Black culture, many composers sought African American folk music (spirituals, blues, dance music) for inspiration and material in their compositions (Brown, 1990; Southern, 1983; Ryder, 1990). Literature by African American authors was also used in African American concert composers’ compositions, particularly art songs (Southern, 1983). By elevating Black folk music to higher forms, composers could convey that their heritage, which even was occasionally detested by Black people, was “an art of greater value” (Burgett, 1990, 29; as cited in Southern, 1983, 402). Because African American song and dance was the object of ridicule and parody, especially in minstrel shows, African American composers and musicians shied away at first from utilizing traditional folk music (Locke, 1936). It was not long, however, until this culture was embraced and used innumerable in compositions by African American composers and performed by musicians. Additionally, Locke (1936) believed that this “anemic hybrid” of African American folk music and classical art music must continually be fused together to create a “superior product” (1936, 112-130.) This “superior product” was thought to be the aspect that would usher in racial equality. Moreover, a solidified sense of racial consciousness would be achieved through this “superior product”, and, as a result, Black intellectuals with commonalities in their ideals and sense of purpose would be united (Brown, 1990). It was common thought among Harlem Renaissance thinkers that the myths and claims about African Americans could be obliterated through artistic achievement; moreover, once Black artists were established, “equality would emerge on all fronts” (Moon, 2006; Floyd, 1990, 2). Essentially, Black artists were meant to embody Dubois’ (1903) theory of the “Talented Tenth.” The “Talented Tenth” is the top 10 % of African Americans whose job is to “guide the Mass away from the contamination and death of the Worst” (Dubois, 1903). As such, the composers and musicians would gain a college education produce music that will uplift their race,

and, therefore, guide the masses of African Americans away from racial destruction to racial prosperity.

Southern (1983) identifies Harry T. Burleigh, Robert N. Dett, Florence Price, Clarence White, Harold Brown, Harry Freeman, and William Dawson as the first group of Black nationalistic composers (1983, 266). A nationalistic composer, as Southern (1983) describes, “consciously turn[s] to the folk music of their people” for compositional inspiration (1983, 266.) It was from this genre that Renaissance thinkers’ placed their highest premium; they looked to this genre for the greatest achievements (Floyd, 1990, 12). Thinkers such as Alain Locke, Nathaniel Dett, William Grant Still, Roland Hayes, and James Johnson felt that racial vindication could not be achieved through the, albeit genuinely African American in nature, rural folk and urban popular musics; instead, they believed that setting folk music to classical forms and demonstrating a “mastery...of the modern orchestra” would usher in racial vindication (Spencer, 1997, 22; Burgett, 1990, 30). African American composers, according to composer Nathaniel Dett were expected to voice the soul of their race in addition to the spirit of America (as cited in Ryder, 1990, 58). Burgett (1990) argues that Locke believes the degree of value of a music increases if it can be utilized in music of a higher level (Locke, 1990). Dett (1928) believed that the spirituals will be of little value unless composers set it to sophisticated forms, such as operatic works and concert suites; the spirituals alone, continues Dett, are not suitable for any church service (as cited in Ryder, 1990, 59). Like other nationalistic composers, Dett’s goal was to preserve and uplift Black folk music.

Even though African American composers looked to their folk music for inspiration, they were not the only composers to take this avenue. It is evident that Czech composer Antonin Dvorak was inspired by the African American spirituals (Burgett, 1990). Dvorak, moreover, is noted as the figure who encouraged the development of an “American School” of composers who would utilize the Black folk music in their compositions (Southern, 1997). As racial interactions grew amongst Black and White musicians, characteristics of Black music disseminated into the White musical cultures of the upper classes (Floyd, 1990, 22). George Gerswhin and Paul Whiteman were among those White musicians who often socialized with Black musicians such as W.C. Handy and “Fats” Waller (ibid). While White musicians continued to incorporate African American musical characteristics into their music, many Black composers such as Still felt that these were mere replicas of the real thing (Spencer, 1997). Said Still (Spencer, 1997): “No matter how extravagant the claims made for white imitations, how pleasing they may be as music, or how much similarity there is in their external aspects, they are at best only imitations” (1997, 88). In other words, Still felt that White composers who were believed to have a mastery of Black music did not have this mastery as only an African American composer is capable of producing genuine African American music.

Because Black music contains “something” that is so fundamentally African American in nature, it cannot be created by anyone who is not African American (Spencer, 1997, 88). Wilson (1973) sheds light on what this “something” may be:

“the black composer... is unique because, unlike his white counterpart, his cultural history has been plagued by an exploitive racism...” (Wilson, 1973, 33). Additionally, the music of Black composers lie “deeply embedded in the collective consciousness of [their] people” (Wilson, 1973, 34).

Removing Barriers In addition to elevating the music of African American music, racial vindication could also be achieved through the removal of barriers that existed. By removing these barriers through their successes, musicians were able to convey to mainstream America that, if given the opportunity, they could “sing, play and compose” successfully (Southern, 1983, 400). As previously stated, Floyd (1990) states that it was popular opinion that if Black artists removed barriers within the realm of concert music, than “equality would emerge on all fronts (Floyd, 1990, 2). Black artists aspiring to enter the world of concert music were often faced with racial indignity, even after receiving intense, conservatory caliber training; even though some barriers were removed, there were many others that arose to prevent the progress of Black composers and musicians (Keith, 2008).

Within the realm of concert music, Black vocalists led the way in removing racial barriers as they were met with less discrimination than instrumentalists (Southern, 1983). Many performed repertoire that included art songs by Black concert composers. Roland Hayes and Marian Anderson were among the first vocalists to break through the color barrier. Singer Paul Robeson, found the opportunity of reaching an audience abroad advantageous in speaking about injustices African Americans faced in the Southern United States (Keith 2008, 64; Southern, 1983).

Black concert pianists were not as successful as their counterparts in vocal music, partly because of their inability to acquire sound, professional management (Keith, 2008). However, Black pianists still had some successes; Carl Diton was the first Black pianist to conduct a transcontinental tour of the United States, and Helen Hagan was the first Black pianist to earn a music degree from Yale (Southern, 1983). Additionally, Andre Watts and Nerrine Barrett were able to establish a sustainable income as concert pianists (Keith, 2008). Black instrumentalists, conductors had similar experiences to the pianists (Keith, 2008).

Education Black artists of the Harlem Renaissance, where thought to embody Dubois’ idea of the group of people who would uplift and progress African Americans. Education is a key component to identifying those who belong in the “Talented Tenth” (Dubois, 1903). That said, it cannot go unnoticed that the vast majority, if not all, of prominent Black concert composers attained a higher education degree. Becoming a classical musician is difficult, and many programs that offer opportunities for developing and producing classical musicians are often found in predominantly White institutions (Banks, 2007). Even though Black musicians were barred from the activities of opera companies and symphony orchestras, they were generally able to gain admission into music schools (Southern, 1971). Composers such as Florence Price, Harry Burleigh, and Nathaniel Dett were able to attend conservatories such as New England Conservatory, National Conservatory of Music, and Oberlin Conservatory, respectively. Locke (1936) notes that it is not

by accident that institutions such as the ones listed were the places in which the majority of Black composers and musicians received their training for these were the most liberal institutions (Locke, 1936). It should be understood, however, that these reputable institutions did not admit African Americans solely on the basis of race; Black musicians “received consideration according to their talent, which was often beyond average” (ibid).

This section would not be complete without mentioning the Washington Conservatory of music, established by Harriet Gibbs Marshall. The Washington Conservatory was the first conservatory established and largest institution created specifically to provide classical training and performances to Black people (Schmalenberger, 2004). Marshall’s primary goals of establishing the Conservatory were in line with the Renaissance thinkers even though she built the school years before the movement. Marshall sought the vindication of African Americans’ rights as citizens, and Marshall wanted to prove that African Americans were capable of producing great, serious art. Marshall’s vision was based on the concept of racial uplift, and she designed her program accordingly often modifying the curriculum based on political, social, and cultural upheavals (Schmalenberger, 2004.)

Audience and Reception Perhaps the most perplexing aspect of Black concert music is the audience. To whom were Black concert musicians performing for? This question may be asked because, assuming that reader has a general knowledge of Black popular music and European classical, the reader understands that a certain standard of audience etiquette exists in the two styles of music that comprise AACM. While the audience of European classical music is expected to be a passive spectator, the audience of Black popular music such as jazz or rap is expected to participate in the overall performance. Schmalenberger (2004) states that it should be a surprise that many Black people embraced this music as the high Black intellectual classes supported the idea of racial uplift through culture (2004). In addition, among the Black elite, patronage was a socializing initiative. When the Washington Conservatory was established, it was pronounced proudly in the *Negro Music Journal*, the only journal at the time dedicated to Black music and arts (Schmalenberger, 2004). While the general behavior of Black concert music is similar to its European counterpart, Black composers wanted to appeal to Black audiences in addition to White audiences. Many times, Marian Anderson or Roland Hayes reduced the prices of their tickets, and they sung spirituals to connect with their audience (Southern, 1983). Additionally, Marshall often held free concerts at the Washington Conservatory for members of the local Black community (Schmalenberger, 2004).

Aesthetics

AACM contains “something” that separates it from other styles and genres of music. At the mention of a AACM, one may be compelled to erroneously deem it the same as Euro-Western classical, but with an African American composer. Although AACM utilizes European mediums, it is still Black music nonetheless for it contains many fundamental qualities of Black music. Additionally, the Black composer is bound to bring his or her experiences to their compositions as it

is inseparable (Wilson, 1973). The qualities that separate Black music from other genres are “call-and-response organizational procedures, dominance a percussive approach to music, and off-beat phrasing of melodic accents;” moreover, group participation, poly-rhythms, dance rhythms and its relationship to dance and bodily movement also help create a working definition of Black music (Floyd, 1990, 83, Gates et. al, 2004, 6; Levine, 1977, 6). The ensuing sections will briefly discuss some of the characteristics that distinguish Black concert music from European classical music.

Characteristics of Black Concert Music

Call and Response and Communal Solidarity Probably one of the most distinctive characteristics of Black music is call and response. Call and response is “overriding antiphony” (Levine, [1977] 2007, 6). In other words, it is “an alternation of solo passages and choral refrains or of two different choral passages” (as cited in Farrah, 2007, 20). Several forms of call and response exist: “solo call-group response, solo call-solo response, and group call-group response (Farrah, 2007). For instance, in a solo call-group response, a leader of a church congregation may sing a line of hymn unaccompanied, and then, the congregation will sing a proceeding line to “answer” the leaders line. Call and response is a feature of African American music that resembles the music found in West Africa (Levine, 1977). Call and response creates a collectiveness between the caller and responders as it requires participation from both parties.

Blue Notes and Modal Mixture Blue notes are altered (usually lowered) degrees of a scale, almost always the third, fifth or seventh (Southern, 1997; Farrah, 2007). There has been general disagreement among scholars about what degrees of a scale have to be altered in order for it to be considered a blue note (Farrah, 2007). While scholars such as Gunther Schuller, David Baker, and Jeff Titon may establish their own working definitions of blues scales, it is generally the third, fifth, and seventh degrees that are changed. Like blue notes, modal mixtures contain some ambiguity as they incorporate both major and minor scales (Farrah, 2007). Much of Black music simultaneously incorporates major and minor scales. Furthermore, the pentatonic scale is one of the most prominent scales in Black music (Floyd, 1990). The prevalence of the pentatonic scale can be attributed to its prevalence in the Black spiritual (Stewart, 1998).

Elisions, Rhythm and Syncopation The result of the ending of a musical phrase serving a dual purpose of the ending of one idea and the beginning of the is an elision (Farrah, 2007). In other words, an elision is a beginning and ending of two musical phrases. An “off-beat phrasing of melodic accents” is characteristic of the rhythm found in African American music (Brown, 1990, 83). By “off-beat,” Brown means that the accents, or strong beats, found in African American music are generally on the second and fourth beats, which is different from the accents on the first and third beats found in most musics. This is called syncopation; normal strong beats are deprived of emphasis as normal weak beats are accentuated (Farrah, 2007).

Method of Historical Inquiry

This research will utilize the method historical inquiry. This process involves searching for sources of information, critically evaluating the same, and synthesizing and exposing the results of the research and criticism (Garraghan 1940). McDowell (2002) states that there are a variety of activities that are used by the researcher; these include “selecting, evaluating and interpreting historical evidence, through to communicating these findings” (2002, 11). The historical researcher usually establishes a chronology and then the researcher analyzes and interprets these events in order to formulate some meaning from it. Historical method, in other words, is a body of principles and rules that are designed to aid a researcher in gathering sources of history, critically appraising those sources, and presenting a synthesis of the results. Historical research attempts to, through systematic enquiry, separate truth from fictionalized accounts about the past (McDowell, 2002). The researcher, therefore, will find sources such as original scores, letters, etc., that demonstrate the diversity in the Black community that is often overlooked. Many historians when conducting historical research focus on the lower economic class of African Americans, and thus ignoring the substantial, albeit small, middle and upper classes.

Research Design and Methods

The historical method of inquiry will be used. The researcher will collect textual data from primary sources such as letters, original manuscripts, and newspaper articles. The researcher will then analyze the data and look for relationships and meaning. The historical method of inquiry is used to explore the outcomes of historical events in hopes of finding solutions and preventive measures to the problems of today. Likewise, the researcher will examine the historical events surround African American concert music’s initial reception in order to find solutions for bringing this music to prominence.

Role of the Researcher

The role of the researcher is to be actively engaged in locating primary sources and external evidence. The researcher will seek and gather primary sources. Because this research will use the historical inquiry method, the genuine validity of the primary sources is of paramount importance, therefore, the researcher will also be active in establishing the authenticity of the evidence (Garraghan, 1940). This will be achieved through various methods such as analysis of vocabulary usage and the style of writing (ibid). The researcher will survey a wide range of repertoire, however, it will be at his discretion and judgement as to what musical pieces are representative of the African American concert music genre. In this proposal, the researcher relied on how authors of secondary sources have interpreted the data from primary sources; in conducting the research, however, the researcher will analyze the primary source.

Data Collecting Strategies and Data Sources

As previously stated, the researcher will search and identify primary sources for this research. The researcher will utilize the University of Maryland's Research Port as a starting point in locating sources. The researcher will also request to interview select faculty members from various post-secondary educational institutions, especially those who have experienced African American concert music as part of their upbringing. Furthermore, the research will utilize archives at various universities and academic institutions as they contain a plethora of original documents such as letters and scores. The Library of Congress will also be utilized in gaining access to original documents and periodicals.

Strategies for Data Analysis

In keeping with the historical method, chronology will be used as a basis for analysis of the data. Once a set of occurrences of African American composers' performances, educational achievements, and compositions has been collected, the researcher will then analyze the data in accordance to the historical method. The researcher will identify, if any, the relationships between the time periods and the performances, for instance, or events in the composers life to the style of composition he or she has written. In other words, the researcher will find meaning in the chain of events to explore what may have encouraged the composer to compose a certain way and why would the audience react to it the way they did. Once this is achieved, the findings will then be analyzed in context of the treatment of African American concert music today. A desired outcome will be that the findings of the historical reception of this genre will provide some answers to the relationship the genre has in today's society.

Ethical Considerations

When dealing with faculty members, the researcher will not conduct interviews without informed consent. Furthermore, the researcher will not require that the interviewee submits any information that he or she is not willing to give. The interviewee will have the utmost confidentiality if he or she so chooses. Additionally, the interviewees will be given the opportunity to view the finished research paper before it is finalized, therefore giving them ample opportunity to modify or request omission of their interview.

Findings from the Literature

How was African American concert music historically received by the Black community?

According to the literature, which includes works by Samuel Floyd, Hildred Roach, and Eileen Southern, the Black community embraced the idea of a Black classical music. After decades of degrading images from minstrel shows and caricatures on commercial products, African Americans were likened to the idea

of a cultural art form that elevated their status in America. Nathaniel Dett, who directed one of the earliest concerts of art arrangements of spirituals, felt that it was “gratifying to the black community” to see a director of African descent; moreover, the African Americans in the audience felt that they were “steppin’ on higher ground,” that is to say, their culture and heritage were being moved in the direction of progress (Spencer, 1997). Composers and musicians became “racial symbols” as their successes, which were “vicariously shared” by other members of the black community, became markers of racial progress (Southern, 1983, 400). Marian Anderson broke one of the color barriers as she was the first black artist to sing with the Metropolitan Opera, a major opera company in the United States (ibid). William Grant Still is often referenced in this matter as he was the first African American to have a work premiered by a major symphony orchestra, the first African American to conduct a major symphony orchestra, and the first African American to have a work premiered by a major opera company (Spencer, 1997; Southern, 1983). The firsts of composers and musicians were generally widely reported by black newspapers as these musicians were measures of racial progress (Spencer, 1997). The Black community was often prideful in that these images of themselves were being presented domestically and abroad. In many instances, the Black community provided support for the development of composers and musicians. Marian Anderson, for instance, was encouraged by her family and church to pursue a career in professional music; this is made evident by the large trust established for her, by her church community, to pursue extended vocal music studies (ibid, 402). While the literature for this proposal shows that the black community overwhelmingly supported their black composers and musicians, the researcher will examine how members of the black popular musics such as jazz and blues viewed their art music counterparts. The researcher will also examine black newspapers such as *New York Amsterdam News* and *Negro Music Newspaper* to find firsthand information on how the black community perceived their composers and musicians in the art medium.

How was African American concert music received by mainstream America?

The reactions in mainstream America have significant variations as there were a number of people who approved or disapproved of African American concert music. On the one hand, many White Americans did not embrace the idea of Black art music as they were accustomed to the stereotypes often portrayed in minstrel shows. White audience members of Nathaniel Dett’s 1915 concert were disappointed because they felt the concert was not genuine (Spencer, 1997). These audience members expected to see the spirituals accompanied by “swaying, hand-clapping, and foot-patting” as they have seen in American popular culture (ibid, 39). Thus, one of the problems in mainstream American accepting African American art music was that they were accustomed to the White interpretation of Black life and not the opposite (ibid).

Other reasons exist for the disdain of mainstream American towards African American art music. Racism, of course, played a vital role in shaping much of America’s attitudes towards this genre of music that was aimed at preserving and

elevating Black culture. Many White Americans did not favor those black composers who, instead of composing within the idioms of spirituals and jazz, aspired to higher compositional goals (ibid). Said Southern (1997), “established white impresarios simply were not interested” in black concert artists (1997, 285). Consequently, many black artists were unable to gain good professional management (ibid).

On the other hand, African American concert music was embraced by American society. This is evident through the many organizations that established awards and prizes specifically for black composers and musicians. For example, the Rodman Wanamaker contest was created to perpetuate black composers in the classical tradition as the Harmon Foundation gave awards for both black composers and musicians (Southern, 1983). Fellowships and commissions were awarded to black composers who demonstrated mastery in the classical tradition. William Grant Still received the Guggenheim Fellowship in 1934 and 1938, the Rosenwald Fellowship in 1939-40, a commission from Columbia Broadcasting System in 1936 to, and one in 1939 for the World Music Fair in New York (Spencer, 1997). Many other musicians and composers received fellowships, scholarships, commissions, prizes, and awards in order to foster the genre of AACM.

Conclusions

Based on the preliminary research of African American concert music, several conclusions have been drawn that give insight for why this influential genre has become marginalized within academia and the performance arena. First, this music came to prominence at a time where there were many negative images and stereotypes of Black Americans. Art music of African Americans was used as a tool to achieve racial equality, and it was successful in perpetuating racial progress. Today, however, there has been significant racial progress since the Harlem Renaissance even though racial disparities still exist. The lack of knowledge about art music of African Americans may be attributed to the significant social upheavals and amelioration. Because the conditions for African Americans in the United States have undergone significant changes, the function of African American concert music as an avenue for racial vindication no longer exists. However, that is not to say that the necessity for this music should cease to exist. It is part of American history, and as such, it has contributed to shaping the ideals and beliefs of American society. The function of a music should change as society changes, therefore, African American art music should be used to instill a sense of pride in Black culture. The events of many Black composers and musicians can serve to inspire anyone in this society, and this music should be preserved for it demonstrates the beginnings of American culture. In addition, it gives a better understanding of American culture today.

The reason vocalists were faced with the least discrimination can be attributed to minstrelsy. As minstrel actors mocked and ridiculed African Americans, they often used the prominence of song and dance in Black culture as the object of their mockery. Therefore, it was expected for African Americans to be good singers,

therefore, they were able to gain easier access in the vocal concert music field. However, vocalists were expected to perform the musical selections of the minstrel repertoire, not of the European art songs. Like the instrumentalists, they were not expected to be serious musicians because they were thought to be inferior beings incapable of producing serious art.

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Spatial Analysis of the Environment's Influence on Pediatric Asthma in Baltimore City using a Geographic Information System

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Abstract

The problem being addressed in this proposed study is the tendency of residents living in low-income, inner city, and minority neighborhoods being exposed to poorer air quality than residents living in upper-income, suburban, white neighborhoods. As a result of the poor environmental conditions, poor urban dwellers experience higher rates of respiratory diseases such as asthma in their communities. The purpose of this proposed project is to study the environmental factors that are associated with an increase in pediatric asthma and identify which of these factors can be found in Baltimore communities using a geographic information system. The location of possible sources contributing to high concentrations of asthma occurrences in Baltimore City such as brownfields and major roadways will be examined. In addition, racial and socioeconomic conditions found in Baltimore will be analyzed to see if they can be linked to asthma rates. The proposed project's methodology will consist of an exploratory analysis of the asthma geographic epidemiology in Baltimore. The literature currently states that areas of high urbanization experience more cases of asthma hospitalization than rural areas. Anticipated findings include having a high concentration of asthma occurrences in Baltimore's predominately black, poor, and inner city neighborhoods. Furthermore, these disadvantaged Baltimore neighborhoods will be located right next to sources of environmental pollution.

Problem Statement

The amount of children living in Baltimore city who are hospitalized for asthma "is 2-3 times the national rate" (Kimes et al, 2004, p. 142). Asthma cases found in Maryland are linked excessively to the poor and African-American populations living in Baltimore City (Blistein, 2002; Gupta, 2008; Magzamen, 2007). The problem being addressed in this proposed study is the tendency of residents living in low-income, inner city, and minority neighborhoods being exposed to poorer air quality than residents living in upper-income, suburban, white neighborhoods. As a result of the poor environmental conditions, poor urban dwellers experience higher rates of respiratory diseases such as asthma in their communities. Not much has been done

using geographic tools to visually document the possible environmental sources and reveal the spatial patterns of the respiratory sickness occurrences. Furthermore, little research has been done using spatial analysis to map possible causes of pediatric asthma. Most of the current studies involving spatial analysis of asthma in urban communities document children hospitalizations (Magzamen). Possible sources that are detrimental to respiratory health include exposure to brown fields and major roadways (Kimes; Litt, 2001; Magzamen).

Purpose of Proposed Research and Proposed Research Questions

The purpose of this proposed case study is to examine Baltimore City's environmental affects on pediatric asthma and to document the demographic trends and environmental causes of these asthma hospitalizations found using geographic information systems (GIS). The project will assess whether the asthma and environmental conditions in Baltimore City follow the general trends for other urban areas as stated by the literature by combining possible causes of asthma on a map. The proposed project emphasizes the environment's big impact on community health (Stair, Wooten, Raimi, 2008). For example, if one's environment is not healthy, he or she will be constantly exposed to toxins that will make him or her sick (Diez Roux, 2001). In addition, by focusing on the environmental conditions that are specific to Baltimore City that affect pediatric asthma, it will help shape environmental health policies for the city's particular needs. Giving the aforementioned purpose statement and the nature of the problem, the following questions are proposed:

- What built environmental factors affect rates of pediatric asthma?
- Where are the sources contributing to high concentrations of pediatric asthma occurrences located?
- What populations are affected the most by these built environment factors?

Significance of the Inquiry

Implementing computer applications like GIS to study health problems is a relatively new field (Dearwent, 2004; Khan, 2003; Lai & Mak, 2007). Researching on the environmental conditions in Baltimore City and its affect on pediatric asthma is significant for the following reasons:

- To note the problem area populations and neighborhoods in Baltimore City
- To see how health problems and geographic location can be connected spatially
- To close the gap between urban planning and public health

Summary of Analytic Framework for the Proposed Study

A conceptual framework is a method for displaying data in a graphic form that uses a map to show connections among concepts. Several characteristics make a framework a good theory for quantitative research methods in public health such as

this proposed study. Concept maps help the researcher frame the project and make it easier to find common themes in the literature. Analysis of the data will be easier as thematic patterns are revealed from concept mapping.

The proposed project will be based on Tobler's first law of geography. As used in Dearwent's (p. 27) project, Tobler stated, "everything is related to everything else, but close things are more closely related." The quote is saying that events that occur near each other are somehow connected with each other. The proposal will use this theory to see how the locations of pediatric asthma, brownfields, major roadways, race, and socioeconomic statuses in Baltimore city are associated with each other.

When studying community urban health, several features are commonly observed. Typically, community health studies are also usually centered around one disease. For this project, pediatric asthma rates in Baltimore city will be studied as provided by the Baltimore City Health Department. The framework will be explained in greater detail in an upcoming chapter.

Theory is important to study because it is necessary for a research project to be grounded in previously applied theory. Projects need theory to define a focus and for analysis. Without theory, the legitimacy of a project will be questioned.

Assumptions, Limitations, Delimitations, and Scope of Proposed Study

Assumptions

There are some assumptions to consider when conducting this study. The researcher is going to assume that the populations included in health research are not changing neighborhoods since much research has been done on these neighborhood emigrational patterns and health (Dearwent; Diez Roux). Also, as stated by Magzamen (3), an assumption can be made that "asthma cases are distributed non-randomly throughout a community." The proposed project will attempt to prove that asthma cases do not occur by chance.

Limitations

Several limitations will occur during this research project. In general, there will be a struggle with limited resources. Time will be a limit, as the researcher will only have 5 weeks to complete the proposal. Furthermore, during the upcoming school year when the project will be implemented, the researcher will be limited by the constraints of a full college course load. The data collected during the project will be small. According to Magzamen (9), "analyses of the impact of place on health outcomes frequently rely on observational data.... inference on the impact of environment on health-related outcomes has been somewhat limited". The researcher will use GIS data already provided by demographic organizations such as the U.S. Census and Baltimore City Health Department. Finally, the proposed project is also limited to basic geographic mapping and statistical tools.

Delimitations

There are many factors that the proposed project does not include. The project is not about how the environment affects of diseases other than asthma. Adults that suffer from asthma will not be studied in this proposed project. The proposed project is not about poverty or environmental health conditions in rural communities. The specific environmental conditions plaguing residents of Baltimore County or other areas in Maryland will not be examined. Most importantly, the proposed research project is not about reforming health policy change in Baltimore.

Scope

The boundaries of the proposed research project are constrained to several elements. The project will examine the asthma health conditions of children who live in Baltimore City. Also, the project is focused on the environmental conditions found in Baltimore City that lead to these asthma respiratory health issues such as brown fields and major roadways. Other factors that will be taken into consideration for the analysis are the racial make-up and socioeconomic conditions of Baltimore city. The time that the project will be implemented will be from 2009-2010. For spatial analysis, the geographic information system that will be used is ArcGIS 9.3. The proposed study will use data from the U.S. Census and Baltimore City Health Department to compare the previously stated variables among Baltimore zip codes using maps.

Definition of Terms

The study will use terms unique to the investigation. The following terms are defined to make clear what the researcher is examining:

1. ***Brownfield.*** “An abandoned and under-used commercial and industrial facility with real or perceived contamination.” (Litt, p. ii)
 2. ***Built environment.*** The phrase built environment refers to the man-made surroundings that provide the setting for human activity. The natural environment consists of living and non-living things occurring naturally on Earth. The project will take into considerations the built environment conditions that affect asthma rates in Baltimore City. (Magzamen)
 3. ***Geographic information system.*** A geographic information system (GIS) is a system for storing and manipulating geographical information on computer. It allows users to question, interpret, and visualize data that reveal relationships, patterns, and trends in forms of maps, globes, reports, and charts. For this project, the GIS tool ArcGIS will be used to visually document environmental, socioeconomic, and racial makeup conditions in Baltimore city as it correlates to asthma rates. (ArcGIS)
 4. ***Medical geography.*** Also known as geographic epidemiology. It “describes the study of the geographic distribution of disease.” (Dearwent, p. 29)
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5. **Neighborhood.** “Neighborhoods” (as well as other geographically defined areas) are interdependent and interacting parts within larger wholes health-related differences across neighborhoods may be partly shaped by how neighborhoods relate to each other within the larger city structure...in emphasizing the social attributes of neighborhoods, we should not forget that neighborhoods are fundamentally places that exist in physical space and often differ markedly in environmental, service, and resource characteristics. (Diez Roux)

Analysis and Discussion of the Literature and Presentation of Analytic Framework

Asthma

The full causes of asthma and its increase are not yet fully understood. However, asthma can be described as an “inflammatory” sickness “that arises from deregulation of immune responses toward environmental stimuli. The bronchial tubes in the lungs are inflamed, restricting airflow in the mouth and nose. These episodes are usually associated with widespread but variable airflow obstruction that is often reversible, either spontaneously or with treatment” (Magzamen, p. 24, 25). There are three main parts of asthma: enhanced bronchial activity - “wheezing after exposure to irritants” (Magzamen, p. 27), reversible airflow obstruction, and chronic inflammation of the airways.

In the United States alone, about seven percent of the youth are diagnosed with the chronic illness of asthma. A widespread phenomenon for America’s children, asthma leads to hospitalization, disability, and absence from school. Studies show that low-income and minority children are more commonly found with asthma than other children. In fact, asthma is found more in children living in the city than in rural settings (Magzamen, U.S. Environmental Protection Agency, 2009). The growth of asthma found in children can be linked to “genetic and physiological factors and environmental exposures” (Magzamen, p. 1) from air pollution. Overall, adults are being affected by asthma in higher rates than children. Still, the proposal will focus on asthma found in children. One reason for this focus is that the majority of asthma cases are found in children. In addition, studying pediatric asthma will be more pertinent to this proposal since the environment affects pediatric asthma rates more than it affects adults with asthma (Magzamen, Lit, Dearwent).

About 90 percent of blacks in America live in cities. Youth residing in cities usually receive less adequate treatment for asthma. Studies show that rural children are at lower risk than city children. This leads to urban children, especially African-American children being hospitalized more for asthma related causes than other youth. As a result, black children have more cases of asthma than white children. In addition, Magzamen also states that rates of asthma can be linked to poorer socioeconomic conditions. He stated that living in poor neighborhoods and below poverty levels is associated with higher rates of asthma. This could be contributed to lack of funds for medical assessments and living near high exposures of air pollution.

Both the indoor and outdoor built environment can trigger asthma found in children in urban areas. Poor ventilation is the result of crowded and meager housing conditions in urban neighborhoods, which “can increase exposure to respiratory pathogens” (Magzamen, p. 5). These conditions generate an explosion in asthma activators like mold, dust mites, and tobacco smoke. In addition, studies have shown that cockroaches, rats, and other rodents are linked with aggravating asthma found in urban populations. According to Magzamen, many inner-city families have limited access to financial and informational materials to get rid of the interior asthma triggers.

Furthermore, air pollution surrounding the environment in urban areas are linked with the presence of asthma. Living near roadways and factory plants has been some of sources of environmental causes of asthma for inner-city people. It is assumed that environmental pollutants affect the urban poor and ethnic groups the most (Brimblecombe, 2001; Diez Rou; Kimes; Litt; Magzamen).

Air pollution caused by traffic has also been a concern for many urban communities. The following air pollutants are big worries for people with asthma since they hinder oxygen transfer: Particular matter (PM), sulfur dioxide (SO₂), Ozone (O₃), carbon monoxide (CO), and nitrogen dioxide (NO₂) (Ayres, 2006; Burkhardt, 2002; Morales, 1998). Overall, cities tend to have more levels of air pollution than rural areas because of higher exposure to major road pollution than rural areas. The built environment affects asthma more in urban areas as a result of more infrastructures such as roads and buildings and less vegetation. Unlike vegetation, the infrastructure helps keep environmental pollutants trapped in a city (Kimes; Sorensen, 2006).

Baltimore and Asthma

Baltimore is the largest city in Maryland. The racial composition of Baltimore City population is about 90% Caucasian and African-American when combined (U.S. Census). The amount of children living in Baltimore city who are hospitalized for asthma “is 2-3 times the national rate” (Kimes). Asthma cases found in Maryland are linked excessively to the poor and African-American populations living in Baltimore City (Baltimore City Health Department). As stated earlier, black children have more cases of asthma than white children (Magzamen).

GIS

In epidemiology, spatial analysis is defined as the study of how spatially based health statistics are connected to the way environmental, socioeconomic, and demographic characteristics are spread out geographically. Thus, spatial analysis is an important method for the proposed project in examining the relationship among pediatric asthma, environmental factors, and demographic conditions. An important tool for spatial analysis is called geographic information system (GIS). GIS is a system for storing and manipulating geographical information on computer. It allows users to question, interpret, and visualize data that reveal relationships, patterns, and trends in forms of maps, globes, reports, and charts (Lai, Khan, Magzamen).

GIS has three main uses when it comes to health applications. First, GIS can be used to expose the spread of disease such as asthma visually on a map. Second, these patterns of disease can be used to identify sources of causes of disease. Third, GIS can be used to discover the people who are affected by asthma and its related causes (Magzamen). Overall, GIS tools can be applied to tracking asthma occurrences in neighborhoods and documenting possible causes. For this proposal, it will help reveal the asthma problem areas found in Baltimore City visually on maps.

Strengths, Summary, and Implications of the Literature

Most of the literature went into thorough detail explaining what asthma is and how it affects the body. However, little research has been done that specifically describes that asthma conditions and causes that occur in Baltimore city. Many researchers have also noted how asthma affects certain populations the most. Also, though most of the literature mentions how the built environment affects asthma rates, most of the literature focused on indoor pollutants rather than outdoor pollutants. Finally, though the implantation of GIS to health is relatively new, many studies have extensively covered how the use of GIS can be beneficial to health research.

Overall, the literature states that asthma is a chronic lung disease that inflames the bronchial tubes and impedes breathing. The environment tends to affect children with asthma more than adults. Higher exposure to environmental pollutants leads to higher rates of asthma found in urban, African-American, and poor populations. Finally, the rates of asthma found in Baltimore city are higher than the national average's rates.

The implication for this proposed study is to try to improve public health for all residents in an urban community. The ideal situation would be that all people have access to healthy environments to lower their risk of disease. However, the researcher only advocates for people to live in a city if they know that the neighborhood they live in will be healthy. This is because moving into areas of poverty and destruction will negatively impact one's health greatly.

Presentation and Discussion of the Analytic Framework

The proposed project will be based on Tobler's first law of geography. As used in Dearwent's (p. 27) project, Tobler stated, "everything is related to everything else, but close things are more closely related." The quote is saying that events that occur near each other are somehow connected with each other. The proposal will use this theory to see how the locations of pediatric asthma, brownfields, major roadways, race, and socioeconomic statuses in Baltimore city are associated with each other.

When studying community urban health, several features are commonly observed. Typically, community health studies are also usually centered around one disease. For this project, pediatric asthma rates in Baltimore city will be studied as provided by the Baltimore City Health Department. Like in Magzamen's study,

this proposal will examine environmental, racial, and socioeconomic data in Baltimore city as provided by the U.S. Census. Similar to Litt and Magzamen's studies, environmental conditions that will be looked at are brownfields and major roadways in Baltimore city. Pediatric asthma rates between black and white children in Baltimore city will be compared since these races make-up 90% of the population in Baltimore city (U.S. Census). Also, pediatric asthma locations will be compared with the locations of between the rich and poor in Baltimore City to see if there are possible health disparities. Finally, when studying urban health, the methods of spatial analysis can be used to measure geographic locations of asthma and how it relates to environmental factors in a neighborhood using a geographic information system (Magzamen).

Research Design and Methodology

Purpose of Inquiry and Inquiry Questions

Methods for Collecting and Analyzing the Literature

Data Collection and Data Sources for Future Research

For the proposal, the University of Maryland College Park library's archives and databases will be used to collect data. The following data sources will be examined for analysis for this proposal: dissertations, demographic data, Baltimore City health data, public health journals, city guides, and U.S. Census data.

In the future research project, the following data collection strategies will be used. Diez Roux recommends studies on neighborhood to make use of both old and new data. As Diez Roux suggests, this study will attempt to connect current demographic and geographic data found from the Census to health data conducted by the Baltimore City Health Department. Since the Census does not provide data on specific neighborhoods, zip code boundaries will be used to compare the environmental, socioeconomic, and racial makeup conditions of Baltimore. Graphs will also be used to document the asthma data to decrease the chances of bias that occurs if maps are used (Diez Roux). This study will add something new by providing extended analysis comparing environmental, socioeconomic, and racial makeup in Baltimore city as it relates to pediatric asthma. Spatial analysis will be done to see if there is a correlation between the previous built environmental conditions and asthma occurrences in Baltimore City by overlaying all the previously stated variables on one map.

Data Analysis Strategies

The proposed project will consist of an instrumental explanatory case study methodology of the Baltimore community. For the future project, two possible methods of analysis could be used: spatial autocorrelation cluster analysis and multilevel logistic regression analysis. Spatial autocorrelation cluster analysis will be used to measure the frequency of asthma in Baltimore City. The multilevel logistic regression analysis will be used to measure the affect of the environmental conditions

on community respiratory health in Baltimore (Dearwent). The computer program ArcGIS 9.3 will be used to visually document the occurrences of allergies and asthma and the previously mentioned environmental conditions that cause them on maps.

According to Diez Roux, research done on neighborhood health should implement many types of research methods. For the best analysis, the proposed project will include varied neighborhoods, an upper class and lower class one, as Roux suggests in his study. Given that the proposed project will be quantitative, Roux (1785) suggests that the project “include data on both individuals and the areas in which they live.” In addition to the previously stated environmental conditions, the following demographic data will be included in this study for analysis to link with asthma rates: racial composition and income levels Baltimore city. Diez Roux believes that a mixed methods study comparing neighborhoods in depth would be best. Thus, a qualitative case study with extensive literature review on the specific environmental conditions found in Baltimore city will also be conducted (Berg, 2009).

The proposed study will follow similar procedures taken on by Magzamen who has done a similar epidemiological study. A geographic information system will be used to examine the association among Census population data, geographic locations of pediatric asthma occurrences, and built environmental conditions in Baltimore, MD. The environmental aspects that will be examined include residential proximity to major roads and brownfields linked with causing asthma. Other factors linked with asthma occurrences such as income and race will also be studied in this descriptive exploratory analysis study (Magzamen).

Census tracts and block groups are frequently used in quantitative human population health studies in examining individual and group-level traits because of its set data units. The U.S. Census is a useful tool for this proposal for two reasons. Census tracts provide useful outline boundaries for analysis such as zip codes, roads, highways, and water feature boundaries. Also, the data from the U.S. Census is reliable because it has been collected for many years. “The census tract is a convenient geographic unit on which to base neighborhood measures due to the large amount of administrative data through the decennial census” (Magzamen, p.122). The use of classifying neighborhoods by Census Zip codes or census tracts is a tool highly used when examining health differences in urban communities.

Choropleth maps will be used to visually display the Census data. With choropleth maps, data value ranges are represented by color hues separated by boundary lines. Because of the data made available by the U.S. Census, choropleth mapping is a practical method to use for spatial analysis.

Land use information related to brownfields will be gathered from Litt's study on Baltimore. GIS will be used to combine land use planes with census data borders. Data on roadways will be gathered from the Census. The classification of the roadways used will be limited to major highways. This study will examine if there is a correlation between asthma occurrences in children and proximity

to traffic exhaust from railroads. As stated earlier, pediatric hospitalization, race, socioeconomic levels, and roadways will be the Census attributes studied in this proposal. Like in a previous study, “exposure to traffic exhaust will be determined by residential distance to” (Magzamen, p. 14) railroads using the buffering tool in ArcGIS.

To examine the association between locations of pediatric asthma and socioeconomic conditions, poverty level attributes in Baltimore city from the Census will also be used. “The burden of asthma among black children warrants particular attention” (Magzamen, p. 66, 67). Thus, this proposal will also focus on the disparity of asthma epidemiology between the white and black population in Baltimore City.

An exploratory analysis of the relationship between environmental factors and pediatric asthma occurrences in Baltimore will be conducted using a geographic information system. Furthermore, like in Magzamen’s epidemiological study, the proposed project will utilize a GIS to examine the association between census socioeconomic data and hospitalization of children with asthma data. The objective will be to combine all the previously stated variables with urban pediatric asthma to see if they line up on a map. Like in the Magzamen study, the proposed project will test for the probability of environmental, socioeconomic, and racial influences on asthma rates using generalized estimating equations (GEE). The statistical software that will be used for analysis will be SAS.

Ethical Considerations

There are many ethical considerations that will be considered for the future research project. The researcher will attempt to make sure that the data presented is not misleading or incorrect. Also, the researcher will attempt to make sure that city of Baltimore is not blamed for the pediatric asthma hospitalizations found. Finally, the data reported about the pediatric asthma will remain confidential (Bowling, 2002; Neutens, 2002).

Anticipated Limitations of Research

One of the main limits of the future research will be finding environmental data that links corresponds to Baltimore city specifically. Due to limited time, the researcher will be limited to data already conducted or available on the environmental conditions in Baltimore. Thus, brownfields in Baltimore were chosen as an environmental factor because of the study done by Litt. Also, major roadways in Baltimore such as railroads were chosen as an environmental factor because the U.S. Census already provides this data. Also, since the U.S. Census tends to aggregate data by zip codes, this proposed project will be limited to pediatric and demographic data that is generalized for entire zip codes instead of individualized for neighborhood differences.

Findings, Conclusions, and Recommendations for Future Research

Findings from the Literature

The purpose of the proposed project is to examine and analyze the spatial patterns of pediatric asthma found in Baltimore City. Providing strong background knowledge for the project, the literature review offered a general overview of applying GIS applications to asthma conditions in urban communities. As stated previously, the following questions were proposed to study the relationship between built environment and pediatric asthma:

- What built environment factors affect rates of pediatric asthma?
- Where are the sources contributing to high concentrations of pediatric asthma occurrences located?
- What populations are affected the most by these built environment factors?

Kimes made several conclusions about asthma rates found in Baltimore city and environmental and socioeconomic conditions. He stated that as urbanization increases in an area, the rates of asthma increases because of the increase in built material and decrease in vegetation. Some of this can be linked to the traffic related pollution caused by transportation vehicles on roadways.

As stated by Magzamen, in general, the built environment has an association with asthma found in children living in city neighborhoods. In terms of major roadways, there was a positive correlation with pediatric asthma. Furthermore, Magzamen stated that highways had no correlation with pediatric asthma while living near interstates had a positive correlation. In terms of ethnicity and asthma, “black race was associated with increase odds of asthma” (Magzamen, p. 181). In terms of socioeconomics, the highest rates of poverty were linked with high rates of pediatric asthma hospitalizations. These findings can be contributed to blacks and the poor having less access to health resources.

The overall trend in asthma hospitalizations for the state of Maryland in 2004–2006 tended to be higher in urban areas. As a result, Baltimore City had one of the highest rates of asthma hospitalizations compared to other Maryland districts (Maryland Family Health Administration, 2008). In terms of asthma rates found in Baltimore City, the Baltimore City Data Collaborative and Goddard Space Center organizations provided the answers. According to their studies, the highest rates of pediatric asthma hospitalizations were found in the inner-city zip codes of Baltimore City in 2005. The outer edge zip codes of Baltimore City tended to have fewer rates of asthma hospitalizations. These findings all support the statement that asthma rates tend to be higher in areas of high urbanization.

Conclusions Based on Review of the Literature

Based on the literature, the environment cannot be claimed as the main cause of asthma found in children. However, it can be said that asthma conditions found in urban youth can be highly influenced by the neighborhood conditions that the children live in. The trapped pollutants found in urban environments as a result of increased infrastructure can aggravate the asthma outbreaks found in children. Also, being a minority and a person of lower class will also increase a child's chance of being diagnosed with asthma because of their tendency to live in impoverished areas. However, as studies show, in Baltimore, "the way that people distribute themselves in Baltimore City is highly correlated to race, socioeconomic, and urban characteristics." Thus, it only makes sense that certain populations will have higher rates of asthma as they live in areas that have high exposures of toxins.

Furthermore, though this study focuses on pediatric asthma in Baltimore, findings from this proposed project can be helpful to many city neighborhoods. The project can encourage local health officials to work with urban planners to improve communities for residents of all races and economic backgrounds. As a result, everyone would live in neighborhoods that would not make him or her sick.

Recommendations for Future Research

For future research, more needs to be done to discover other possible sources of pediatric asthma by the built environment in Baltimore City. The researcher would like to look into proximity to abandoned housing, industrial factories, and gas stations to see if those environmental factors can be linked with asthma. Also, a project needs to be implemented to locate the locations of these sources and put them on maps for more detailed spatial analysis. The researcher would also like to possibly keep track of asthmatic children who move out of sick urban environments to see if their asthma conditions improve by living in healthier communities.

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Improving Disadvantaged Adolescents' Critical Reading Skills Using Direct Instruction

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Abstract

The problem addressed in this research proposal is that students who are minority come from families with low socioeconomic status and attend urban-area high schools have a higher possibility of not developing critical reading skills that will help them succeed both in college and in prestigious careers. These students are more likely to fail because they often lack the support and resources that will increase their chances of academic success. Direct Instruction is a teaching method devised to close the achievement gap between disadvantaged and privileged students. This approach may help improve the critical reading skills of disadvantaged students. However, little empirical research exists on the use of Direct Instruction to improve such skills. The purpose of this proposed qualitative case study will be to determine how Direct Instruction can improve the critical reading skills of disadvantaged students. The study will consist of semi-structured interviews of four high school English teachers who work primarily with disadvantaged students at an urban-area high school. The study will involve examining the current practices used by high school English teachers who have improved the critical reading skills of their disadvantaged students. The study will also involve determining whether their practices align with components of Direct Instruction.

Introduction

Readers who look below the surface, who can apply a little inference, will come up with quite a complex story compared to the few short words on the page... That's the kind of reader we want to help our students become: readers who can move beyond the literal and who can interpret the text. (Gallagher, 2004, p.6)

An objective that high school English teachers should strive to achieve is to teach their students to become critical readers: readers who can infer, analyze, predict, synthesize, and use any other higher-order thinking with different kinds and mediums of texts. Such critical reading skills are not limited to the scrutiny of literature, but are also essential in questioning different beliefs, laws, and theories. People in fields associated with health, science, government, and business implement critical reading skills to better previously accepted views and enhance technology. Certainly, one must first develop their critical reading skills before using them in

specific careers fields. Students further develop and apply their analytical skills to a specific field while in college. Yet, many colleges expect incoming students to have acquired critical reading skills in high school, and unfortunately, many high school teachers do not teach their students these skills (Mendelman, 2007).

Although the lack of critical reading skills learned in high school puts all students at risk of not doing well in college, students who are minority, come from a family with low socioeconomic status, and attend an urban-area high school are more at risk. These adolescents, otherwise noted as disadvantaged students, are more prone to failure because of poor social (Dunham & Wilson, 2007). Compared to their more privileged counterparts, who typically enter school well prepared by their highly literate parents (Koziuff, LaNunziata, Cowardin, & Bessellieu, 2000), disadvantaged students often lack the social and educational support that will increase their chances of success (Alexander, Entwisle, & Horsey, 1997). Some teachers contribute to the problem by overlooking the needs of disadvantaged students and not engaging them in class lessons, which leads these adolescents to fall behind in learning (Alexander et al). Evidently, there is an achievement gap between disadvantaged and privileged students.

A teaching approach designed to decrease this unequal achievement distribution is the Direct Instruction model. Research shows that Direct Instruction is effective in improving the reading and reading comprehension skills of elementary school students (Gersten & Carnine, 1986) and middle-school students (Grossen, 2004). Teachers who use this model can help close the achievement gap between their disadvantaged students and students who attend more prestigious institutions, because Direct Instruction assists to accelerate the learning process.

Unfortunately, little empirical research is available on the effects or use of Direct Instruction on critical reading. Hence, the proposed study intends to look at the components of Direct Instruction that can contribute to the improvement of disadvantaged students' critical reading.

Problem Statement

As previously mentioned, the problem addressed in this research proposal is that students who are minority, come from families with low socioeconomic status, and attend urban-area high schools have a higher possibility of not developing critical reading skills that will help them succeed both in college and in prestigious careers. These students are more likely to fail, because they often lack the support and resources that will increase their chances of academic success. Since Direct Instruction was devised to close the achievement gap between disadvantaged and privileged students, this approach may help improve the critical reading skills of disadvantaged students. However, little empirical research exists on the use of Direct Instruction to improve such skills. Looking at how Direct Instruction can improve critical reading will highlight key elements that educators should consider implementing in their teaching practices.

Purpose of Research and Research Question

The purpose of this proposed qualitative case study will be to determine how Direct Instruction can improve critical reading skills for disadvantaged students. The study will involve examining the current practices used by high school English teachers who have improved the critical reading skills of their disadvantaged students. By assessing teachers' practices, the researcher can determine the methods that align with components of Direct Instruction. This study will add to research on Direct Instruction as well as the knowledge on instructional methods for teaching critical reading.

Given the nature of the research, the study will be guided by the following governing question: What components of Direct Instruction align with current teaching practices used to improve disadvantaged students' critical reading skills?

Significance of the Topic

The topic addressed in this study is significant since adolescent literacy has been and continues to be an issue in the United States. According to an article by Fritz, Cooner, and Stevenson (2009), reading levels have not improved at all from 1971 to 2004. Concerning critical reading, many U.S. high schools do not teach such higher-order thinking skills in the classroom (Mendelman, 2007). This helps explain why high school students often read at "surface-level" and tend to give up if they do not understand the task (Bosley, 2008). Since disadvantaged students receive less social and educational support compared to students who come from more privileged, educated families, they are more likely to fail (Dunham & Wilson, 2007). With an achievement gap between disadvantaged and privileged students, issues of not teaching critical reading in high school only augments the academic problem for disadvantaged students, lowering the possibility for them to succeed.

To help close the achievement gap and provide a way for disadvantaged students to develop critical reading skills, the proposed research project will examine how to apply Direct Instruction to teaching critical reading. The study will involve interviewing high school English teachers to gain a better understanding of current practices that have worked successfully in improving disadvantaged students' critical reading skills. By becoming knowledgeable about these practices, the researcher can determine the components of Direct Instruction that correspond with current practices.

Summary of Conceptual Framework

A conceptual framework is "an idea or concept [that] is presented in the context of a broader body of knowledge to help clarify, explain, and expand understanding of the concept being presented" (Spencer, 1988). For this proposed study, the concept is *Direct Instruction*.

As previously stated, Direct Instruction was designed to help close the achievement gap between disadvantaged and privileged students by accelerating the learning process for disadvantaged students. Watkins and Slocum (2003) note that “Direct Instruction programs enable students to learn more in less time for the very reason that they are not learning isolated, unrelated bits of information by rote, but are learning strategies that can be broadly applied across numerous examples, problems, and situations” (p.77). This program is also designed for learning success, meaning, that struggling students will not be left behind (Grossen, 2004). Teachers using Direct Instruction use a systematic approach where students develop skills in layers (Koziuff et al, 2000). After students learn one skill, the teacher then takes a step further by teaching a more difficult skill or by applying the skill to a more challenging problem. By initially using a teacher-directed approach and then gradually moving to independent activities, teachers are helping students master the skills taught (Gersten & Carnine, 1986).

Research states that Direct Instruction can be used for all education (Koziuff et al, 2000). Concerning literacy, research also shows that Direct Instruction is effective for teaching reading and reading comprehension to elementary school students and for teaching middle- and high-school students in remedial courses. This study will serve as empirical evidence that either supports or challenges the idea Direct Instruction can be applied to any content. The proposed study looks at components of Direct Instruction and sees whether these components align with current practices used by teachers to improve the critical reading skills of disadvantaged students.

Assumption, Delimitations, and Scope

Assumption

While several studies show the effective use of Direct Instruction in many subjects in education and in various age groups, not all subjects have empirical evidence supporting the use of this model. Hence, an assumption that the proposed study will test is that Direct Instruction can be used for all education. As stated above, research has examined the use of Direct Instruction in primary schools and remedial courses in middle and high schools. Little empirical research is available on the use of Direct Instruction for improving critical reading in a regular high school classroom that mainly consists of disadvantaged students. The proposed study will examine this specific issue.

Delimitations

The proposed study does not look at the use of Direct Instruction in a remedial high school setting, in a private high school setting, nor in a home-school setting. The study will also not confirm whether Direct Instruction is ineffective for teaching critical reading.

Scope

The proposed study looks at the current practices used by high school English teachers who have improved their disadvantaged students' critical reading skills. By looking at the current practices, the researcher can then see which practices align with components of Direct Instruction. Hence, the study focuses on how teachers can use Direct Instruction to improve critical reading and not whether it is effective or not. The study will compose of conducting semi-structured interviews of four high school English teacher. The teachers work in urban-area high schools that mainly consist of poor, minority students. The interviews will be based on the way the teachers instruct their regular English classes.

Review of the Literature and Presentation of Conceptual Framework

This literature review serves as context for using Direct Instruction to improve critical reading. The chapter first discusses the drop out problem in high schools and leads to the problem with critical reading. The review then discusses reasons why disadvantaged students are at a greater risk of not succeeding academically. Lastly, the literature discusses components of Direct Instruction, which will be used to analyze the teaching practices found in the literature.

Failure in High School

“The public schools are supplying a work force, one fourth of which have dropped out of school and another quarter that graduate but can barely read their own diplomas.” (Hargis, 1997, p.5)

Hargis addresses a critical issue in the U.S. educational system—many students are not learning. While education reformists hope for a time when all U.S students can have an equal opportunity to succeed academically, the nation has yet to reach that day. The U.S Census Bureau (2007) notes that each year, nearly half a million students drop out of school. While this may be true, statistics show that some students are more likely to fail than others are. The majority of students who are dropping out are those labeled as disadvantaged. McNeal (1999) indicates that during the 1990s, over two- and- a half times as many students who came from poor families dropped out of school than the number of students who did not come from poor families. Dunham and Wilson (2007) showed that whites and Asians have a lower dropout rate compared to Blacks and Hispanics.

Critical Reading in High School

High school teachers should not only strive to graduate their students, but graduate well-educated students who are skilled enough to continue their education in college, qualifying them for more high-paying, prestigious careers. The above quote addresses this issue by noting that many graduates are incompetent and ill-prepared for postsecondary education. Lewin (2005) notes that 65% of the nation's

twelfth graders read below grade level. With such a high percent of twelfth grade students reading below expectancy, it is clear that many educators are not doing their job, which lowers the chances for students to do well in college. Skills that teachers usually fail to develop in their students yet help bring about success in college are critical reading skills. Hall and Piazza (2008) notes that students are more likely to accept what is written in a text than challenge it or look for implicit messages. If students lack the skill to analyze and challenge texts in the classroom, how will they be able to question and challenge the status quo or contribute to enhancing or improving society? Additionally, many colleges actually expect incoming students to have developed these skills in high school (Bosley, 2008). Unfortunately, disadvantaged students who do not develop critical reading skills in high school are more at risk of not succeeding in college compared to those who are more privileged.

Disadvantaged Students

This is the case since disadvantaged students often lack the support that privileged student get from their families, communities, and schools. One reason for this is that privileged students have higher levels of social capital than disadvantaged students (Dunham & Wilson, 2007). Social capital refers to the effort and time that parents put in to interact with their children, while also building ties that will better their children's opportunities in society (Portes, 1998). Dunham and Wilson showed that African- American students have the lowest level of social capital followed by Hispanic students. Asian students had a higher level of social capital compared to whites. These levels of social capital reveal that African-American and Hispanic parents are not putting in as much time to interact with their children compared to the more privileged white and Asian parents. Pinkerton and Dolan (2007) indicate that family serves as a strong source for social support and that the core of this support comes from the parents. Social support is essential during adolescence because it is a period where a young person experiences physical, emotional, and social changes. Since minority-raced parents are not providing as much social support for their children, their children are less equipped for school and are more likely to struggle academically.

Moreover, the structure of learning in the classroom and the teachers' preconceptions add to the problems of disadvantaged students. Angerame (2008) states that the middle-class white culture dominates school systems. This puts minority and low-class students in an inferior position. The structure of learning is geared for those who come from privileged backgrounds where they are better prepared for school and receive more support from their family. This supports why disadvantaged students are less engaged in school and struggle more in their classes. Teachers' biases about the success of students promote disadvantaged students' disengagement. Denti and Guerin (2004) state that some teachers overlook struggling students. If teachers leave struggling students behind, students may feel less motivated to participate. According to Boyd (2007), resistant students can behave the way they do, because

they are bored or alienated. If these students feel that they affect their school culture, then they will be more likely to engage in school.

Components of Direct Instruction

Direct instruction was created to close the achievement gap between disadvantaged and privileged students. This is possible because students learn general strategies that are applicable to a variety of situations and problems (Watkins & Slocum, 2003). Components of Direct Instruction that contribute to improving students' skills are as follows: grouping students based on skill level; explicit, step-by-step strategy or modeling; student mastery of each step in the process; strategy (or process) correction for student errors; gradual fading from teacher-directed activities toward independent work; and adequate, systematic practice using examples (Carnine, Kameenui, & Woolfson, 1982; Gersten & Carnine, 1986; Koziuff et al., 2000; Watkins & Slocum).

Grouping students based on skill level. Teachers who use a comprehensive Direct Instruction model group student based on skill level. Koziuff et al (2002) state that this allows the teacher to easily monitor students while it also allows teachers to provide help to those who need it more. As Watkins and Slocum state, "The principle that guides grouping in Direct Instruction is that each student should receive instruction that is appropriate to his or her individual needs" (p. 86). By giving students the appropriate amount of attention, no student is left behind.

Explicit, step-by-step strategy or modeling. Using a direct, systematic approach to teach is a fundamental part of Direct Instruction. Gersten and Carnine (1986) indicate that teachers directly instruct students using a step-by-step approach to explain thinking processes. This allows students to have a systematic solution to solving problems and can help them correct errors immediately. This step-by-step approach also makes teaching more analytical and precise. Koziuff et al states that teachers first explicitly teach a strategy to allow students to "internalize the presented cognitive strategy." Evidently, using an explicit, step-by-step approach helps students to use a higher level of thinking. In situations where a teacher cannot breakdown a strategy into steps, modeling is also effective.

Student mastery of each step in the process. Another key component of Direct Instruction is that students master the skills taught. Teachers expect students to be able to perform skills successfully by themselves. For students to master skills, teachers must monitor students' learning closely to make certain that students understand concepts, rules, strategies, and routines (Koziuff et al., 2000). Teachers must also feel responsible for the success and failure of their students. They must believe that all students are "teachable." This is way of thinking will lead teachers to engage all students in learning.

Strategy (or process) correction for student errors. Teachers using a comprehensive Direct Instruction method correct students directly and immediately (Koziuff et al., 2000). By doing so, students clearly understand the mistake made and will not make the same error in the future.

Gradual fading from teacher-directed activities toward independent work. The fading from teacher-directed activities toward independent activities is essential in Direct Instruction. The process allows students to not only understand the material, but also master it. During this process, the teacher continually assesses his or her students' progress and based on the progress, makes a decision on the amount of guidance the students need (Gersten & Carnine, 1986).

Adequate, systematic practice using examples. After providing direct instruction, teachers have students practice the skills using many examples. Similar to how the teacher has students build skills based on difficulty level, the teacher also uses simple examples initially and then moves to more complex examples (Koziuff et al, 2000). By building on the complexity of the examples, teachers can assure that students will eventually master the skills taught.

Summary and Implications

In summary, several components of Direct Instruction enable disadvantaged students to master skills taught in class and motivate them to succeed. Yet, the components discussed are part of a comprehensive Direct Instruction method, meaning that teachers employ all methods in their classroom. This may not be necessary for improving the critical reading skills of disadvantaged students. Likewise, the components discussed were found in articles that talked about improving the reading skills of primary school students, students in remedial courses, and other subjects like mathematics, history, and science. The proposed study will show which components are necessary to implement in a regular high school classroom consisting of mainly disadvantaged students.

Research Design and Methodology

Literature Sources

Literature on Direct Instruction and reading instruction served as guides to compose this research. Journal articles, textbooks, empirical studies, and web pages were the primary sources used to gather information. Literature on Direct Instruction was used to gain a better understanding on how Direct Instruction has been used and why it is considered effective. Carnine et al. (1982) is one source on Direct Instruction that helped with this research by disclosing information about components of Direct Instruction. Gersten and Carnine (1986) addressed the use of Direct Instruction to improve reading comprehension. Koziuff et al (2000) provided an overview of Direct Instruction, and Watkins and Slocum (2003) exhaustively described components of Direct Instruction. Literature on reading instruction was used to gain an understanding of the different teaching practices used for improving students' literacy. This set of literature was used in the analysis for the findings, considering that the objective for the proposed study is to determine the components of Direct Instruction that align with current teaching practices. Douglass and Guthrie (2008), McLaughlin & Allen (2002), and Mendelman (2007) served as sources that discussed teaching strategies that improve literacy.

Methods for Analyzing the Literature

Coding and thematic analysis were used to determine the components of Direct Instruction that align with the teaching practices explained in the literature. Coding is “the process of identifying different segments of the data that describe related phenomena and labeling these parts using broad category names” (Lodico, Spaulding, & Voegtler, 2006, p.305). With coding, the researcher can examine reading instructions that other authors have proved to be effective in high school English classrooms. It also allows the researcher to label practices in the instruction based on a broader category. After this step, the researcher analyzed the codes into themes. Themes “identify the major concepts or issues that researchers will use to interpret and explain the data” (Lodico, Spaulding, & Voegtler, p.307). At this stage in the analysis, the researcher grouped the codes into broader concepts and then compared the concepts to components of Direct Instruction. Using these methods, the researcher was able to distinguish which components of Direct Instruction have teachers used to improve students’ literacy skills.

Role of the Researcher

The researcher is an undergraduate student majoring in English and Secondary Education. Through the McNair program, she has become acquainted with qualitative research. However, she does not have experience conducting interviews for research. Therefore, she will receive assistance from a professor. The professor will check the researchers’ interview questions for relevancy and accuracy.

Since the study is based on the views of the participants, interaction between the researcher and the participants is essential. It is imperative that the teachers feel comfortable disclosing their teaching practices to the researcher, so the researcher will visit the high school prior to the interviews to become acquainted with the teachers. The researcher will be responsible for explaining the purpose of the interviews to the teachers.

Moreover, the researcher is responsible for recording and transcribing the interviews verbatim. She will then analyze the transcripts using coding and thematic analysis.

Data Collection Strategies and Data Sources

As a qualitative case study design, this study will use semi-structured interviews to explore the teaching practices used by high school English teachers. The reason for choosing a semi-structured interview format is to make certain that the teachers’ responses are relevant to the research question, yet are expressed naturally and casually. Semi-structured interviews will allow the teachers to feel more relaxed and less reserved, leading them to give genuine responses. Additionally, this format will allow teachers to address issues that are relevant to the research, but the researcher overlooked in the initial set up of the study.

The interview questions are as follows but are subject to change:

- What is critical reading?
- How do you teach critical reading in the classroom?
- How do you think teaching critical reading to disadvantaged students differ from teaching critical reading to more privileged students?
- What strategies or practices have you found to be effective in improving the critical reading skills of your students?

Participants

As stated above, the semi-structured interviews will be of four high school English teachers. These teachers work in an urban-area high school located in the poorer part of the city. The majority of the students attending the high school are minority, come from a poor family, and live in poor neighborhoods. Essentially, the larger population of students is disadvantaged. The high school chosen must have met or exceeded the state Reading standards, which would be shown in the results of the state's standardized tests.

The English teachers chosen for the interviews will have at least five years of experience teaching in an urban-area high school that serves mainly disadvantaged students. The reason the teachers interviewed must be experienced is that they are more knowledgeable about effective teaching strategies. These teachers can use their personal experiences to validate the effectiveness of certain practices, while new teachers are less likely to be able to do this.

Data Analysis Strategies

After conducting the interviews, the researcher will transcribe the interview recordings and use coding and thematic analysis to study the transcripts. Transcribing the teachers' responses will make the analysis process easier since the data will be observable. Similar to analyzing the literature, coding and thematic analysis will enable the researcher to see common strategies that are consistent with Direct Instruction practices.

Strategies for Minimizing Bias and Error

To minimize bias, the researcher will transcribe the interviews verbatim. This will allow the researcher to analyze the responses based on observable data that directly matches the teachers' responses. The professor overshadowing the researcher's study will also listen to the interview recordings to assure that the interview transcripts and the analysis drawn from the transcripts are accurate.

Additionally, the researcher will use *member checks* to check that her perspective of the interviews is in line with the teachers. A member check consists of the researcher sending the transcribed interview or summary to the participants for review (Lodico, Spaulding, & Voegtle, 2006). The teachers will be able to add comments or make corrections to the transcripts. By allowing the teachers to review

the transcripts, the researcher is ensuring that she is clearly conveying the ideas and views of the teachers. This will lead to a more accurate analysis of the data.

Ethical Considerations

The researcher will have the teachers sign a form that explains the ethical considerations for the study. The researcher will not use nor disclose names in the write-up of the study. Teachers used in the study will be selected, yet they will not be forced to carry out the interview. Teachers are also able to stop the interviews at their discretion with no penalty.

Anticipated Limitations of Future Research

A limitation of the proposed study is that there is a limited amount of transferability. All the teachers interviewed will be from one high school, which decreases the accuracy of the data, since the practices used at the chosen high school may not be as effective for high schools in other areas. The small sample size also contributes to low transferability. Interviewing more than four teachers would make the data more accurate.

Another limitation is that teachers may answer the interview questions in a manner that is not genuine, but based on what they believe is most desirable by the researcher. However, to avoid this issue, the researcher will not disclose the entire purpose of the study to the teachers. The teachers will not know that their practices will be aligned with components of Direct Instruction.

Findings, Conclusions, and Recommendations for Future Research

Findings from the Literature Related to the Proposed Research Questions

As mentioned previously, the proposed research question is what components of Direct Instruction align with current teaching practices used to improve disadvantaged students' critical reading skills? The literature did not disclose practices used specifically for disadvantaged students and critical reading. However, the literature did show various reading instruction methods that aligned with components of Direct Instruction.

Douglass and Guthrie (2008) discussed using a mastery goal structure. This involves scaffolding skills, which means to build skills by starting with understanding easier skills and then moving to skills that are more complex. Before assigning students tasks, the teacher provides a rubric of performances ranked from low levels of competence to high levels of competence. The teacher helps students attain higher levels by discussing the skills needed to do well on a certain task. The teacher then models the skills and allows students to practice them. While practicing, the teacher provides feedback on the students' progress while also allowing students to help each other. The entire class sees and discusses work samples that show the

completed assignment. Discussing work samples conveys to students the idea that mastering all skills taught in the classroom, including those that most challenging is possible.

Mendelman (2007) describes an instruction method that the author has used to improve critical thinking in her classroom. In the article, Mendelman states,

In my ninth-grade classroom... I began [class] by drawing a dividing line on the whiteboard and asked students to do the same in their notes. On one side, I wrote, "Images"; on the other "concepts." Images, I explained, are objects-- things that can be felt and seen; concepts are intangible, abstract ideas that are usually associated with one or more images....After roughly a month and a half of image-concept discussion, I introduced the next step in the critical thinking process: moving from verbal analysis to written analysis. Again, as with the categories, I gave the class a specific framework within which to work....On that first batch of in-class essays, the thesis statements and their accompanying arguments were a bit forced, but by the end of the year, following roughly the same format, the evidence of critical thinking was phenomenal. (p. 301-302)

Mendelman explicitly instructed her students on tasks and then allowed students to practice completing the task successfully. She also expanded on other literary techniques that were previously taught as a way to enhance students' skills. This shows that she uses skill building to help students be able to carry out tasks that are more difficult.

The teaching practice discussed in McLaughlin & Allen (2002) is a three-stage guided comprehension model. It involves progressing from explicit, teacher-directed practices to independent practice. The first stage involves teacher-directed activities where the teacher explains the strategy and demonstrates the strategy. The teacher then guides students while they practice the strategy, have the students apply the strategy, and then have the class reflect on the strategy by thinking about how they can use the strategy on their own. The second stage of the model uses a teacher-guided approach which involves the class dividing into small groups and applying the strategy learned either in groups, pairs, or individually. The final stage uses a teacher-facilitated approach where the teacher teaches to the whole group again, but the focus now is to reflect on what was learned and to set new goals.

Conclusions Based on Analysis of the Literature

The teaching practices discussed in the literature showed four components of Direct Instruction: explicit, step-by-step strategy or modeling; student mastery of each step in the process; gradual fading from teacher-directed activities toward independent work; and adequate, systematic practice using examples.

The mastery goal structure described in Douglass and Guthrie (2008) involved teaching students to mastery by explicitly teaching skills in a step-by-step format and then allowing students to practice the skills. This teaching strategy also aligned

with the Direct Instruction component where there is a gradual fading from teacher-directed activities toward independent work. This is the case since teachers first model the skills necessary to do well on specific tasks and then allow students to work on the skill, providing help only when needed.

The teaching approach described in Mendelman (2007) also involves many Direct Instruction components. Mendelman used explicit instruction when explaining the difference between “concepts” and “images.” She also used a step-by-step strategy by moving from an easier skill, such as verbal analysis, to a more difficult skill, such as written analysis. She showed that she implements the practice component of Direct Instruction by having students write in-class essays throughout the school.

McLaughlin & Allen (2002) showed the use of all four components in the three-stage guided comprehension model. As stated in the literature, the emphasis of this model is to move from teacher-directed practices to independent practices, which is clearly a component of Direct Instruction. Teachers using this method explicitly instruct their students on a skill, another component of Direct Instruction, and then allow students to practice the skill. Teachers also use a step-by-step approach to teaching skills by having students learn skills and then make new goals that build on their previous goals. Since students must meet the objective of their goals before moving on to new goals, student mastery also plays into this three-stage model. The model involves grouping students, but the literature does not clarify whether students are grouped based on skill level. Hence, no connections can be made to the grouping component of Direct Instruction.

While four Direct Instruction components are apparent in reading instructions discussed in the literature, the literature does not disclose whether these practices were used for disadvantaged students and whether these instruction methods were used specifically for teaching critical reading. Since these issues are not discussed in the literature, gaps still exist.

To improve the critical reading skills of disadvantaged students, educators need to be aware of effective teaching practices. By incorporating the foundations of Direct Instruction to improve disadvantaged students’ critical reading skills, educators may be able to serve the needs of students more.

Recommendations for Future Research

For future research, observations should be conducted and work samples should be collected. Observations will serve as supplemental data that will show the practices used by English teachers. The researcher will need to observe teachers over an extended period to see how students react to the different teaching practices. Future studies can also include collecting students’ work samples to document improvement over time. Collecting this data will supplement the data drawn from the state testing results that students are improving their critical reading skills. Further research on improving critical reading will lead to more solutions that can help end the crisis that is taking place in the education system.

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The Use of 2-Bornanethiol for the Asymmetric Synthesis of Amines

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Abstract

The proposal to synthesize a camphor sulfinamide reagent using 2-bornanethiol was initiated. A novel disulfide for the synthesis of the reagent was produced through inexpensive means via three synthetic steps. Readily available (+)-camphor underwent thionation using phosphorous pentasulfide in excess. The resulting thiocamphor was reduced to camphor thiol (or 2-bornanethiol) and oxidized to yield camphor disulfide. Further investigation of the disulfide is necessary for confirmation and characterization. Oxidation followed by reaction of the purified sample of this product with ammonia and lithium amide could give camphor sulfinamide. It was determined that purification at the end of each step would help to give better results and cleaner NMR spectra to analyze. Limitations included difficulty with keeping reactions under dry conditions as well as large amounts of time required to run each reaction. From here, the purified disulfide will be used to synthesize camphor sulfinamide which could then be combined with chiral aldehydes and ketones to yield imines in high selectivity.

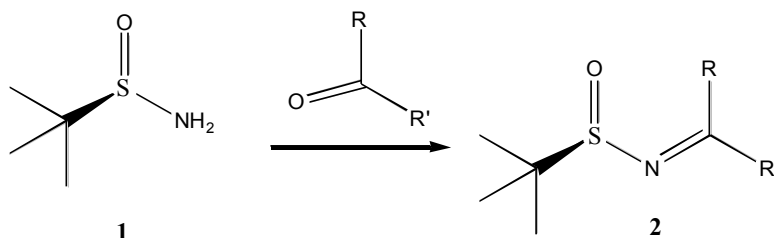
Introduction

Many pharmaceuticals, drug candidates, natural products, and synthetic materials involve amine functionality (Ellman, Owens, and Tang, 2002). It is extremely important that these compounds contain chiral amines that are enantiomerically pure (Yang, Chen, Lee, Peng, Jian Mi, and Jong, 1994). The interaction between one chiral compound and another can be important in things like activity of drug (Procter, 1996). A chiral compound can have two enantiomers (configurations), one of which may be active in the body, the other which may not. That is, the stereochemistry (or orientation) of a chiral system can have a profound effect on the magnitude of the biological response (Procter, 1996). For this reason, methods that give better control (high selectivity) over the configuration of a chiral compound are significant for the synthesis of pharmaceuticals. Resolution of racemic mixtures of enantiomers is one current method for preparing enantiomerically pure chiral amines. However, there are large disadvantages of low yields (due to the loss of half of the unnecessary isomer) as well as the time and resources required to perform such a purification (Ellman et al., 2002).

Hence, the development of efficient methods for the asymmetric synthesis of amines is significant. The amine reagent tert-butanesulfinamide **1** is nucleophilic

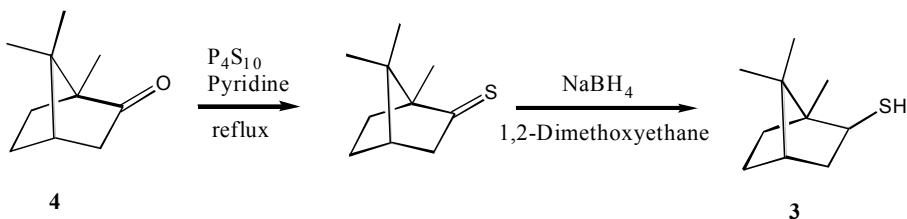
enough for direct condensation with ketones and aldehydes to form tert-butanesulfinyl imines **2** in high yields as seen in Figure 1 (Weix and Ellman, 2003). The addition of nucleophiles to sulfinyl imines produces an array of chiral amines in high stereoselectivity including α -branched and α,α -dibranched amines, α - and β -amino acids, tertiary carbinamines, α -trifluoromethyl amines, and 1,2-amino alcohols (Weix and Ellman, 2003).

Figure 1



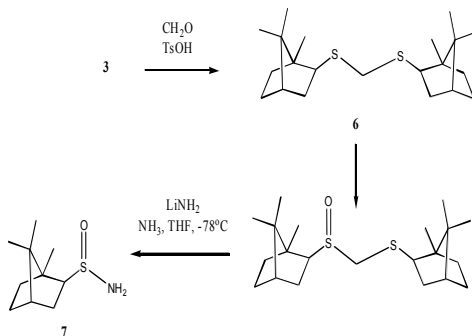
Direct condensation of tert-butanesulfinamide with aldehydes and ketones yield tert-butanesulfinyl imines in high selectivity (Ellman et al., 2002).

This research proposal utilizes the efficiency and stereoselectivity of reagent **1** in the synthesis of chiral amines and alters the substituent on sulfur to one that is chiral. The modified reagent will be condensed with a ketone/aldehyde that contains a chiral center. The effect of the novel substituent on the stereochemistry of the chiral center (of the ketone) will then be investigated. There has been no successful work performed on the reaction of sulfinamides with chiral ketones and aldehydes as of yet. The chiral sulfide chosen for this proposal is 2-bornanethiol **3**, a derivative of camphor (Figure 2). Camphor (both in the (+) and (-) form) is a readily available starting material for the synthesis of enantiomerically pure compounds (Wolfgang, 1990). Chiral bornyl derivatives have been found to induce strong stereocontrol in many asymmetric reactions (Bonner and Thornton, 1991). Enantiomerically pure camphor thiol **3** can be made from commercially available (+)-camphor **4** (Figure 2) for the synthesis of this new reagent (Zaidi and Gunjial, 2007).

Figure 2

The synthesis of camphor thiol from (+)-camphor (Zaidi and Gunjial, 2007).

In general, the new camphor sulfinamide reagent (Figure 3) must first be synthesized and then used in the reaction with an aldehyde and ketone each containing a chiral center. The effect of the chirality of the reagent on the configuration of the final product (an aldimine and ketimine) will then be analyzed. All of this work, if successful, will contribute to a new method in which the orientation of imines can be controlled to yield enantiomerically pure products. These imines can then be reacted with nucleophiles to produce a variety of asymmetrical amines that are significant to the production of many pharmaceuticals.

Figure 3

Proposed camphor sulfinamide reagent.

The research questions that will be attempted to be answered are as follows: Which methods are most successful for the synthesis of the camphor sulfinamide reagent? Can the reagent be synthesized? Will the chiral camphor substituent have any effect on the absolute rotation of the amine? What analytical techniques will determine the percent major enantiomer achieved? What methods will give the highest yields as well as enantiomeric excess? Will the orientation of the amine occur due to the chirality of the substituent or its steric hindrance? How can we tell?

The synthesis of asymmetric amines is well-studied. The methods developed using the reagent *tert*-butanesulfinamide as well as those involving camphor-derived auxiliaries have produced chiral amines in high yields and stereoselectivities, which is very important to pharmaceutical industries. This proposed research aims to enhance prior achievements in the synthesis of chiral amines. If successful, an inexpensive scheme for the production of amines (with high yields and stereoselectivity) containing two chiral carbon centers could be developed for further use. From these efficiently produced amines, an array of pharmaceuticals could be produced. Less money that must be put into synthesizing drugs means less money charged for them.

The research will follow a simple analytical framework that includes multiple steps for the overall (intended) synthesis as well as the numerous analytical techniques to be performed at each of these steps. The ultimate goal of the project is to produce two different imines in high selectivity, but the first priority is to ensure that the camphor sulfinamide reagent is produced in high yields. If the proposed synthesis of the reagent is not successful, the conditions will be altered or a new method may be attempted altogether. The second part of the framework is the reaction of the reagent with the aldehyde and ketone to produce two imines. The results at each step are analyzed to determine whether the process must begin again in order to repair the methods used (if the product is not what was desired). It will then be determined by a reliable method the absolute rotation of the imines produced, the percent enantiomeric excess, and the percent yield of each imine product.

This research will not be looking very deeply into the six-membered transition state which forms when using the *tert*-butanesulfinamide reagent (Ellman et al., 2002). Although the knowledge about this transition state may be used to explain or understand the resulting configurations of prepared imines and amines, no attempts will be made to view this transition state. In addition, this paper will not explore the use of the synthesized imines to produce the variety of amines stated above. The purpose of this research is to determine whether the camphor sulfinamide reagent can be synthesized and if it can then be used to produce imines in higher selectivity than what has already been achieved by the Ellman group. If this research is successful, further research can be performed to produce various amines using these imines. The final delimitation of this research project is the identification and investigation of specific drugs and natural products that could be produced from the methods developed. Knowledge of the synthesis of pharmaceuticals is not great enough to determine what types of drug candidates could be prepared from the proposed reagent. In general, the reagent is only a compound that can be used by pharmaceutical industries to produce drugs and natural products more efficiently, inexpensively and in higher selectivity.

Definitions related to the main topics covered in the paper will be stated for a better understanding of the paper. An amine is a molecule containing a nitrogen group such as $-\text{NH}_2$, $-\text{NHR}$, or NR_2 bonded to an alkyl or aryl group. An imine is a nitrogen containing group double bonded to an alkyl chain. The term

chirality refers to a geometric property or spatial arrangement of a molecule. A chiral molecule is non-superposable on its mirror image and is in fact a completely different substance from a molecule with the same structure and atoms but a different spatial arrangement of the atoms. Enantiomers are stereoisomers (differing in their arrangement in space) that are related as an object and its nonsuperimposable mirror image. In order for a substance to be optically active, it must be chiral and contain one enantiomer in excess of the other. Enantiomeric excess is the difference between the percentage of the major enantiomer present in a mixture and the percentage of its mirror image (the other enantiomer). A racemic mixture contains equal amounts of enantiomers and is not optically active. A sample which contains all molecules of the same enantiomer is optically pure as well as enantiomerically pure. The sequence rules (or the Cahn-Ingold-Prelog system) are used to specify the absolute configuration at the chirality center of a molecule. The configuration of a chirality center can be identified as the R or S configuration. Asymmetric synthesis is the stereoselective synthesis of chiral compounds. A stereoselective reaction is one in which a single starting material can form two or more differing products (which are stereoisomers), but forms one in excess of the others (Carey, 2006).

Nuclear magnetic resonance (NMR) spectroscopy is a method used to determine the structure of an organic molecule based on the molecular environment on the energy needed to excite a nucleus from a low to high energy spin state. The chemical shift of a nucleus is the dependence of its resonance position on its molecular environment. Chemical shifts of protons in a molecule can be different and show the structure of the molecule. Infrared absorption (IR) spectroscopy is an analytical technique that measures the energy absorbed by a molecule as it vibrates through stretching and bending bonds. Most often, the technique is used to identify important functional groups in a sample. A resolution of a substance is the separation of two enantiomers in a racemic mixture. The reflux of a mixture is defined by heating a stirring mixture with a water condenser attached above. A nucleophile is an atom or ion with an unshared electron pair which is used to bond or “attack” a carbon atom. Steric hindrance is an effect on structure or reactivity of a molecule to due to repulsive forces or “bulkiness” (Carey, 2006). This section can be referenced when reading the paper in order to clarify basic topics involved in the research presented.

The second chapter of this paper contains a review and analysis of the literature related to the research proposal and the presentation of the analytic framework. The literature review will cover information on the work performed on the asymmetric synthesis of amines using tert-butanefinamide. The review will also discuss the literature found on using camphor-derived auxiliaries for the synthesis of amines. The strengths, limitations, and implications of the literature will then be discussed. The third chapter contains an outline of how the research will be done. It also states the data needed to be collected, the strategies for analyzing this data, ways in which bias and error will be minimized, ethical considerations and the limitations of the study.

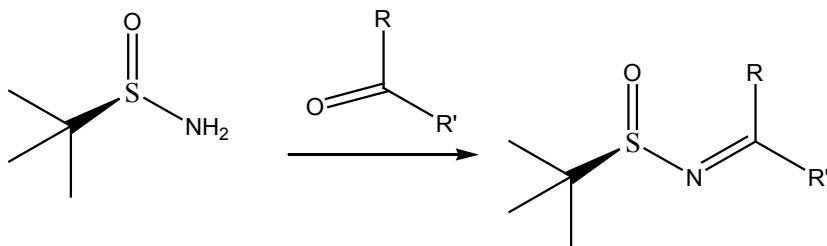
Analysis and Discussion of the Literature and Presentation of Analytic Framework

The following sections review the literature on the use of tert-butanesulfinamide as well as chiral auxiliaries for the asymmetric synthesis of amines. The first few sections discuss the synthesis and applications of the tert-butanesulfinamide reagent. The last section covers the literature on the synthesis of amines using a camphor-derived sulfide compound.

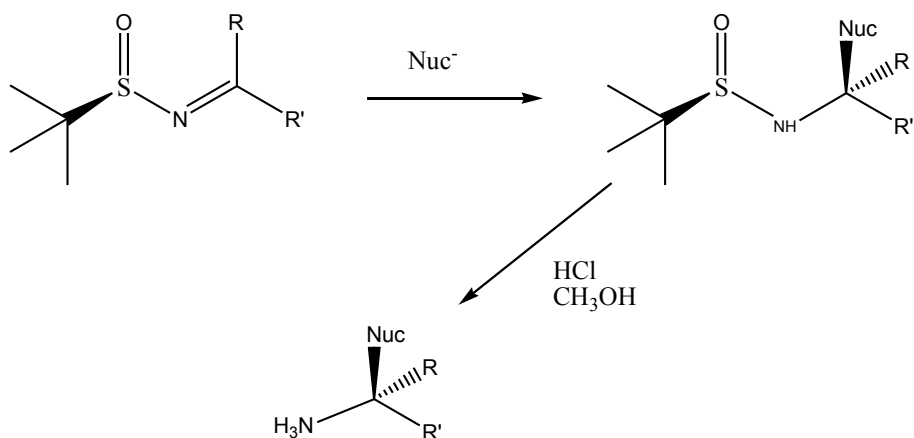
Tert-butanesulfinamide: Properties and Synthesis

The amine reagent tert-butanesulfinamide is nucleophilic enough for direct condensation with ketones and aldehydes to form tert-butanesulfinyl imines (Figure 1) in high yields (Ellman et al., 2002). The sulfur atom in tert-butanesulfinamide is a chiral center because although there appears to be only three different groups around the atom, there are indeed four. The sulfur atom has six valence electrons signifying that in addition to the four visible bonds to the atom, there is also a lone pair of electrons around it. These electrons act as the unique fourth group bonded to the sulfur. The reagent activates imines to the addition of nucleophiles and directs such additions to give great selectivity through significant steric hindrance (Weix and Ellman, 2003). The electronegativity of the tert-butanesulfinyl group compared to other substituent options helps to minimize the competition for nucleophilic attack at the sulfur atom (Ellman et al., 2002). Another important property of these imines is that they are stable and isolable unlike common aldimines and ketimines (Dragoli, Burdett, and Ellman, 2001). The addition of nucleophiles to sulfinyl imines produces an array of chiral amines in high stereoselectivity (Figure 2) including α -branched and α, α -dibranched amines, α - and β -amino acids, α -trifluoromethyl amines, and 1,2-amino alcohols (Weix and Ellman, 2003).

Figure 1



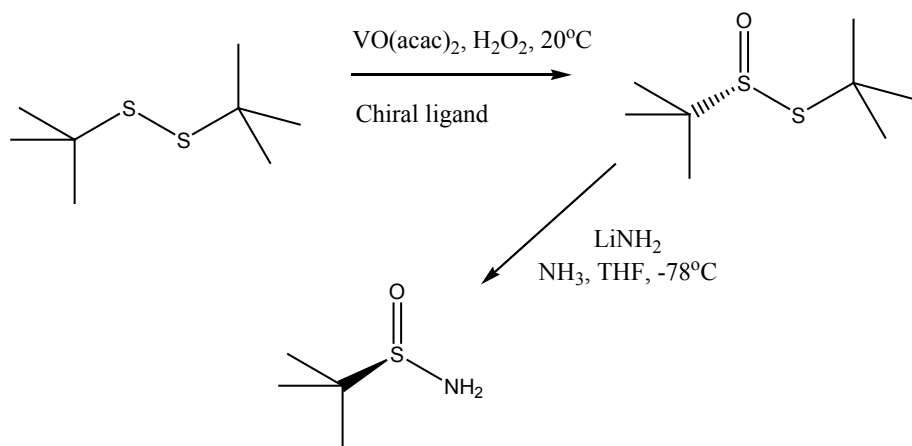
Direct condensation of tert-butanesulfinamide yields tert-butanesulfinyl imines (Ellman et al., 2002).

Figure 2

Various nucleophiles can be added to tert-butanesulfinyl imines, giving chiral amines in high yields and high stereoselectivity (Liu, Cogan, Owens, Tang, and Ellman, 1999).

The synthesis of tert-butanesulfinamide occurs in two steps. The starting material is tert-butane disulfide which is commercially available (as it is a by-product of petroleum) and inexpensive. It is first asymmetrically oxidized to give tert-butaneethiosulfate and then reacted with an amide anion (LiNH_2) as seen in Figure 4 (Weix and Ellman, 2003). The oxidation step results in good conversion and high enantiomeric excess when hydrogen peroxide (also inexpensive), $\text{VO}(\text{acac})_2$ and a chiral ligand are used. The reaction can be carried out in air, allowing for it to be done in any standard laboratory. The two antipodes of the ligand are accessible which allows either enantiomer of the tert-butaneethiosulfate to be produced (Ellman et al., 2002). Improvements were made on this method to allow for large scale production. This homogeneous oxidation procedure is efficient and can be performed at high concentrations. The step in which tert-butane disulfide is oxidized to the thiosulfinate ester was found to be where improvements were necessary to facilitate large scale production of tert-butanesulfinamide.

The starting material for this new synthesis remained to be tert-butane disulfide and was asymmetrically oxidized as before. However, changes were made to this step including the replacement of the original ligand used with one that would be more inexpensive and easily produced from commercially available starting materials (Weix and Ellman, 2003). Controlled addition of hydrogen peroxide to the reaction and a shift in the solvent from acetonitrile to acetone resulted in high conversion and stereoselectivity in the product provided by the new ligand (Weix and Ellman, 2003). With this new method, tert-butanesulfinamide can be synthesized with tolerance of concentration changes as well as independence from the scale being used (Weix and Ellman, 2003).

Figure 3

The synthesis of tert-butanesulfonamide involves the oxidation of tert-butane disulfide followed by the addition of an amide ion (Ellman et al., 2002).

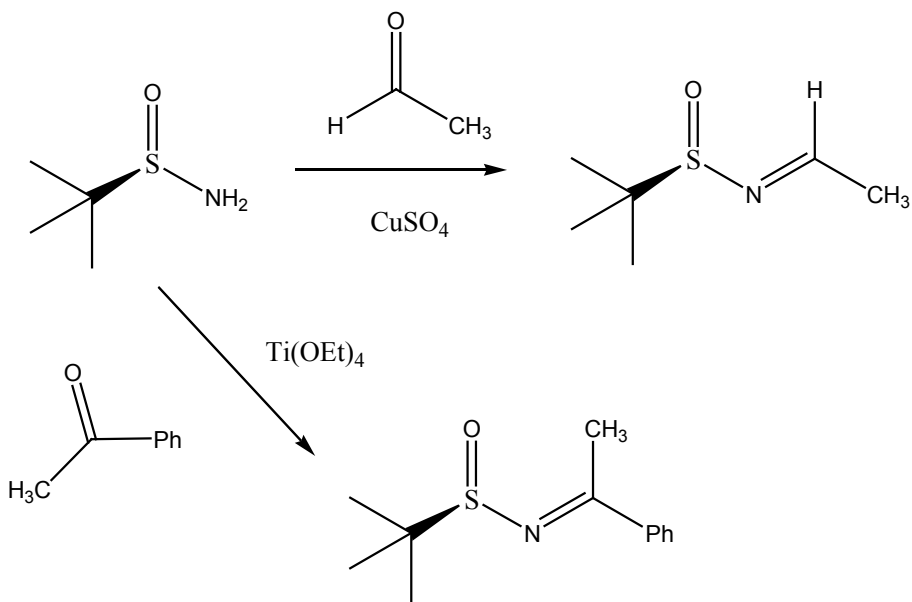
One method of using tert-butanesulfonamide as an intermediate in the asymmetric production of amines is synthesizing a support-bound tert-butanesulfonamide derivative which is then implemented as a linker for asymmetric synthesis of enantioenriched amines. The support or “tether” is an all-carbon structure. The support-bound derivative is capable of undergoing organometallic addition as well as acidic cleavage. The starting material is a tertiary alcohol which is chlorinated in hydrochloric acid (HCl). The following one-pot sequence entails the addition of a Grignard reagent to sulfur dioxide and chlorination with thionyl chloride to give sulfinyl chloride. Resolution of the sulfinyl chloride converts it to the enantiopure sulfonamide which is covered in the following topic (Dragoli et al., 2001).

General Applications of tert-Butanesulfonamide

The preparation of aldimines and ketimines is quite simple. The condensation of an aldehyde with tert-butanesulfonamide using copper sulfate as a Lewis acid yields aldimines. Similarly, ketimines are produced from the condensation of ketones with tert-butanesulfonamide, but $\text{Ti}(\text{OEt})_4$ is used as a Lewis acid instead (Figure 4) [Liu et al., 1999]. Many aldimines can be prepared in this way, even using aldehydes which are sterically hindered, electronically deactivated, or unreactive. However, the more acidic $\text{Ti}(\text{OEt})_4$ is usually used for the reaction of tert-butanesulfonamide with an unreactive aldehyde (Liu et al., 1999). Unreactive ketones can also be used in the preparation of ketimines by this method (Ellman et al., 2002). This is not only due to the fact that nitrogen is more electronegative than the sulfur atom to which it is attached, but also because the oxygen atom (which is even more electronegative than nitrogen) in the sulfinyl group pulls electrons away from the sulfur atom.

In result, the difference between the electronegativities of nitrogen and sulfur is quite large, causing the nitrogen of tert-butanesulfonamide to be very reactive. It is an important detail to note that if the ketone differs at its two α -positions, only the E-imine will form (Ellman et al., 2002). Even for ketones with less difference in steric demand between the two groups of the ketone than the example below, the ratio of the E-imine to the Z-imine is still quite large (Liu et al., 1999). As seen in Figure 5, the Z-imine (if formed) contains too much steric hindrance between the larger group on the asymmetrical ketone and the sulfinyl group.

Figure 4



Synthesis of ketimines and aldimines from the condensation of ketones and aldehydes (respectively) with tert-butanesulfonamide. Asymmetrical ketones will only form the E-imine (Liu et al., 1999).

The method by which α -branched amines can be produced involves the addition of Grignard reagents to sulfinyl aldimines (Figure 5). These aldimines can be aromatic while the Grignard reagents can be alkyl, aryl or vinyl. Studies show that a six-membered transition state occurs (Figure 6) where the magnesium of the Grignard reagent coordinates to the sulfinyl oxygen (Ellman et al., 2002). The alkyl group attached the magnesium atom then attacks where the smaller alkyl group (the hydrogen atom) is oriented. In a chair conformation of this six-membered transition state, the smaller alkyl group of the sulfinyl imine is in the axial position because it is more stable for the large alkyl group is be in the equatorial position. Hence, when the new alkyl group adds to the imine, it is in the “axial” position in relation to the other alkyl group (or “up” while the large alkyl group is oriented

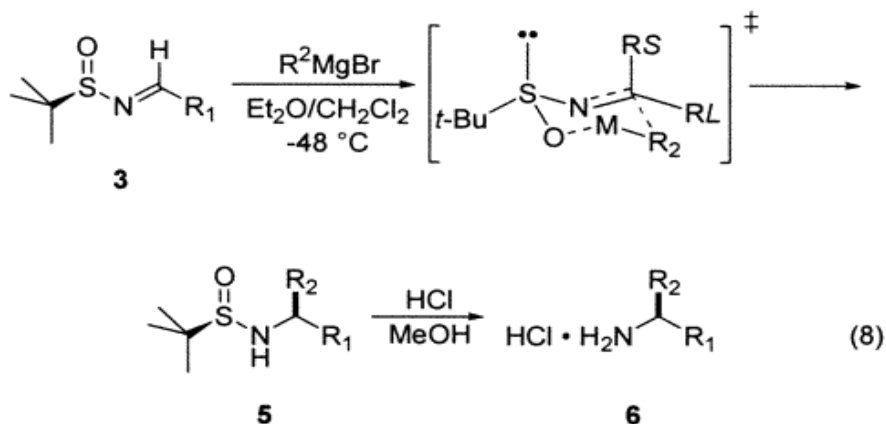
“down”). This method works best when the solvent is noncoordinating. Using HCl, the sulfinyl group is removed from sulfinamide to give an amine hydrochloride. The enantiomerically pure product results from the crystallization of the salt of the amine hydrochloride (Liu, Cogan, and Ellman, 1997).

Figure 5

entry	Sulfinamide		Amide			
	R1	R2	yield (%) ^b	dr (%) ^c	yield (%) ^b	configuration
1	Et	Me	96	93:07:00	97	S
2	Et	i-Pr	97	92:08:00	92	R
3	Et	Ph	100	96:04:00	90	R
4	i-Pr	Me	99	98:02:00	97	S
5	i-Pr	Et	100	97:03:00	93 (85) ^d	S
6	i-Pr	Ph	98	89:11:00	91 (76) ^d	R
7	Ph	Me	96	97:03:00	88	S
8	Ph	Et	98	92:08:00	94	S
9	Ph	i-Pr	29	97:03:00		

Addition of Grignard reagents to tert-butanefulfinyl aldimines. R1 represents the alkyl group attached to the aldimine while R2 is the alkyl group from the Grignard reagent. The amide is achieved through treatment of the sulfinamide with HCl in MeOH (Liu et al., 1997).

Figure 6



The addition of a Grignard Reagent to tert-butanesulfinyl aldimine goes through a 6-membered transition state before the sulfinyl group is removed from the sulfonamide (Ellman et al., 2002).

Tertiary carbinamines can be synthesized through the 1,2-addition of organolithium reagents to tert-butanesulfinyl ketimines which is an efficient and direct method (Figure 7). Better yields and higher diastereoselectivities result from the precomplexation of the ketimines with Me_3Al . Alkyl and aryl lithium reagents can be added to aromatic and nonaromatic ketimines. A six-membered transition state occurs similar to that of the synthesis of α -branched amines (Ellman et al., 2002).

Figure 7

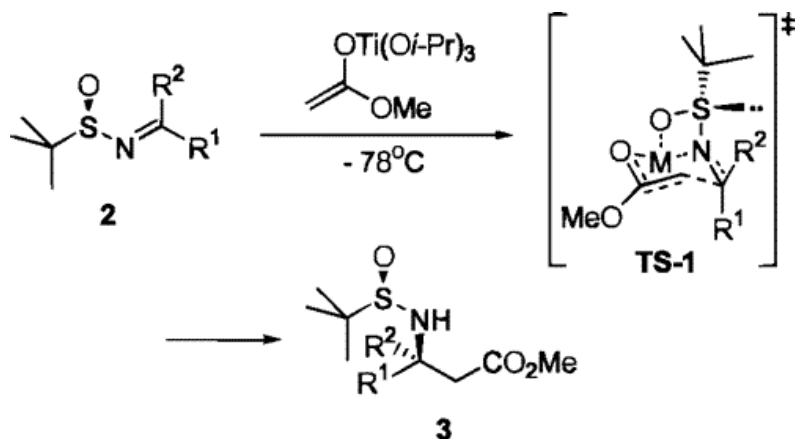
entry	R1	R2	R3Li	yield (%)	dr
1	Me	i-Pr	Bu	61	99:01:00
2	Me	i-Pr	Ph	93	97:03:00
3	Bu	i-Pr	Me	82	91:09:00
4	Bu	i-Pr	Ph	82	91:09:00
5	Me	Ph	Bu	86	98:02:00
6	Me	Bu	Ph	93	89:11:00
7	Me	i-Bu	Ph	62	85:15:00
8	Me	2-Npth	Ph	62	99:01:00
9	Bu	Ph	Me	quant.	99:01:00

Synthesis of tertiary carbinamines from the 1,2-addition of organolithium reagents (R3Li) to tert-butanefulfinyl ketimines which are characterized in the columns labeled R1 and R2 (Ellman et al., 2002).

The use of tert-butanefulfinamide as an intermediate in amine synthesis also allows for the production of highly substituted β -amino acids, something that was not possible by existing methods up until a few years ago. Before the introduction of tert-butanefulfinamide, one method for the synthesis of β -amino acids was the Mannich-type reaction of α -alkoxy enolates with aldimines (Kobayashi, Ishitani, and Ueno, 1998). Even earlier methods include the hydroboration/oxidation of allylic amines (Burgess, Liu, and Pal, 1993). Highly substituted β -amino acids are significant due to their structural properties as well as their role in therapeutic agents and natural products (Tang and Ellman, 1999). In this method, varying enolates can be added to tert-butanefulfinyl aldimines and ketimines to produce an assortment of substituted amino acids. Just as in the synthesis of α -branched amines, a six-membered transition state (Figure 8) was found to occur (Tang and Ellman, 1999). As seen in Figure 8, the titanium of the enolate coordinates to the sulfinyl oxygen placing the alkene part of the enolate in the plane of the chair structure and the methoxy (from the enolate) and the alkyl groups (from the ketimine/aldimine) either axial or equatorial to the chair structure. This transition state dictates the orientation of these groups in the product to give high stereoselectivity. Titanium enolates are added to tert-butanefulfinyl aldimines and ketimines to give highly substituted β -amino acids. The addition of acetate enolates to sulfinyl aldimines and

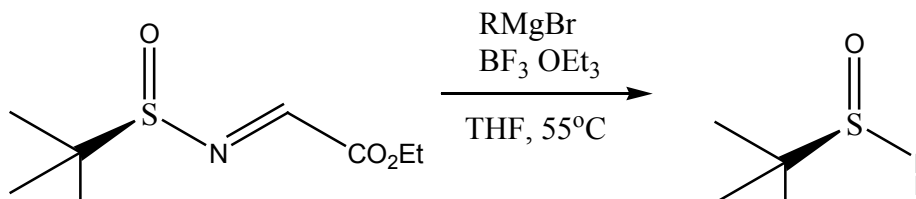
ketimines yields β -substituted amino acid derivatives and β,β -substituted β -amino acid derivatives respectively. The same can be done with α -substituted enolates to provide α,α -disubstituted and α,β,β -trisubstituted β -amino acids. Even more interesting is the fact that α,α -disubstituted enolates can be used to produce high yields of α,α,β -trisubstituted and $\alpha,\alpha,\beta,\beta$ -tetra substituted β -amino acids (Ellman et al., 2002).

Figure 8

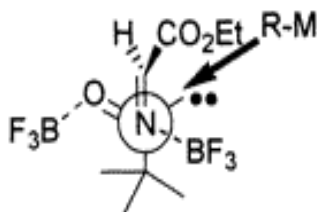


The addition of varying enolates such as a titanium enolate to aldimines and ketimes yield highly substituted β -amino acids. More substituted acids result from a more substituted enolate. A six-membered transition state occurs as well (Tang and Ellman, 1999).

The method developed for the synthesis of α -amino acids involves the addition of Grignard and dialkylzinc reagents to N-tertbutanesulfinyl imino esters. Two equivalents of $\text{BF}_3 \cdot \text{OEt}_2$ are added to activate the imine for the addition of the Grignard reagent (Figure 9). The reaction of Et_2AlCN with tert-butanesulfinyl ketimines yields α,α -disubstituted α -amino acids. The synthesis of these compounds is extremely important given the fact that they have significant effects on the conformation of the molecules in which they are involved (Bonner & Thornton, 1991). In the intermediate species for this reaction (Figure 10), the BF_3 molecules coordinate to the oxygen and the sulfinyl group and the ester group on the alkene are oriented forward while the hydrogen atom is oriented back. The alkyl group then attacks at the back where the least amount of steric hindrance is found (the tert-butyl group is also oriented forward in the molecule), giving the stereoselectivity seen in the product of Figure 9 (Liu et al., 1999).

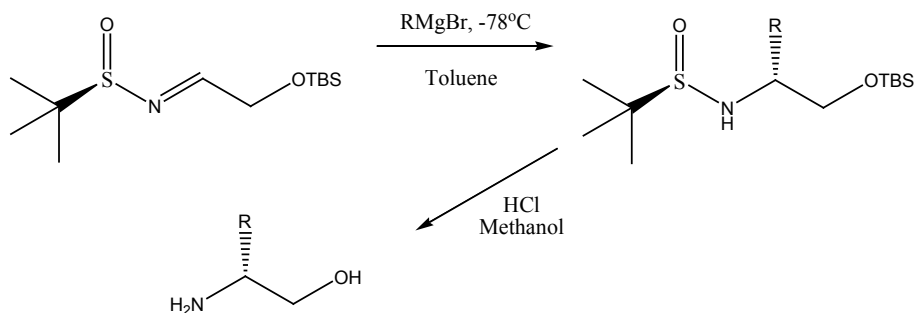
Figure 9

The addition of Grignard reagents to *N*-tertbutanesulfinyl imino esters yields varying α -amino acids (Ellman et al., 2002).

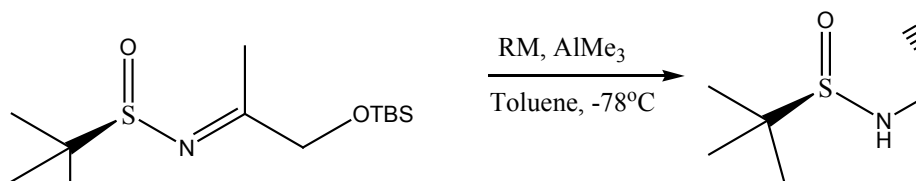
Figure 10

The intermediate species of the addition of Grignard reagents to *N*-tertbutanesulfinyl imino esters (Ellman et al., 2002). The alkyl group attacks at the back of the molecule where the least amount of steric hindrance is found.

Because 1,2-amino alcohols are precursors to chiral ligands for asymmetric catalysis, its synthesis has been looked at extensively using the tert-butanesulfinyl reagent. Methods existing previous to the introduction of tert-butanesulfinamide include the reduction of α -amino acids, catalytic ring opening of epoxides, and asymmetric aminohydroxylation. However, none of these were highly stereoselective (Tang, Volkman, and Ellman, 2001). In general, the synthesis consists of a 1,2 addition of an organometallic reagent to α -alkoxy sulfinyl imines (Figure 12) [Ellman et al., 2002]. For example, the addition of a Grignard reagent to an α -silyloxy sulfinyl aldimine gives the product in high yield and selectivity in a noncoordinating solvent such as toluene or dichloromethane (Figure 11). Treatment of the 1,2 addition product with HCl and methanol removes the sulfinyl and silyl groups, leaving a 1,2-amino alcohol (Bonner & Thornton, 1991). The addition of Grignard reagents to aryl and alkyl *N*-sulfinyl aldimines results in attack from the S face of the molecule (the face at which the substituents appear counterclockwise when placed in order of priority) through a six-membered transition state (Tang et al., 2001). The reaction of organometallic reagents with α -silyloxy sulfinyl ketimines has also been successful (Figure 14) [Ellman et al., 2002]. When using organometallic reagents (whether it is with an aldimine or a ketimine), AlMe_3 is necessary to gain high stereoselectivity (Tang et al., 2001).

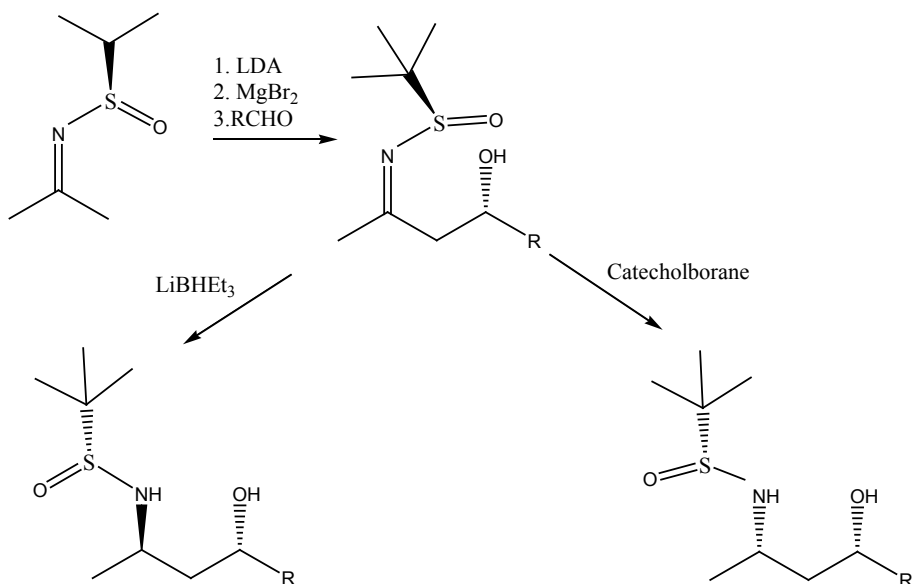
Figure 11

1,2 addition of a Grignard reagent to an α -silyloxy sulfinyl aldimine followed by treatment with hydrochloric acid yields a 1,2-amino alcohol (Ellman et al., 2002).

Figure 12

1,2 addition of an organometallic reagent to an α -silyloxy sulfinyl ketimine followed by treatment with hydrochloric acid will yield a 1,2-amino alcohol (Ellman et al., 2002).

The β -hydroxy ketimine is the intermediate used in the synthesis of syn- and anti-1,3-amino alcohols. This intermediate can be prepared by the deprotonation and metalation of a ketimine with LDA and ZnBr or MgBr respectively followed by reaction with aldehydes (Kochi, Tang, and Ellman, 2002). Reduction of the ketimine intermediate with LiBHET_3 gives the anti-1,3-amino alcohol while reduction with catecholborane yields the syn product (Figures 13 and 14) [Kochi et al., 2002].

Figure 13

Reduction of β -hydroxy ketimine yields the syn-1,3-amino alcohol when catecholborane is used and the anti-1,3-amino alcohol when LiBHET_3 is used (Kochi et al., 2002).

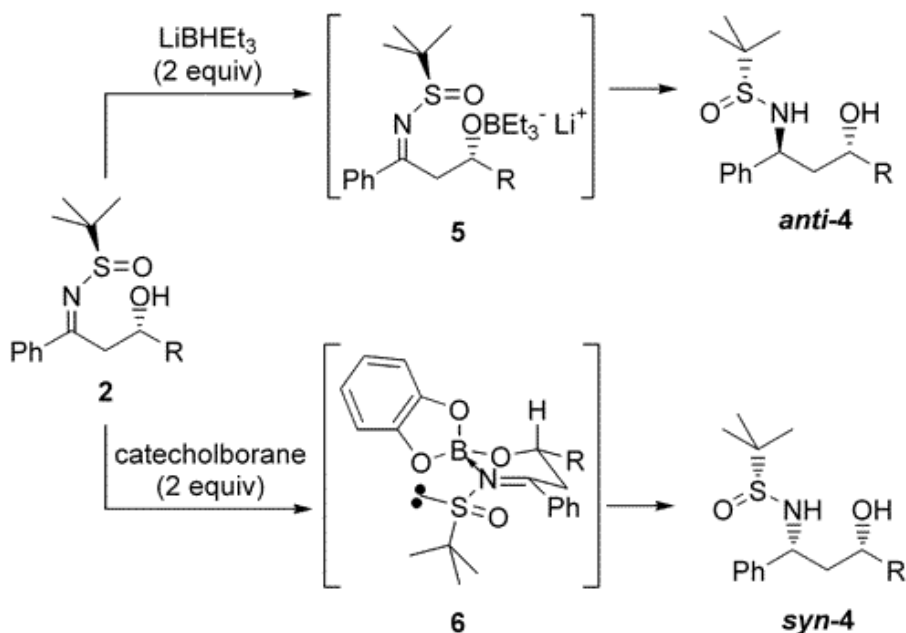
Figure 14

R	reductant	major isomer	dra	yield (%) ^b
Et	catecholborane	syn	95:05:00	94
	LiBHET_3	Anti	>99:1	69
i-Bu	Catecholborane	Syn	96:04:00	84
	LiBHET_3	Anti	>99:1	85
i-Pr	Catecholborane	Syn	96:04:00	88
	LiBHET_3	Anti	>99:1	83
t-Bu	catecholborane	Syn	96:04:00	89
	LiBHET_3	Anti	>99:1	91
Ph	catecholborane	Syn	96:04:00	84
	LiBHET_3	anti	>99:1	73

Reduction of β -hydroxy ketimines with both catecholborane and LiBHET_3 (Kochi et al., 2002).

The outcomes of the reduction products are controlled by the stereochemistry of the tert-butanesulfinyl group. According to X-ray data, the ketimine intermediate has an E-geometry. The LiBHET_3 will not change this geometry while catecholborane is capable of giving a six-membered ring intermediate (Figure 15). In result, the E-imine will isomerize to the Z-imine to ultimately give the syn product (Kochi et al., 2002).

Figure 15

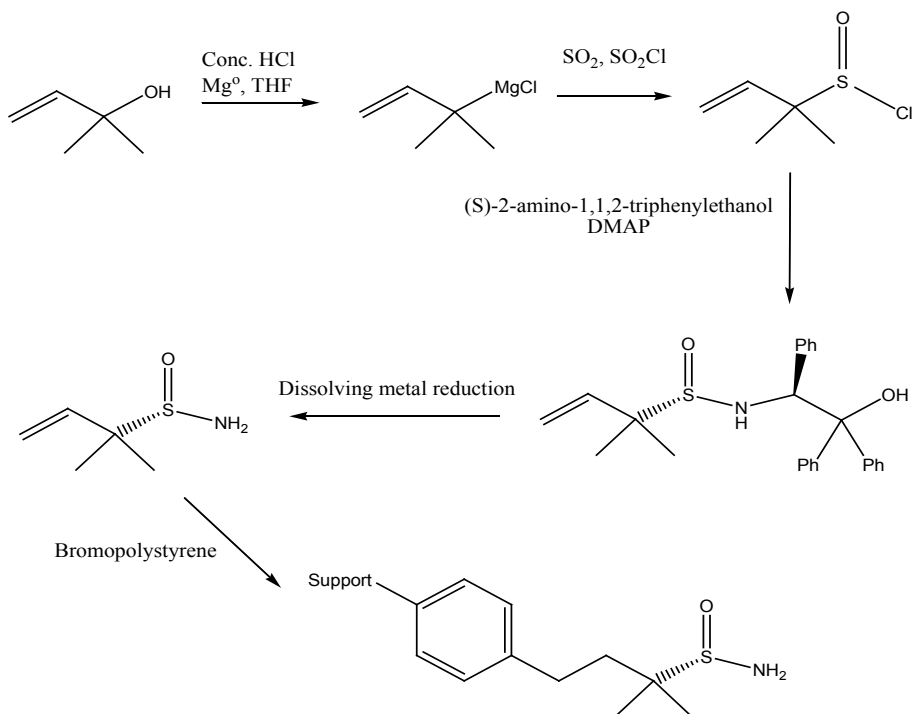


Reduction of the β -hydroxy *N*-sulfinyl imine with LiBHET_3 results in no change to the E-geometry of the imine and in turn an anti-1,3-amino acid. The use of catecholborane as a reducing agent will form a six-membered ring transition state giving the syn-1,3-amino acid (Kochi et al., 2002).

An efficient synthesis of a support-bound tert-butanesulfinamide derivative has been developed as a linker for the production of enantioenriched amines (Figure 16). The synthesis of this linker begins with the chlorination of a tertiary alcohol in concentrated HCl coupled with the addition of magnesium and THF for the conversion to a Grignard reagent. The Grignard reagent is reacted with condensed sulfur dioxide followed by chlorination of the product with thionyl chloride to give sulfinyl chloride (racemic). To resolve this racemic product, (*S*)-2-amino-1,1,2-triphenylethanol was added to sulfinyl chloride along with DMAP, eventually (after a dissolving metal reduction) resulting in enantiopure sulfinamide. Finally, sulfinamide undergoes hydroboration and coupling with bromopolystyrene to give

the support-bound tert-butanesulfinamide (SBS) linker. For the production of drugs or natural products using the SBS linker, the “tether” or support is removed at the very end of the process by addition of something like triflic acid in dichloromethane (Dragoli et al., 2001).

Figure 16



The synthesis of the support-bound tert-butanesulfinamide (SBS) linker (Dragoli et al., 2001).

Self-Condensation of *N*-tertbutanesulfinyl Aldimines

The development of intra- and inter-molecular self-condensation reactions of *N*-tertbutanesulfinyl aldimines has facilitated the production of amine-containing compounds to which two new adjacent stereocenters are introduced. These reactions are the first instances of imine self-condensation. Many cyclic drug candidates contain a core structure that could be achieved through this self condensation reaction, making this technique a fairly significant one (Schenkel and Ellman, 2004).

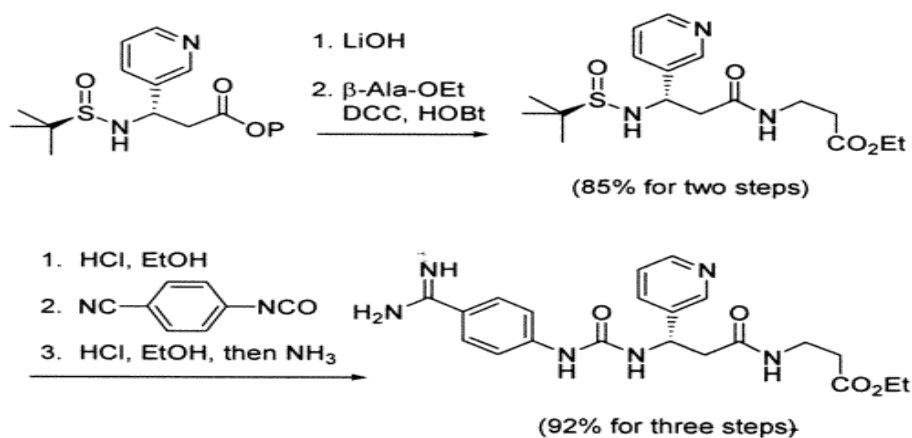
Bis-sulfinyl imine was used as the starting material for the intramolecular self-condensation reaction. This was first prepared by the condensation of (*R*)-tertbutanesulfinamide with hexanedial. The imine was then reacted with the base

NaHMDS (hexamethyl disilazide) and DMPU (a pyrimidinone) to give high yields of a self-condensation product. This intermediate was heated in acetonitrile and the resulting nitrile underwent acid-catalyzed hydrolysis. Removal of the sulfinyl group in the same step gave the desired β -amino acid. The β -amino acid seen in Figure 17 is fairly significant because foldamers prepared from this compound have been found to exhibit antimicrobial activity. With only four steps necessary for this synthesis and a 31% overall yield, this synthesis was proven to be extremely efficient. The CuSO_4 -catalyzed self-condensation of a different tert-butanesulfinyl aldimine was applied to the intermolecular option. Grignard reagents, KHMDS, and NaHMDS were not very effective bases in this reaction, but LHMDS was successful in yielding the intermolecular condensation product that was desired. These two methods were also applied to the total synthesis of trans-2-aminocyclopentanecarboxylic acid and serotonin 5-HT₄ (Schenkel and Ellman, 2004).

Tert-butanesulfinyl Group as a Protecting Group

The tert-butanesulfinyl group is capable of acting as a low-molecular weight protecting group much like the Boc protecting group. For one, the group is stable to basic conditions. It also causes the nitrogen to which it is attached to be non-nucleophilic, allowing for the activation and amide bond coupling of a β -amino acid (protected with a sulfinyl group). The group is easily cleaved (as a good protecting group should be) by adding acid to give the free amine. From here, the amine can be further acylated or even undergo reductive amination. This reaction scheme has been carried out on multiple occasions including the synthesis of an intermediate to the antagonist seen below (Figure 17) [Ellman et al., 2002].

Figure 17



Antagonist synthesized from the acidic cleavage of the sulfinyl protecting group on a β -amino acid followed by acylation (Ellman et al., 2002).

Enantioselective Catalysis

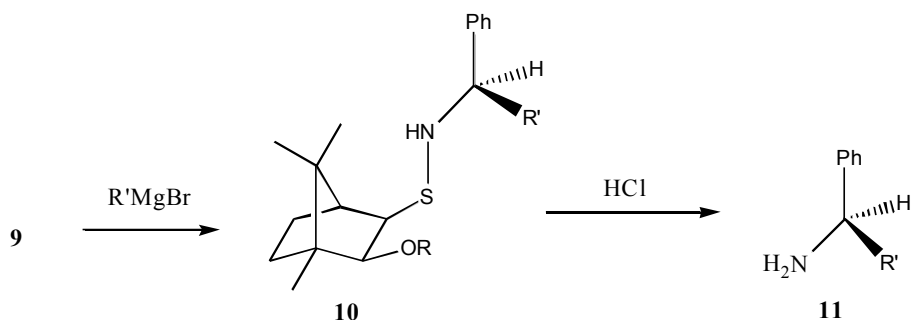
Currently, there is a significant amount of research being done to develop metal-free chiral organocatalysts. Most organocatalysts that are available use a chiral carbon center in order to induce stereochemistry (Pei, Wang, We, Zhang, and Sun, 2006). In view of the fact that chiral sulfur centers have been found to be efficient in giving stereoselective products as well as utilized in chiral auxiliaries and ligands, S-chiral compounds have been studied recently as effective organocatalysts. Commercially available (R)-tert-butanesulfinamide was examined as a catalyst for the hydrosilylation of a ketimine in dichloromethane. The product was successfully produced in relatively high yields due to the sulfinamide catalyst.

The study went on to test the efficacy of several derivatives of the catalyst in the reduction of a specific ketimine. In looking at the results, the catalyst **4c** gave the best percent yield and enantioselectivity in -20°C (92% yield and 92% enantiomeric excess) [Pei et al., 2006]. This tert-butanesulfinamide derivative incorporated a benzene ring with an electron-withdrawing fluorine substituent as well as a hydroxyl substituent, making it the strongest Bronsted acid. For this reason, a new series of reactions were performed using **4c** as the catalyst for the hydrosilylation of varying ketimines (Figure 21). After a great deal of optimization of these reactions, the reaction of all selected ketimines occurred with high yields and selectivity using an S-chiral (tert-butanesulfinamide) compound as an organocatalyst (Pei et al., 2006).

The Use of Chiral Auxiliaries for the Synthesis of Amines

The synthesis of chiral primary amines from sulfinimines and sulfenimines has previously been developed through the use of camphor-derived mercapto chiral auxiliaries. A chiral thiol **8** containing an alkoxy group was first treated with N-chlorosuccinimide in a mixture of liquid ammonia and dichloromethane. The addition of benzaldehyde gave the sulfenimine **9** in high yield. The sulfenimine was asymmetrically alkylated by the addition of a Grignard reagent in tetrahydrofuran. Hydrolyzation of sulfenamide **10** in hydrochloric acid yielded chiral primary amine **11** as well as the camphor thiol **8**, making it a recyclable reagent (Figure 18) [Pei et al., 2006].

Existing research has shown that in many reactions of tert-butanesulfinyl imines with nucleophiles a similar six-membered transition state occurs (Ellman et al., 2002). Although diastereomeric ratios of R to S forms of **10** were determined to favor the S configuration, this only displayed the formation of a similar six-membered transition state (Pei et al., 2006). The transition state involves the coordination of magnesium with the oxygen atom attached to the sulfur atom (if **9** has been oxidized) or the camphor molecule. This causes the alkyl group from the Grignard reagent to attack the si face of the imino group (Kochi et al., 2002).

Figure 18

Synthesis of primary amines from a camphor-derived sulfenamide (Pei et al., 2006).

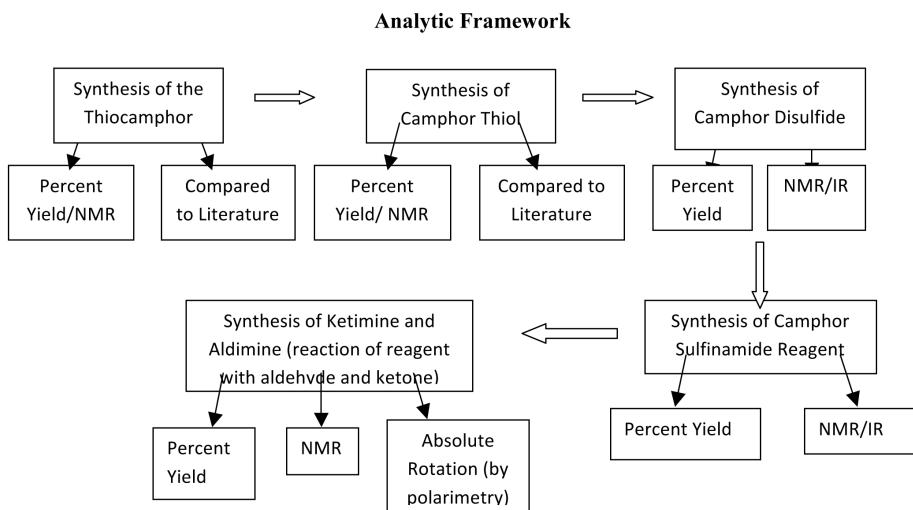
Asymmetric Synthesis

There are three kinds of stereoselective synthesis including selective formation of diastereomers, selective formation of enantiomers and double stereodifferentiating reactions (Eliel & Wilen, 1994). This research proposal deals with the formation of enantiomers, better known as enantioselective or asymmetric synthesis. One main strategy is to have a chiral auxiliary bonded to the achiral substrate (that will eventually become chiral). New or incoming stereocenters are established in relation to the chiral centers in the auxiliary. After such reactions have occurred, the chiral auxiliary can be cleaved. Through this strategy, pure enantiomers can be obtained with relative ease (Eliel & Wilen, 1994). No matter what methods are used, it is important that the compounds chosen from enantiospecific syntheses are enantiomerically pure, available, and inexpensive (Eliel & Wilen, 1994).

Implications of the Literature

The extensive review compiled of the literature surrounding the syntheses and applications of the tert-butanefulfenamide reagent gives a clear idea of its efficacy. With this information, the importance of the reagent can be fully understood in order to make a reasonable improvement (which is this proposal). The literature found and assessed also revealed positive results for an experiment that was very similar to this research proposal. A camphor-derived sulfur reagent was used to synthesize imines and amines in high selectivities. Although this proposal involves the synthesis of a slightly different sulfur reagent, the literature found on camphor chiral auxiliaries implies that the research to be attempted has great possibilities for success. Lastly, the literature found on the use of chiral auxiliaries implied that having camphor present in the asymmetric synthesis of imines and amines could actually increase the selectivity of the reaction. It is chiral, enantiomerically pure, easily accessed, and inexpensive. This is significant because using camphor could then increase the enantiomeric purity of the imine and amine products which is one of the ultimate goals of both this proposal as well as those of pharmaceutical synthesis.

Analytic Framework



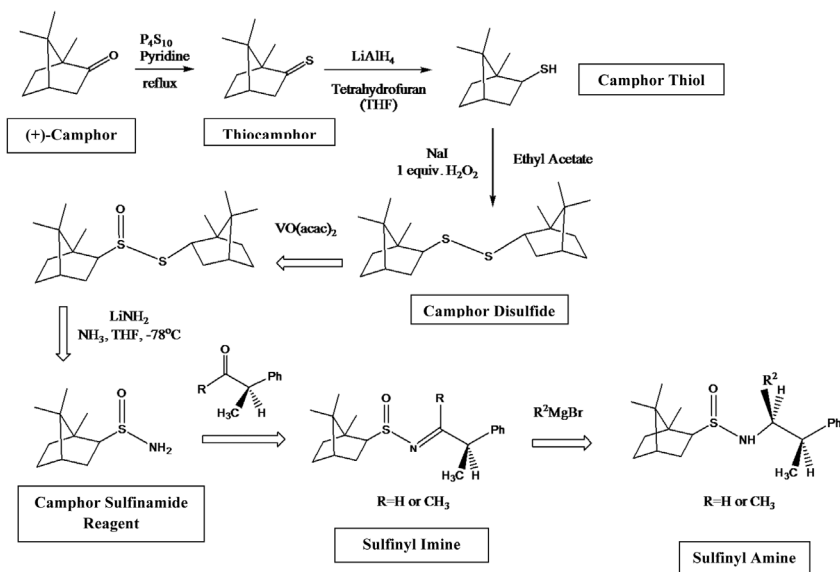
The analytic framework highlights the steps and analytical techniques that will be executed for this research project. The first part of the proposal to be achieved is the synthesis of the camphor thiol which is outlined in Chapter 1, Figure 2. Using the camphor thiol, two methods could possibly be tested to prepare the proposed camphor sulfinamide reagent as seen in Chapter 1. The percent yield for the reagent produced will be determined for each method used. After each method is attempted, the reagent will be analyzed to determine whether the product desired has been formed. From this information the conditions and amounts used will be altered to give better results when the experiment is done again. The same procedure will be followed when the reagent is condensed with the aldehyde and ketone. The final part of the framework follows that the aldimine and ketimine produced will be analyzed in order to ensure that the product formed is what is desired and also to determine which configuration, if any, has been favored. The production of the ketimine and aldimine will be repeated until the results from the third part of the framework give the desired information.

Research Design and Methodology

The purpose of this research is to synthesize and assess the camphor sulfinamide compound as a viable reagent for the asymmetric production of amines. The effect of the chiral substituent on the configuration of the amines synthesized will then be investigated. The following research questions will be assessed: What methods are most successful for the synthesis of the camphor sulfinamide reagent? Will the chiral camphor substituent have any effect on the orientation of the amine? What analytical techniques will determine the percent major enantiomer achieved? What methods will give the highest yields as well as enantiomeric excess? Will the orientation of the amine occur due to the chirality of the substituent or its steric hindrance? How can this be determined?

Data will be collected through an extremely detailed synthesis which is summarized in this section of the chapter. The synthesis of tert-butanesulfinamide occurs in two steps. First, commercially available tert-butane disulfide is asymmetrically oxidized with hydrogen peroxide. The use of $\text{VO}(\text{acac})_2$ and a chiral ligand in this step gives good conversion. The resulting tert-butanethiosulfinate is then reacted with an amide ion (Weix and Ellman, 2003). The disulfide of the bicyclic compound is not commercially available, but there has been a method developed for the synthesis of camphor disulfide from the 2-bornanethiol (Figure 1) [Kiriara, Asai, Ogawa, Noguchi, Hatano, & Hirai, 2003]. Camphor disulfide would be asymmetrically oxidized with hydrogen peroxide and $\text{VO}(\text{acac})_2$ followed by the addition of an amide ion to give the desired camphor-derived sulfinamide product. The chiral ligand will not be needed in the oxidation step because its purpose in the synthesis of tert-butanesulfinamide was to induce stereochemistry. However, the disulfide already contains chirality and will retain this property through the synthesis of camphor sulfinamide. The oxidation of the sulfenimine has been reported to have produced yields between 83 and 99 percent (Yang et al., 1994). The method using the disulfide for the synthesis of the reagent will be tested first. If results imply that this method will not work, the oxidation of the sulfur to synthesize the reagent will be attempted through the use of m-chloroperbenzoic acid (MCPBA) in dichloromethane or magnesium monoperoxyphthalic acid in methanol (Yang et al., 1994).

Figure 1



Projected synthesis of the desired camphor-derived sulfonamide from camphor disulfide and α -branched amines (Zaidi and Gunjial, 2007; Kirihara et al., 2003; Weix and Ellman, 2003.)

Camphor-sulfonamide compound will be assessed as a viable reagent for the synthesis of chiral amines. Just as tert-butanesulfonamide was first reacted with ketones and aldehydes (Ellman et al., 2002), camphor sulfonamide will be condensed with both carbonyl compounds to produce sulfinyl imines. Racemic mixtures of the commercially available 3-methyl-3-phenyl-2-propanone and 2-methyl-2-phenyl-ethanal will be used. The desired sulfinyl imine will be produced with high stereoselectivity (with one configuration favored over the other). Addition of nucleophiles to these imines will then yield an amine with two chiral carbon centers as seen in Figure 2 (which has yet to be done through the use of tert-butanesulfonamide or camphor-derived sulfenamide).

From these chiral imines, α -branched amines, tertiary carbinamines, β - and α -amino acids, 1,2-amino alcohols, and 1,3-amino alcohols can be produced by the methods used for tert-butanesulfonamide (Weix and Ellman, 2003). The reaction of a camphor sulfinyl aldimine with a Grignard reagent will give an α -branched amine (see figure above).

At each step of these projected syntheses, the data that needs to be collected includes the mass of the product and NMR/IR spectroscopy data. A high yield is desired for the product at each step of the syntheses to ensure the best yield possible for the final synthesis of the imines. This can be ensured through the measurement of the mass of the final product at each step of the overall synthesis. NMR/IR

spectroscopy data is necessary for characterization of the products from each step of the overall synthesis of the imines. NMR and IR spectroscopy instruments will be readily available in the laboratory at St. Mary's College of Maryland in order to collect data. For the final imines prepared, the absolute rotation will be measured using polarimeters available at the college laboratory.

The masses of the final product can be analyzed by simple calculations of the percent yield of the products. Using stoichiometric calculations of the theoretical yield of the products (the amount that "in theory" should result), the percent yield of the experimental yield in relation to the theoretical yield can be found. Analysis of NMR and IR data is performed through a comparison of literature values for the NMR and IR of functional groups found within aldimines, ketimines, camphor sulfinamide and the camphor disulfide (used for the synthesis of the camphor sulfinamide reagent). This analysis of data will allow for a characterization of the products synthesized for this project. If such an analysis is not done, it cannot be ensured that the products from the syntheses are indeed what is desired. Analysis of NMR and IR data will help to identify the functional groups present in the products prepared. This is done at each step of the overall synthesis because in order to prepare the imines, it must first be confirmed that the camphor sulfinamide reagent has been prepared. The absolute rotations of the imine products are used in a simple calculation to determine the percent enantiomeric excess of each product. From this analysis of data, one can understand which orientations of the imines were favored.

The first way in which error will be minimized is to perform the syntheses for the project on an extremely small scale. Working with smaller amounts of chemicals will save money as well as make the synthesis easier to handle and understand before performing it on a larger scale. Some error in the products formed can also be minimized after they have been prepared. Purification methods such as Thin Layer Chromatography and Column Chromatography can help to eliminate most or all of impurities that may exist in the products synthesized. Making sure all glassware used is clean beforehand will also minimize the risk of contamination. To minimize bias in this project, the main strategy used will be to have an experienced professor (mentor) look at the data collected at each step of the overall synthesis. Often, bias can occur when one analyzes NMR and IR data because it can be interpreted in one's favor. To avoid this issue, a professor will be taking a second unbiased look at all NMR and IR data to confirm or counter previous analysis of the data.

Four main ethical considerations will be observed for this project. The first is that proper safety materials and guidelines will be implemented in the laboratory at all times during work. Many chemicals used for this project can be hazardous and must be treated with the utmost care. Second, all other students present in the laboratory will be alerted whenever an extremely hazardous material may be used so that they observe the proper safety regulations. Third, the performance of the syntheses on a small scale first will ensure that starting materials are not wasted. This

reduction of waste is an environmental as well as monetary consideration. Lastly, strict guidelines for disposal of waste in the laboratory will be followed to ensure that materials that could be hazardous to the environment are not merely deposited in the sink.

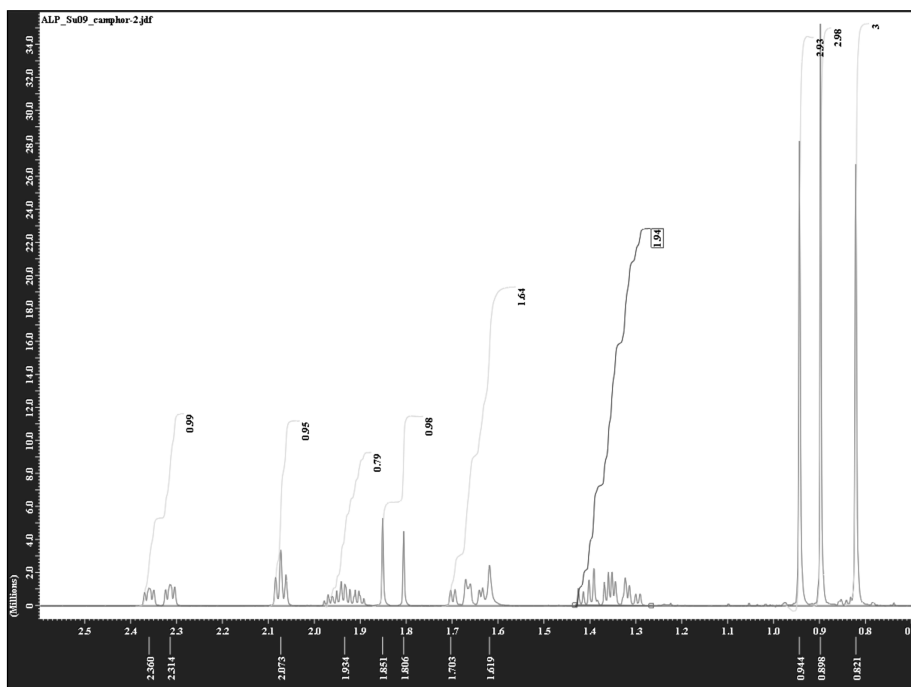
There are many limitations of this research proposal. Most of these limitations come from the inexperience of the student performing the work in the laboratory. Although many techniques used in organic synthesis are known, most are still being perfected. Purification techniques such as column chromatography have never been done (or not performed often) by most students doing undergraduate level research. Limited time will play a large role in this project as well. Most synthesis projects require much more time than five weeks. This proposal will most likely be started during the five week period to be continued in the fall semester. Also, the laboratory at St. Mary's College of Maryland does not currently have precise instruments to measure the percent enantiomeric excess of a product. Only basic polarimeters are available which give approximate data of this kind. Hopefully, new instruments will be procured during the time of this project to gain more accurate data. One last limitation of this project is the small amount of funds available at St. Mary's College of Maryland for the procurement of chemicals for research. This will make it difficult to get the best reagents and chemicals needed for the syntheses of this project.

Data and Results

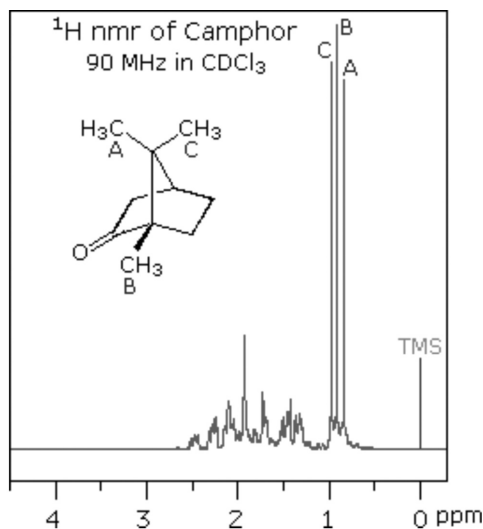
The thionation of (+)-camphor (the first step of the proposed synthesis) was attempted by two different methods on a small scale to determine which method would give the best results. The first method involved the reflux of (+)-camphor, a homogeneous mixture of phosphorous pentasulfide (P_4S_{10}) and aluminum oxide (Al_2O_3), and dried acetonitrile under argon gas (to keep it dry). This reflux went overnight to ensure that the reaction went to completion (Polshettiwar & Kaushik, 2004). The second method included a twelve hour reflux of (+)-camphor with an excess of P_4S_{10} in dry pyridine under argon gas (Zaidi and Gunjial, 2007). The second method was chosen based on percent yield. On the smaller scale, the thiocamphor was then reduced with sodium borohydride in 1,2-dimethoxyethane. Analysis of the resulting camphor thiol product by NMR spectroscopy showed that a large amount of starting material (camphor) still remained.

Because the peaks and corresponding chemical shifts of the hydrogen atoms of the three methyl groups (of camphor and camphor-derived compounds) are the clearest to identify, the analysis of the NMR spectra of any products in relation to that of camphor was done through comparison between these three peaks. The three chemical shifts for the methyl groups of pure camphor are found at 0.821 ppm, 0.898 ppm, and 0.944 ppm. The figures below display both the NMR results of pure camphor as well as an assignment of chemical shifts to each of the three methyl group hydrogen atoms of the compound. Integration of these three peaks gives a 3:3:3 ratio (because each of the three methyl groups contain three hydrogen atoms) while the majority of the rest of the peaks of the spectrum integrate to one. This shows that most of the other hydrogen atoms in camphor are different from each other. This causes the hydrogen atoms to be split more, giving a messier spectrum at which to look.

Figure 1

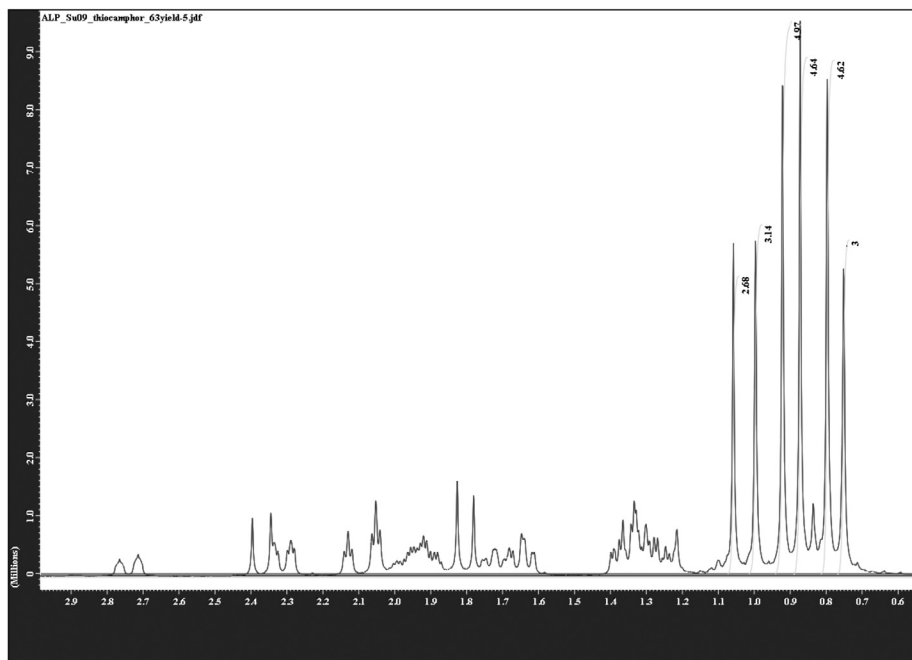


NMR spectrum of pure camphor.

Figure 2

Assignment of the three chemical shifts of the NMR to the methyl groups of pure camphor.

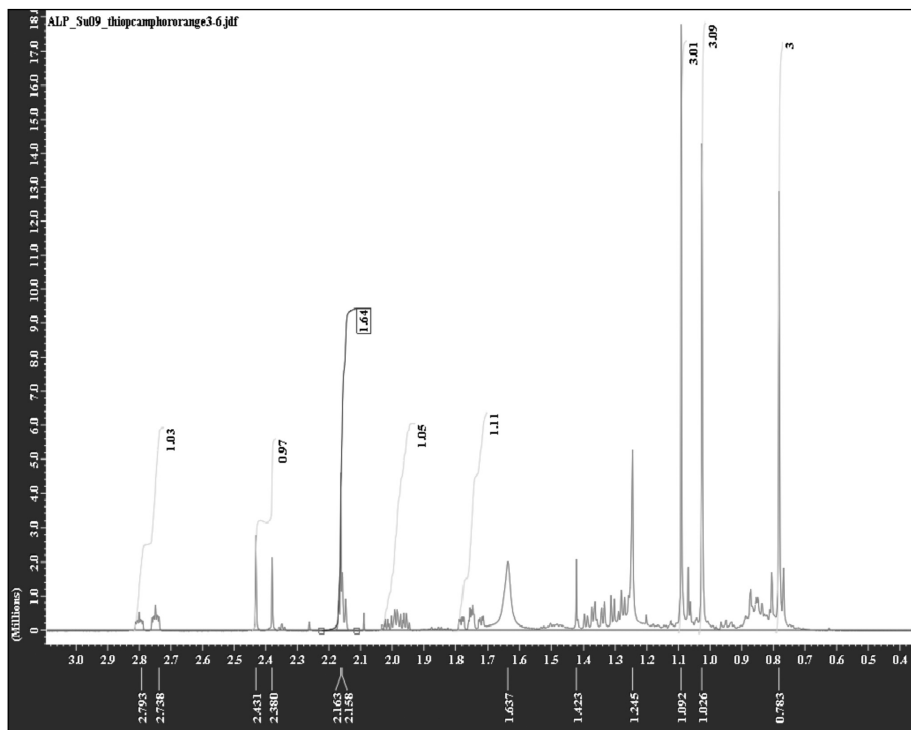
The first step of the proposed synthesis of camphor sulfinamide was eventually carried out on a slightly larger scale. It was clear from the NMR spectra of this product (thiocamphor) that a lot of the solid was camphor that had not reacted. There were three large peaks at chemical shifts corresponding to those of camphor (0.821 ppm, 0.898 ppm, and 0.944 ppm) in addition to three more chemical shifts resembling those of thiocamphor at 0.751 ppm, 0.997 ppm, and 1.058 ppm (this was known from the data given in the literature of the synthesis of this substance). The smaller peaks for thiocamphor integrated to around three (corresponding to three hydrogen atoms) while the camphor peaks integrated to about five. Even examining the rest of the NMR spectrum revealed that every peak had been doubled with one at a chemical shift similar to camphor and one at an entirely new chemical shift. It is clear from this NMR spectrum that the thiocamphor needed to be purified to eliminate the remaining camphor.

Figure 3

NMR spectrum of unpurified thiocamphor on a small scale.

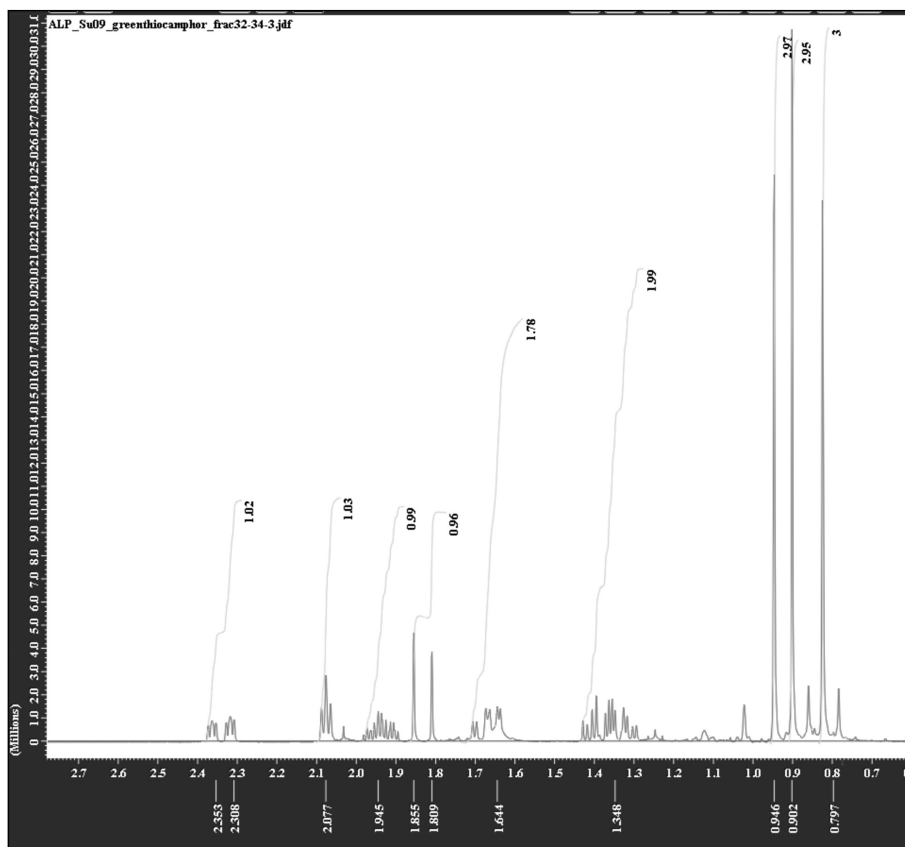
Thin layer chromatography of the thiocamphor product against pure camphor in pure hexanes gave the best separation between the two. For this reason, column chromatography was performed on the product in pure hexanes. Eventually, two different fractions came off of the column, one being a peach color, the other a light green. The solvent of each fraction was removed under reduced pressure to give an orange and green solid. The NMR spectrum of the orange solid (Figure 4) displayed three singlet peaks at 0.783 ppm, 1.02 ppm, and 1.091 ppm, all which integrated to about three (three hydrogen atoms). A doublet integrating to two hydrogens had also shifted from about 1.8 ppm to 2.4 ppm. In comparing these chemical shifts to those given in the literature, one could see that the two were nearly identical. This confirmed that the orange solid was pure thiocamphor. The green solid gave an NMR spectrum (Figure 5) almost identical to that of pure camphor. This NMR analysis showed clearly that the thiocamphor and camphor had been separated. Taking into account how much thiocamphor remained after purification, the percent yield was about 10.333%.

Figure 4



NMR spectrum of purified thiocamphor (orange-colored fraction from column chromatography).

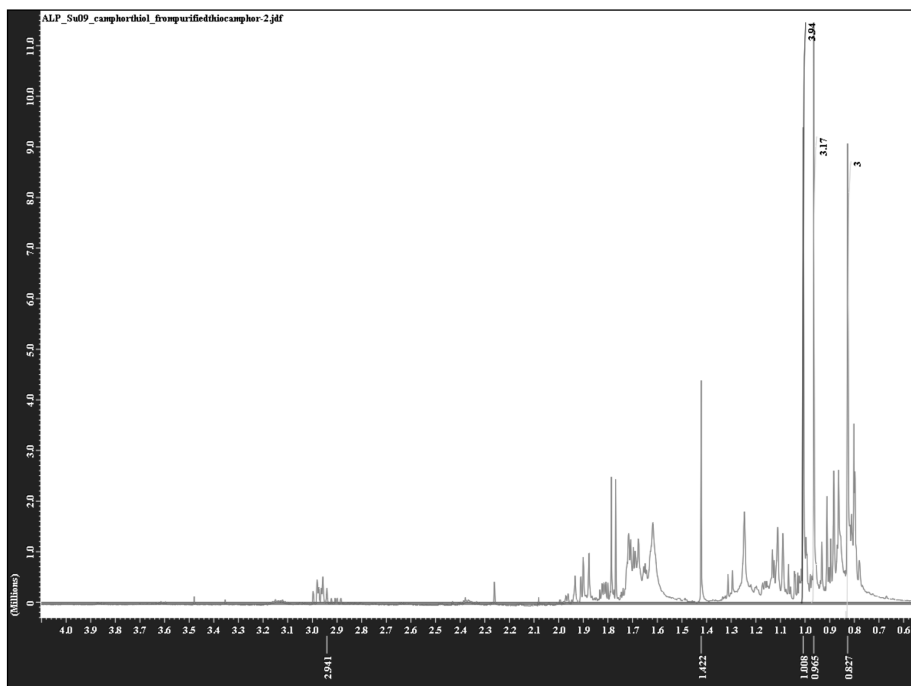
Figure 5



NMR spectrum of green-colored fraction from column chromatography (almost identical to that of pure camphor).

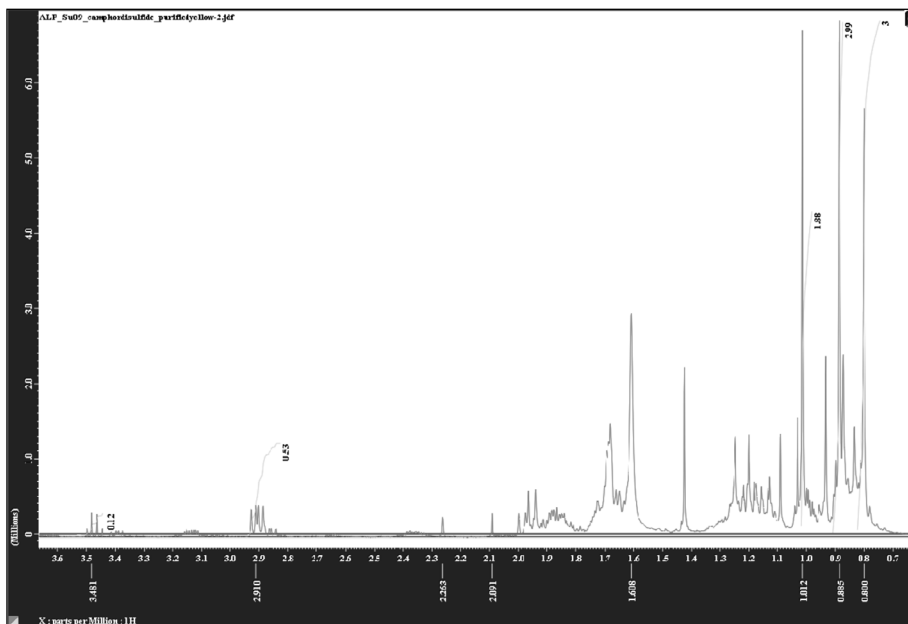
The reduction of the purified thiocamphor was again analyzed by NMR spectroscopy (Figure 6). Although the signals of the peaks for the three methyl group hydrogen atoms were not as easily comparable with literature values, it was still clear that a reaction had taken place. It was predicted that the methyl hydrogen atoms shielded by the pi cloud (produced by the carbon to sulfur double bond) would shift downfield once the pi cloud no longer remained (after reduction had taken place). This was precisely what was observed. The peaks at 1.09 and 1.03 ppm had shifted upfield to 1.008 and 0.965 ppm while the peak at 0.78 ppm had shifted downfield to 0.827 ppm. The other peaks showed movement as well but were too close together to analyze.

Figure 6



NMR spectrum of unpurified camphor thiol.

Analysis of the camphor disulfide synthesized from the unpurified camphor thiol (Figure 7) showed again a reaction and a shift of the singlet peaks to 1.012 ppm, 0.885 ppm, and 0.813 ppm. Because this compound has not been prepared before, its NMR spectrum is more difficult to use in order to characterize it as camphor disulfide. One way that the disulfide product could be analyzed is to take an IR spectrum on the starting material (camphor thiol) and final product (disulfide). A peak for a sulfur to hydrogen bond (which is what a camphor thiol contains) comes off at about 2500 inverse centimeters while no visible peaks come off for a sulfur to sulfur bond (which is what a disulfide contains). In taking an IR of both the camphor thiol and disulfide, the expectation is that there will be a peak at 2500 inverse centimeters that disappears. Unfortunately, the IR instrument at St. Mary's College of Maryland was not available by the time this data was collected. The first collection of data did not include a calculation of percent yields for the products prepared past the thiocampher because they had not yet been purified. It is unclear whether the camphor thiol and disulfide are the desired products. Until purification techniques can be implemented, the accurate percent yield for each cannot be determined.

Figure 7*NMR spectrum of unpurified camphor disulfide.*

The initiation of this research proposal was successful overall. Although the syntheses proved to require much more time than what was given, many lessons were learned in improving the syntheses as well as general skills used in the laboratory. New purification techniques such as column chromatography and silica plugs were studied. Use of the glove box, an air and water free hood, was also implemented and understood to a great degree. With experience in starting this project, the synthesis of the desired camphor sulfinamide reagent will be well underway by the end of the summer. Thiocamphor was achieved in high purity but low yields. The camphor thiol was also prepared, but needs purification. The camphor disulfide that was prepared still needs examination to determine whether it is indeed a disulfide. Many methods were explored throughout this program for the syntheses of the first three compounds of the overall scheme, but only one was chosen to be used for the project (which can be viewed in Figure 1 of Chapter 3).

Three main recommendations were understood from the outcome of this summer's research program. The first was that the products resulting from each step of the overall synthesis need to be purified. If a starting material for a new step of the synthesis is not pure, the resulting product will not be pure either. In addition, the chemicals used in this project are extremely sensitive air and water (moisture in the air) so new methods must be developed in order to avoid such contact. One way to do this is to implement more steps of the synthesis inside of the glove box. Argon

gas should be available at all times because all refluxes must be done under argon gas to keep the reaction dry. Lastly, chemicals such as the phosphorous pentasulfide are extremely dangerous and potent. For this reason, gloves, safety glasses and even a facemask should be worn when handling such chemicals.

In the near future, this proposal will be continued in order to prepare the camphor sulfinamide reagent. The camphor thiol must be purified to make the disulfide and the disulfide must be identified as the desired product. Once it has been shown that the reagent can be made in high purity, the overall synthesis will be started over again to achieve all products in high yield. With the camphor sulfinamide reagent in high purity and yield, it will be tested with a chiral ketone and a chiral aldehyde (racemic mixtures of both). Then, the configuration of the resulting imine will be examined via polarimetry to understand whether the chiral auxiliary affected the chiral centers in any way. Methods for successful and efficient synthesis of enantiomerically pure imines will result in a wide variety of enantiomerically pure amines. This could be a great stride in easier and cheaper drug synthesis.

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Decline and Disparities in Mammography Use Trends by Socioeconomic Status and Race/Ethnicity

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Abstract

The second leading cause of death in women in the United States is breast cancer. While it remains the most common type of cancer in women, early detection through mammography screening has been used to combat and treat breast cancer. But after the 2000, the rates of mammography have been declining. The purpose of this study is to examine whether or not the decline has continued and whether all racial/ethnic and socioeconomic groups experienced the same rate of decline. Data from the National Health Interview Survey (2003 to 2005) and the Behavioral Risk Factor Surveillance System (2002 to 2004) were used to calculate the percent decline for the total population and by race/ethnicity and socioeconomic status. Mammography rates declined between 2003-2005 (NHIS) and 2002-2004 (BRFSS). Data from both the NHIS and BRFSS show a greater rate of decline for African American women, and women with lower income and education. These results differ from previous studies which examined broader time interval (2000 to 2005). Further research is recommended to explore whether the rates of decline have continued, the impact of the decline in mammography rates on breast cancer incidence, mortality, and stage of diagnosis, as well as the underlying reasons for the observed decline in mammography rates and for disparities in the rates of decline.

Nature of the Study

Breast cancer is the most common type of cancer in women throughout the United States and is also the second leading cause of death in women today (Kim & Jang, 2008). According to the National Cancer Institute's Surveillance, Epidemiology, and End Results Cancer Statistics Review (2008), the age-adjusted death rate for breast cancer was 24.5 per 100,000 women per year during 2002-2006 in the United States (Horner et al., 2008). About 40,170 women are estimated to die from breast cancer in 2009 (Horner et al., 2008). Mammography can detect breast cancer at an earlier stage when treatment is more effective (Makuc, Breen, & Freid, 1999). Mammography screening detects about 90 percent of breast cancer even before it can be felt so show any symptoms (American Cancer Society [ACS], 2008). Therefore, the key to treat breast cancer certainly is early detection. Not only does mammography save women's lives by improving their treatment options and their

chances for successful treatment, but most importantly, it improves their chances of survival (ACS, 2008). Mammography screening has been one of the important keys to combating and surviving breast cancer.

In the American Cancer Society's "Breast Cancer Facts & Figures 2007-2008" Report (2008), race/ethnicity, socioeconomic status, stage at diagnosis, and age at diagnosis greatly influence breast cancer survival (ACS, 2008). Women who have less than a high school education and have no health insurance coverage are the least likely to have had a recent mammogram (ACS, 2008). This may contribute to the later discovery of breast cancer, making their chances of survival less likely. Similarly, African American patients who are more likely to be of lower socioeconomic status compared to White American patients are also less likely to have had a recent mammogram. African American women are more likely to die from breast cancer at every age, according to the American Cancer Society's report (ACS, 2008). The survival differences between White American and African American breast cancer patients suggest that these differences maybe attributed in part to racial disparities regarding in mammography screening (Chagpar, Polk, & McMasters, 2008).

The percentage of all women ages 40 and older who reported having had a mammogram within the past two years increased dramatically between 1987 and 2000, from 29% to 70% (Breen & Kessler, 1994). This increase in the use of mammography over time has had a profound effect on the incidence and mortality rate of this disease. It made early detection more common and helped to reduce mortality of breast cancer (Breen et al., 2007). Earlier this decade, the American Cancer Society observed that after the rapid increases, the rate had stabilized between 2000 and 2003. However, recent data from the National Health Interview Survey (NHIS) suggested that there was a decline in mammography use for all women ages 40 and over between 2003 and 2005, from 70% in 2003 to 66% in 2005 (ACS, 2008).

Nancy Breen's "Reported Drop in Mammography: Is this Cause for Concern?" article (2007) reported a decline in the use of mammography from 70% to 67% using 2000 and 2005 NHIS data (Breen et al., 2007). Although they found that rates were lower in 2005 than in 2000 for nearly all of the different groups of women, they found that a "significant decline was observed among white women, women with higher educational attainment" and also "the largest significant declines were among women who traditionally have used mammography at high rates, including women with higher incomes" (Breen et al., 2007). A similar study using 2000 and 2005 NHIS data, "Racial Trends in Mammography Rates: a Population-Based Study" (2008), also reported the decline in all groups of women, but further stated that the decline only reached statistical significance in the White American population (Chagpar, Polk, & McMasters, 2008). Although this report reported that rates of mammography were declining in all groups, it further stated that there is a greater rate of decline among White American populations and declared that "race is not a significant independent predictor of mammography rates in each year" (Chagpar, Polk, & McMasters, 2008). This study will further explore the results and conclusions from these previous studies using data from the NHIS and BRFSS.

Research Questions

The purpose of this study is to analyze trends of mammography use, using a more precise time interval of two-years (2003–2005 NHIS and 2002–2004 BRFSS), among women ages 40 and over by race/ethnicity and socioeconomic status in the United States in order to examine whether all racial/ethnic and socioeconomic groups experienced the same rate of decline.

According to the NHIS, there has been a decline in mammography rates for women ages 40 years and over, regardless of socioeconomic status and race/ethnicity. The questions are: 1. Has there continued to be a decline in mammography rates? 2. Has the rate of decline varied by family income, education, or race/ethnicity? 3. Do data from the Behavioral Risk Factor Surveillance System (BRFSS) show similar patterns to data from the NHIS?

Definitions

When investigating any phenomena, it is important to define explicitly the terms being used. Certain terms may have a particular meaning to people who study trends and disparities in health organizations in general. The terms and abbreviations below are typically associated with the topics of this study.

Age-adjusted rate. Age-adjusted is defined as “weighted average of the age-specific rates, where the weights are the proportions of persons in the corresponding age groups of a standard population” (United States National Institutes of Health, 2008).

Behavioral Risk Factor Surveillance System (BRFSS). This data system is a state-based system of telephone health surveys that collects information on health risk behaviors, preventive health practices, and health care access primarily related to chronic disease and injury. It was established in 1984 by the Centers for Disease Control and Prevention (Centers for Disease Control and Prevention, 2008).

Breast cancer disparities. This concept is defined as the differences in the incidence, mortality, and survival rate that existed among specific population groups (ACS, 2008).

Healthy People 2010. The national disease prevention and health promotion agenda was released by the Department of Health and Human Services in 2000 in order to provide a framework for prevention for the Nation. The national health objectives are designed to identify the most significant preventable threats to health and to establish national goals to reduce these health threats (U.S. Department of Health and Human Services [USDHHS], 2000).

Mammogram. Mammogram is defined as “a low-dose x-ray procedure that allows visualization of the internal structure of the breast.” On average, mammography will detect about 90% of breast cancers in women without symptoms (ACS, 2008).

National Health Interview Survey (NHIS). This data system is a primary source of health information on the civilian, noninstitutionalized population in the United States. It is conducted by the Centers for Disease Control and Prevention (CDC) and was designed specifically to produce national estimates. An annual survey is

administered in person by Census Bureau interviewers. Information is gathered on health knowledge, attitudes, and practices for various population groups, including those defined by age, sex, race, family income, geographic region, and place of residence (Breen & Kessler, 1994).

Surveillance, Epidemiology, and End Results (SEER). This data system is sponsored by the National Cancer Institute (NCI) to provide an authoritative source of information on cancer incidence and survival in the United States (Horner et al., 2008).

Socioeconomic Status (SES). This term is defined as “a combined measure of income, education, and access to health care” (Merriam-Webster Online Dictionary, 2009).

Research Design and Methodology

Each year the National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention (CDC) conducts the NHIS. It has been conducted every year since 1957 to collect data using national population-based face-to-face survey in order to represent the American civilian noninstitutionalized population (NCHS, 2006). Nationally, about 400 interviewers were trained about basic interviewing procedures and concepts and procedures unique to the NHIS. The NHIS is conducted using computer-assisted personal interviewing or CAPI. This method presents the questionnaire on computer screens to each interviewer, guides them through it and allows them to enter survey responses directly into the computer. The CAPI program system also automatically routes the interviewer to appropriate questions based on answers to previous questions of the interviewees (NCHS, 2006). Not only does the CAPI program determine if the selected response is consistent with other data collected during the interview, but it also saves the time required for transferring and processing data and it makes sure the accurate flow of the questionnaire (NCHS, 2006). The interviewers are directed under health survey supervisors in the United States Census Bureau Regional Offices to interview about 35,000 adults. Response rates for the questions fielded in the cancer module are in the range of 80% (NCHS, 2006). These adult female respondents ages 40 years old and over were asked questions regarding the use and the timing of their most recent mammogram (Appendix A). The first question was “Have you ever had a mammogram?” and if women responded “Yes,” the second question was then asked: “When did you have your last mammogram?” (Appendix A). The most recent data available for mammography use for women ages 40 and over receiving it within two years is from the year of 2005. The data from 2003 to 2005 were used for this study.

Another data source that was used to examine trends and patterns in the recent use of mammography is the CDC’s BRFSS data. Unlike NHIS data which represent the entire United States and is administered in person, BRFSS is administered through telephones and questions regarding mammography use were not administered to women in all states (CDC, 2008). Randomly selected from the telephone directory,

one adult age 18 or older in each household was interviewed about their health risk behaviors, preventive health practices, and health care access primarily related to chronic disease and injury (CDC, 2008). Breast cancer-related questions are included in the women's health section, which is conducted differently each year and in each state (CDC, 2008). In Module 9: Women's Health section, their first question started with a brief description of a mammogram, "A mammogram is an x-ray of each breast to look for breast cancer," and then it asked "Have you ever had a mammogram?" (Appendix B). If women answer "Yes," then the second question about "How long has it been since you had your last mammogram?" was asked (Appendix B). The data for women ages 40 and over who have had a mammogram within the past two years from the year 2002, 2004, and 2006 were used for this study.

In order to examine the trends from the two data sources to answer the research questions, the percent change formula was used to calculate the percent decline of the 2003-2005 NHIS data and the 2002-2004 BRFSS data.

The formula is:

$$\text{Percent Change} = \frac{(V_{\text{past}} - V_{\text{present}}) \times 100}{V_{\text{past}}}$$

$$V_{\text{past}} = \text{past or present value}$$

$$V_{\text{present}} = \text{present or future value}$$

The percent change from one period to another is calculated using value at beginning of period subtracted by value at end of period, and then divided it by value at beginning of period, and finally multiplies by 100. For example, to find the percent decline for all women ages 40 and over receiving mammography within the past two years from 2003 to 2005 from the NHIS data, it is calculated as follows:

$$\frac{(70\% - 67\%) \times 100}{70\%}$$

After the result of the percent decline comes out to be 4.2857%,

the result is rounded to one place decimal, 4.3%. This method is also repeated to calculate all of the percentages of the percent decline in the categories of race/ethnicity, family income level, and educational level in both NHIS data and BRFSS data. The percent change formula is a useful indicator to look at how much this rate is declining in this area.

Findings, Conclusions, and Recommendations for Future Research

Findings

Table 1

Comparison of Mammography Rates Among Women Ages 40 and Over by Race/Ethnicity, Family income level, and Educational level: The 2000, 2003 and 2005 National Health Interview Surveys

Category	2000	2003	2005	Percent Decline 2003-2005
Women receiving a mammogram during the past 2 years (ages 40 and over)	70%	70%	67%	4.3%
Race/Ethnicity				
African American	68%	70%	64%	8.6%
White American	71%	70%	67%	4.3%
Family income level				
Poor	55%	55%	48%	12.7%
Near poor	57%	60%	55%	8.3%
Middle/High income	76%	74%	72%	2.7%
Educational level				
Less than high school	57%	58%	54%	6.9%
High school graduate	69%	67%	64%	4.5%
At least some college	76%	75%	72%	4.0%

Source: National Health Interview Survey, CDC, NCHS (NCHS, 2006)

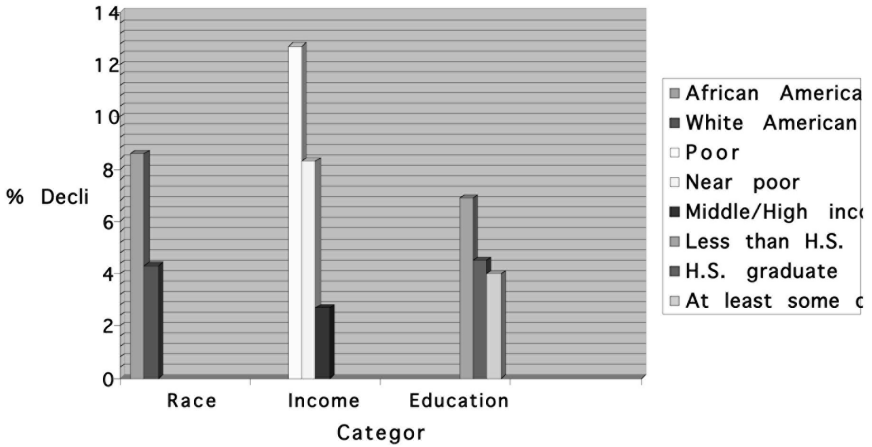
Table 2

Comparison of Mammography Rates Among Women Ages 40 and over by Race/Ethnicity, Family income level, and Educational level: The 2000, 2002, 2004, and 2006 Behavioral Factor Risk Surveillance System

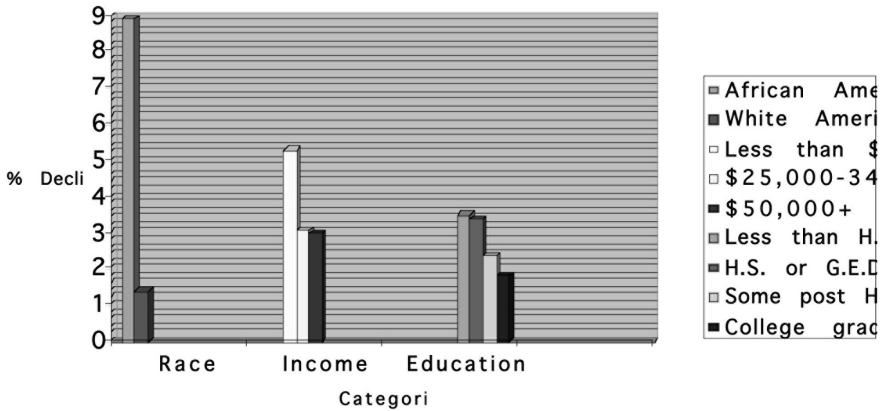
Category	2000	2002	2004	2006	Percent Decline 2002-2004
Women receiving a mammogram during the past 2 years (ages 40 years and over)	76.1%	76.1%	74.9%	76.5%	1.6%
Race/Ethnicity					
African American only	80.2%	82.8%	75.4%	80.1%	8.9%
White American only	76.4%	76.2%	75.1%	77.0%	1.4%
Income					
Less than \$ 15,000	65.4%	66.3%	62.8%	64.7%	5.3%
\$25,000-34,999	76.5%	76.5%	74.1%	73.6%	3.1%
\$50,000+	83.4%	82.7%	80.2%	81.7%	3.0%
Education					
Less than H.S.	67.7%	65.8%	63.5%	66.0%	3.5%
H.S. or G.E.D	75.3%	75.7%	73.1%	74.6%	3.4%
Some post H.S.	78.5%	77.8%	75.9%	77.1%	2.4%
College graduate	82.4%	81.4%	79.9%	81.3%	1.8%

Source: Behavioral Risk Factor Surveillance System, CDC (CDC, 2008)

Percent Decline in Mammography Rates: The 2003 and Health Interview Surveys



Percent Decline in Mammography Rates: The 2002 and Factor Surveillance System



Overall, mammography rates declined during 2003 to 2005 according to the National Health Interview Survey and during 2002 to 2004 according to the Behavioral Risk Factor Surveillance System. According to the NHIS, the rate of having had a mammogram declined 4.3%, from 70% in 2003 to 67% in 2005. According to the BRFSS, the rate of having had a mammogram also declined 1.6%, from 76.1% in 2002 to 74.9% in 2004.

While a downward trend in mammography screening was seen in all women, there was a more significant rate of decline for certain groups based on race/ethnicity, family income level, and education level (Table I and II). Both NHIS and BRFSS data show a greater rate of decline for African American women, women with lower income, and women with lower education. In these years, both surveys suggest that African American women, women with lower income level, and women with lower education level were less likely than White women, women with higher income level, and women with higher education level to report having had a mammogram within the past two years. For example, the percent decline for African American women was 8.6% compared to 4.3% for White American women based on the NHIS 2003–2005 data. Similarly to the 2002–2004 BRFSS data, the percent decline for African American women was 8.9% while it was only 1.4% for White American women. Disparities also existed in various family income level and education level groups as well. In the NHIS data, the percent decline percentages decrease as we move from “Poor” to “Near Poor” to “Middle/High income” in the family income level category with 12.7%, 8.3%, and 2.7%, respectively. The percent decline percentages also decrease as we move from “Less than high school” to “High school graduate” to finally “At least some college” in the educational level category with 6.9%, 4.5%, and 4.0%, respectively. In the BRFSS data, the percent decline percentages decrease as we move from “Less than \$15,000” to “\$25,000–34,999” to “\$50,000” in the income level category with 5.3%, 3.1, and 3.0%, respectively. And finally, the percent decline also decrease as we move from “Less than High School” to “High School or G.E.D.” to “Some post High School” to “College graduate” with 3.5%, 3.4%, 2.4%, and 1.8%, respectively. Data from the BRFSS from 2002–2004 show similar patterns as data from the NHIS 2003–2005 regarding a decline for all women ages 40 and over and a greater rate of decline for African American women, women with lower income level, and women with lower education level.

The third finding is that BRFSS data show no further decline during 2004 to 2006 in mammography rates in all women ages 40 and over receiving mammography within the past two years. From 2004 to 2006, the percentage increased from 74.9% to 76.5%. The rates also increase for all three categories: race/ethnicity, income level, and education level. Unfortunately, public data are not yet available from more recent NHIS.

Conclusions

The percentage of women ages 40 and over having had a mammogram within the past two years increased from 29% in 1987 to 70% in 2000 (ACS, 2008). Although mammography screening across racial groups and socioeconomic statuses increased from 1987 to 2000, a decline after 2000 in the mammography rate has been noted in national studies.

Examining the differences in the period of 5 years, Breen et al. (2007) and Chagpar, Polk, & McMasters (2008) found that there was only a significant decline among White American women, women with higher education, and women with higher income. In contrast, when this study examined the trends of mammography rate for women ages 40 and over from 2003 to 2005 and from 2002 to 2004, the two-year time period indicated a greater rate of decline for African American women, women with lower education, and women with lower income. Now another question is raised: what was happening between 2003 and 2005 that did not show in the longer period between 2000 and 2005?

However, despite the contrasting findings, it is obvious that mammography rates for women ages 40 and over are not consistent with the Healthy People 2010 goal of 70% (USDHHS, 2000). Although it is not significantly different, it may indicate to us that we might be going in the opposite direction of our nation's goal. This should alarm us and should call for continued monitoring of trends in incidence, screening, mortality, and their underlying factors.

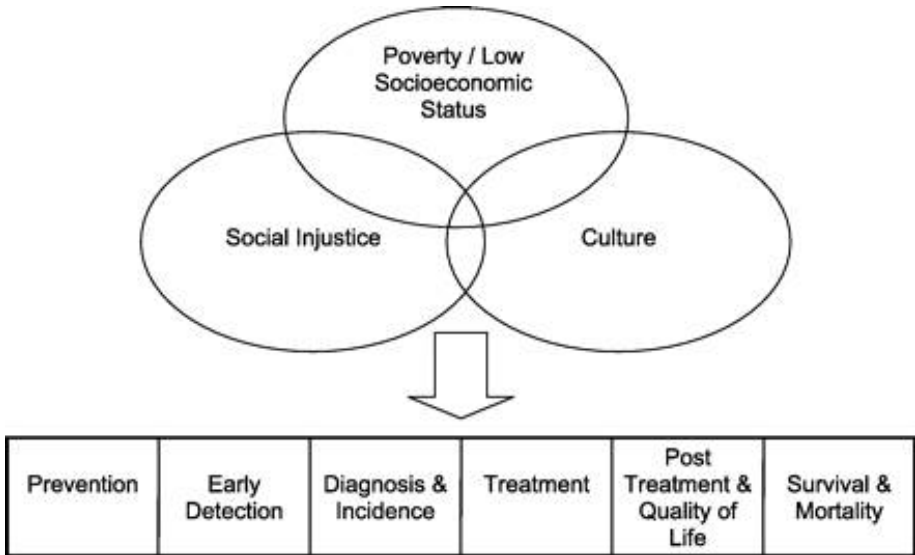
Recommendations for Future Research

For future research, I intend to closely examine the reasons why there was a decline in mammography use for all women ages 40 and over in the United States, and to examine whether the decline continues. Some literature suggests possible reasons for the decline in mammography use. The drop in rates may be caused by factors, including an increase in the number of women who do not have health insurance, higher health care costs, lower belief in the effectiveness of mammograms, reduced perceived risk because of reported decrease in mortality from breast cancer, and a lack of promotion of mammography (Campbell et al., 2009). Other reasons from the Institute of Medicine (IOM) include low reimbursements by insurers, rising malpractice law suits against radiologists who read mammograms, and fewer radiologists choosing to specialize in breast imaging (Campbell et al., 2009).

I also plan to closely examine the reasons why there are greater decline rates and breast cancer disparities among African American women, and women with lower income and education. Using Drs. Freeman and Chu's Social Determinants of Health Disparities in Cancer framework as a theoretical framework, I will guide my research study based on three major social determinants of low socioeconomic status or poverty, culture, and social injustice. These three determinants will help guide me when exploring my future research question of why disparities in mammography rates existed among racial minority and low socioeconomic population. The Institute

of Medicine (IOM) published a review explaining how Freeman and Chu's model is a model in which health care disparities arise. It is the overlap of three major factors: economic, social, and cultural factors (Ward et al, 2004).

Figure



Social determinants of health disparities in cancer (Freeman and Chu) (Ward et al, 2004).

First, poverty or low socioeconomic status factors influence cancer risk factors, such as tobacco use, poor nutrition, and physical inactivity. Income, education, and health insurance coverage play important roles because they largely influence people's level of resources, information, and knowledge (Ward et al, 2004). Second, cultural factors include learned beliefs, values, traditions, and behaviors that are common to a particular social group (Ward et al, 2004). They are the accepted social norms within that particular group that largely influence people's behaviors and attitudes. For example, some groups that believe in alternative forms of healing as opposed to modern medicine may be less likely to get a regular breast cancer screening or a mammogram (Ward et al, 2004). Third, social injustice also influences the interactions between patients and physicians, according to the IOM. The unfair treatment of an individual or group based on race or socioeconomic status may determine the quality of health care that one receives (Ward et al, 2004). The three major factors, poverty or low socioeconomic status, social injustice, and culture, all influence access to health care, such as appropriate prevention, early detection, diagnosis and incidence, treatment, post treatment and quality of life, and survival or mortality (Ward et al, 2004). This framework will be useful in guiding the future research.

For the follow-up study methods, I plan to do one or more of the following: 1. Examine more recent NHIS data to see if there continues to be a decline over time (the BRRSS data suggested that it was only a short-term decline), 2. Examine breast cancer incidence and mortality trends to see whether the decline in mammography resulted in lower breast cancer incidence and/or higher breast cancer mortality and/or later average stage at diagnosis, 3. Examine changes in health insurance coverage overall and for mammography, and 4. Conduct in-depth interviews with several key informants, including breast cancer program managers, to find out why they think there was a decline in mammography rates.

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Examination of Family Environmental Factors Associated with Obesity in African American Youth Resides in Baltimore City

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Introduction

Obesity is very prevalent in America, making it epidemic (Dalton, 2004). Obesity is the measurement of body fat based on an individual's weight and height (kg/m squared). This measurement is called the Body Mass Index or (BMI). African Americans are at a high risk of developing obesity which is not considered a disease. The World Health Organization states differences in categorizing obesity across ethnicities. National Center of Health Statistics defines obesity for adolescence as a BMI \geq 95th percentile based on their age and sex (CDC, 2008). Obesity is defined for adults as BMI \geq 30 (NCHS, 2007). Obesity affects adult, adolescence and children alike. A study by Ogden et al. (2006) stated more than half of America's adult population, 32.3%, is obese. Statistics for children and adolescence, male and female, are equally alarming at 16.4% (Ogden et al., 2006).

Researchers Freedman et al. (2005) examined the relationship between childhood weight gains leading to adult obesity commonly known as tracking. It has been noted by various studies that adolescent obesity tracks into adulthood (Dalton, 2004; Dietz, 1998; Freedman et al., 2005). Obesity originating from childhood puts individuals at a greater risk for health concerns (Freedman et al, 2005). Understanding the importance of curbing obesity in adolescence so it will not continue throughout an individual's life is crucial. In addition, it is commonly known that obesity leads to a rise in health cost (Dalton, 2004). Some of the health risk associated with obesity are both short and long term. Some health risks are diabetes, cardiovascular disease, high blood pressure, high cholesterol and breathing difficulties or asthma (Dalton, 2004).

As youth transition to adolescence, physical activity levels decline (Kimm et al., 2002) thus creating an ideal situation for weight gain. Weight gain is common during this transition. Moreover, overweight or obese African American adolescent began puberty earlier which leads to decrease activity levels (Dalton, 2004). High School years represent a life stage in which girls, and boys are not engaging in sufficient physical activity. The family environment also plays a huge role in the development of obesity (Kimm et al., 2002). It has been revealed there is a relationship between social environment and its influence in supporting or hindering physical activity.

The following sections will highlight the general topic of the prevalence of obesity, health consequences and family environmental factors that relate to obesity.

Problem Statement

African American adolescents are at a bigger risk for developing obesity than some of their counterparts. African American females are more likely to be obese than White or Hispanics adolescents. African American women are 70% more likely to be obese than Non-Hispanic White women (CDC, 2007). Furthermore, research notes that obesity in adolescence continues into adulthood (Freedman et al, 2005). Understanding the development of obesity in adolescence can possibly curb its continuation into adulthood. Several studies consider the environmental aspects that contribute to obesity in the African American population (Boyington et al., 2008; Kibbe and Offner, 2003 Kimm et al., 2002).

Purpose of Study and Research Questions

Many factors contribute to obesity. The study, however, examines family factors associated with the epidemic. The purpose of the proposed research is to examine the family factors associated with obesity. Some family factors that may contribute to obesity in African American adolescents are: (a) family environment, (b) socioeconomic status, (c) family practices. Given the purpose of the research the research questions are:

1. What family factors may contribute to adolescent obesity?
2. How do family environment, socioeconomic status and support for physical activity contribute to adolescent youth obesity and non obesity?

Significance of Study

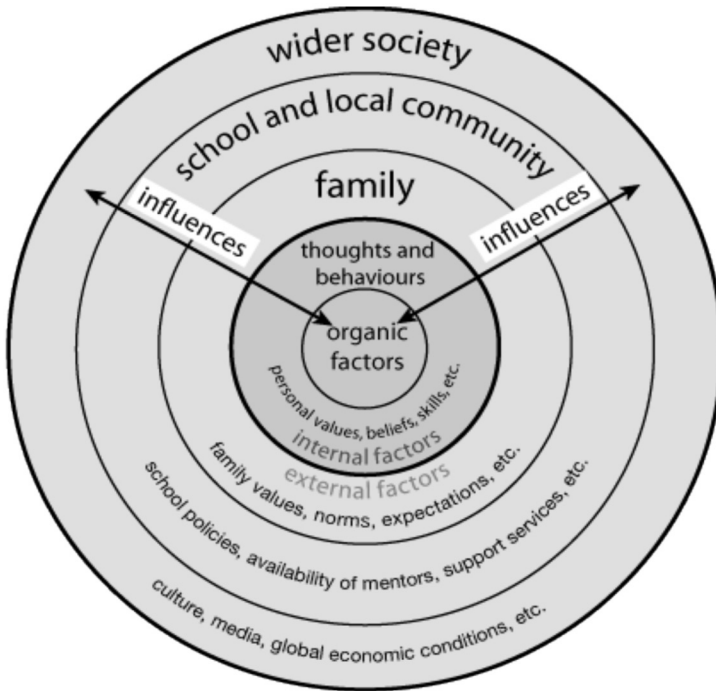
Studying family factors of adolescent obesity is significant due to the current increases of obesity levels. African American obesity levels are increasing significantly, resulting in many health consequences and increase health care cost. Research supports over the last two decades, there has been an upward trends in obesity among adolescents (Kaur, Choi, Mayo, & Harris, 2003).

Theoretical Framework

Some researchers say obesity results from an interplay of multiple factors which include family demographics and parental practices (Mei, et al., 1998). The ecological systems theory effectively frames the topic. Researchers Davison & Birch (2001) analysis Urie Bronfenbrenner's Ecological Systems Theory (1979) in relation to child development. In addition, the framework allows refinement of research questions included in the proposal. The theory defines how complex "layers" of the environment effect child development (Bronfenbrenner, 1979). Their analysis shows the environmental factors associated with childhood/ adolescence

obesity (Davison & Birch, 2001). The four systems described are the Microsystem, Mesosystem, Exosystem, and Macrosystem as Figure 1 displays. The microsystem is the most influential system because the child experiences their first contact with the environment, including interactions with parents (family), school, neighborhoods, and childcare environments. The child and those surroundings both influence each other. For example, a child's parents may affect his or her beliefs and behavior, and vice versa. Another name for this is the *bi-directional influence* (Davison & Birch (2001). Secondly, the microsystem and mesosystem are interrelated. In the mesosystem, family experiences are directly related to experiences outside the initial environment (microsystem). Each aspect of the system shows the connection surrounding the child's teachers, parents, neighborhood, and overall environment. Thirdly, the exosystem describes larger social systems that are not directly in contact with the child. Lastly, the macrosystem consists of cultural values, customs and laws. The system has a distance influence on development of obesity since it is the last level (Davison & Birch 2001).

In addition, the theory has been renamed "*bioecological systems theory*" to emphasize a child's own biology as a primary environment factor influencing development. Their biology in combination with the complex levels plays a role in development. The interaction between factors in the child's biology, immediate surroundings, and the broader societal landscape all influence development (Davison & Birch 2001). The framework effectively explains factors influencing child development that related to obesity. Davison & Birch conclude that the family environment is the strongest factor in the early development of obesity.

Figure 1

Displays the different environmental levels and influences on the child. First two inner rings display the microsystem- child's first environmental contact, mesosystem- immediate environment like family, exosystem-large social systems like school and community, and macrosystem- the wider society.

Literature Review

This chapter will cover obesity, adolescent obesity, and adolescent obesity in adolescence, factors associated with obesity in adolescent, health consequences, parental obesity status, cultural attitudes, and the family environmental factors associated with obesity in adolescent girls. It is evident that many of factors

Literature on Obesity in America

Prevalence of overweight and obesity has increased sharply for both adults and children, since the mid- seventies (CDC, 2008). The National Health and Nutrition Examination Surveys (NHANES) shows that “among adults aged 20–74 years the prevalence of obesity increased from 15.0% (in the 1976–1980 survey) to 32.9% (in the 2003–2004 survey)” (CDC, 2008). For many, adult obesity is a continuation

of a condition that developed as an adolescent (Freedman et al, 2005). Since the condition continues from adolescence then the associated health risk will not only continue, but develop into more serious ones. Many overweight people develop asthma, high blood pressure, high cholesterol and the development of cardiovascular disease (CDC 2007). Not all obese adolescents develop into obese adults, but obese adolescents have a higher risk of becoming obese adults. The health consequences will be discussed more specifically later on in the review.

Health consequences of obesity. Some health concerns surrounding adolescent obesity are asthma, diabetes, and pre-hypertension and colon cancer. Some of these consequences occur naturally out of the environment. As mentioned before, some health risk are diabetes, cardiovascular disease, high blood pressure, and breathing difficulties or asthma (Dalton, 2004). African Americans in particular suffer an increased risk for developing the disease.

In addition, various studies have shown a relation between adolescent obesity and hypertension. This problem needs to be curbed at a young age before it progresses into a mountainous issue (Dietz, 1998 & Freedman et al., 2005. The issue is the development of high blood, pressure and diabetes as an adult (CDC, 2007). It is imperative that the health risks are taken seriously because they have the potential for lasting a lifetime. On the contrary, it has been reported that among the studies revealing childhood obesity tracking in to adulthood, only 15% to 30% results from obesity beginning in adolescence.

Adolescent obesity. “One out of three children in the United States is either overweight or at a serious risk of becoming so” (Dalton, 2004, p.35). The data represents a large number that will continue to increase if something does not change. The following statistics from the Center for Disease Control and Prevention support the notion that obesity starting in adolescence is likely to persist in adulthood, “Obesity is of particular concern for our children, since overweight adolescents have a 70% chance of becoming overweight or obese adults” (CDC, 2008). With that alarming fact, the health risks associated are devastating. The following are some health risks associated with obesity in adolescents: (a) Type 2 diabetes, (b) cardiovascular disease, (c) advance maturation, (d) asthma, (d) gastrointestinal and (e) psychological problems (Vargus, 2006). Vargus’ discussion on the psychological health risk is important. Other researchers agree that adolescent weight gain can lead to other feelings of low self worth, and difficult peer relations (Boyington et al., 2008, Dalton, 2004, Kimm et al., 2002). Alleyne & Lapoint support that obese adolescents that are teased by their peers suffer from low self esteem and self worth (Alleyne & Lapoint, 2008). It is important to understand the social consequences associated with weight gain since it is an on going concern. Additionally, adolescents classified as obese have a difficult time socializing with their peers. Some fear that their peers are laughing or mocking their size (Boyington et al., 2008, & Kimm et al, 2002). This is why it is important to understand the impact of the environmental factors having on an adolescent obesity.

Obesity in adolescent girls. Adolescent years create an environment favorable to weight gain. Some girls experience more weight gain than their male counterparts. A study conducted by Dietz (2004), supports that adolescence is a critical period where weight constantly fluctuates:

Adolescence represents a third critical period when overweight may occur and may increase the risks of obesity in adulthood. The risk of becoming overweight during adolescence appears to be higher among girls than among boys, perhaps because adolescence in girls is characterized by a relative increase in fatness. (p.855)

This quote refers to the how girls develop compared to boys. Findings show that girls experience weight gain at a higher rate due to puberty related weight gain compared to their male counterparts. It also shows the long term consequence of adolescence obesity, which is the possible growth into adulthood obesity. Adolescent is a critical period for girls in particular because weight gain is common during puberty (Dalton, 2004). Research conducted in Kimm's study supports that a decline in physical activity is common during adolescent years due to the expected weight gain resulting from puberty for girls (Kimm et al., 2002).

Furthermore, findings of the National Heart, Lung and Blood Institute (NHLBI) reported that in addition to African American children/adolescents being at disproportionate risk, the prevalence of obesity in black girls specifically, is one third higher (31%) in comparison to white girls (Kibbe & Offner, 2003). Clearly, African American adolescent girls are at a high risk for developing obesity. Boyington et al. (2008) and Kimm et al (2002) provide some explanation to why African American girls are at a high risk. Young African American females are less likely to eat the recommended daily amount of fruits, vegetables, and whole grains, and are more likely to consume high amounts of fat and sodium (Boyington et al., 2008, Krebs, 2008 and Kimm et al. 2002). The study further reveals, in contrast, white adolescent girls are shown to eat more of the daily recommended amount of nutrition like the fruit, vegetables, and whole grains. One conclusion of the study is that consumption of these types of food will evidently lead to weight gain (Boyington et al., 2008, and Krebs 2008).

Asian American obesity literature. The World Health Organization has reported Asian youth have a higher risk, compared to other ethnic groups, for developing health problems related to obesity at a lower body fat measure. For example, a 12-year-old Asian boy who is 5 feet tall may be overweight at 125 pounds (BMI 25), and could have the same risk of developing diabetes as a white classmate of the same age and height who weighs much more at 155 pounds (BMI 30).

Factors Associated with Obesity in Adolescent Girls

There are many factors associated with obesity in adolescent girls. Some are (a) diet, (b) physical activity or inactivity, (c) genetics, (d) and Family Environmental characteristics associated

Diet Scientists have reached a consensus that obesity results from an imbalance of an individual's energy intake and energy output (Krebs et al., 2008). High energy intake coupled with low output creates an imbalance which can lead to weight gain. Having a high calorie diet and low physical activity levels is a leading cause of obesity (Krebs et al., 2008). Krebs study explained obesity in it's the simplest form. The amount of calories consumed by boys and girls differ. Studies show that boys eat more than girls. Various studies reveal that when compared to young white females, young African American females are less likely to eat the recommended daily amount of fruits, vegetables, and whole grains, and are more likely to consume high amounts of fat and sodium (Boyington et al, 2008 & Krebs et al., 2008).

Physical Activity There are clear racial and ethnic differences in physical activity levels. African American adolescents have lower levels of physical activity than white and Hispanic adolescents. Statistics from the YRBS, point out that 29.5% of African American adolescents met recommended physical activity levels compared to 38.7% of whites, and 32.9% of Hispanic adolescents (CDC, 2005). The recommended level is at least thirty minutes of sweat producing physical activity. There is a clear difference across ethnicities with activity levels. African American adolescents still lag behind.

Reis (2008) study supported that all racial and ethnic groups had low physical activities however; African American females had the lowest physical activities (Reis, 2008). To maintain a healthy weight it is recommended that adolescents engage in a minimum of thirty minute of moderate to vigorous daily physical activity. Boyington supports that African American adolescent females lag behind in physical activity. This is due to a couple of reasons. Boyington study explains that a large amount of African American girls do not exercise because they do not want to sweat their hair out (Boyington et al., 2008). In the African American community it is common to value your appearance more than physical health. Many of the girls in that study honestly said, "My hair style is an equal exchanged for me not exercising" (Boyington et al., 2008, p.2) Cultural environments play a huge role in whether or not, and how often this population exercises.

Genetics Genes determine if a person is likely to store excess energy from fat as lean muscle. A common saying is that we are fat because it "runs in our genes" (Dalton, 2004, p.46). Common thoughts as those may lead to the belief that weight gain is totally genetic. Genetics alone cannot explain obesity. Dalton suggests that environmental factors are largely associated with the development of an obesity status (Dalton, 2004, p.46). Recent studies conclude genetics only contributes 30% to the issue and 70% is attributed to the environment. One could also say that obesity runs in the environment, like the above statement of it running in our genes.

Some scientist says that certain types of people have a genetic predisposition to become obese aside from those genetic factors. Dalton asserts children are more vulnerable than others in the obesity epidemic. A geneticist J.V. Neel identified the environment changes everyday, faster than our bodies can keep up. The body will have a hard time adapting to the changes leading to excess gain (Dalton, 2004). This environmental as a prime driver of the obesity epidemic is termed the obesogenic environment (Elinder & Jansson, 2008). Obesity had has been link to an environment that cluttered with large portions sizes. There has been a rise in unhealthy food accessibility along with long physical activity levels which are factors related to the genetic aspect of obesity (Elinder & Jansson, 2008). If the environment stays constant then so will a person weight gain or weight lost.

Even though genetics has a role in obesity it only plays a part. The environment has always had a role as this reveals, "Certain genes increase child's potential for becoming fat, and then other factors fall under the nature (environment) category trigger that genetic predisposition until he or she actually becomes overweight" (Dalton, 2004,p.47). Individuals are constantly influenced by the environment in which they live. Simply put it helps shape you and that could not be truer in the obesity epidemic.

Family Environmental Characteristics

Family environment is one of the many determining factors for the rise of obesity among African American girls. Family environments are the key factors in developing food preferences and patterns that shape children's eating habits and physical activity desires. These factors can lead to African Americans girls having healthy or unhealthy weight status (Dalton, 2004 and Kimm et al, 2002). If a family supports sedentary behavior, i.e. watching television compared to going for a walk for instance, there is no push to incorporate physical activity into there daily routine. A study by Granich et al., revealed that less supportive families can show little concern for the level of sedentary activities their children participate in. "Excessive screen based activity" or watching television, as the study reveal, has excessive consequences; one being weight gain and asthma (Granich et al, 2008, abstract). On the other hand, a family supportive of active lifestyle will help lead to an adolescent with a healthy weight.

Especially during early and middle childhood, family environments are the key influencers for the development of food preferences, patterns of food intake, eating styles, and the development of activity preferences and patterns that shape children's developing weight status.

Low Socioeconomic Status Poverty and low education are some other risk factor associated with obesity. Individuals with a low socioeconomic status have a greater likelihood of becoming obese. Federal statistics show that, "23% of white and 34% of black earning 15,000 dollars or less is at risk for obesity" (Dalton, 2004, p.55). She further states that a low income decreases the options for consuming healthy low processed foods. The main concern of these families is to eat. The types of food eaten are of little concern. She also found that since African American

families are more prone to eating low quality high fat foods, they eat the foods they want their children to eat, and less of what they should eat. Fresh fruits and vegetables snacks are snacks they want them to eat (Dalton, 2004).

The families know the foods that are better for their children to consume. Access to these foods is another issue alone. Today's society provides increase access to fast on the go foods. Fast food restaurants and quickie shops are common in many neighborhoods in urban low socioeconomic areas (Boyington et al., 2008). It is easier to access foods that are not a hassle to prepare. Certain areas don't have access to supermarkets providing fresh produce, in comparison to more wealthy areas. It is important to understand how the environment as revealed is negatively associated with obesity in African American adolescent.

Parental Obesity A study supports that parents categorized as obese have relationships with their adolescents which lead to their development of obesity. Kosti et al., (2007) revealed that between school age children and parents there is an association between BMI's of the parent and child (Kosti et al, 2007). This shows that if a parent is obese, [BMI \geq 30] that the adolescent is likely to follow in their footsteps. This study suggests that parents are a strong influential factor when it comes to creating an environment that supports a certain level of health.

Boyington et al., (2008) further revealed that parents initiate the type of eating habits for their children which become the basis for life long eating patterns.

This quote explains how the parents shape the food environment early on in their child's life,

...relatively little research has assessed the extent to which parents (particularly parents who are overweight) select environments that promote overweight among their children. Parents provide food environments for their children's early experiences with food and eating. These family eating environments include parents' own eating behaviors and child-feeding practices. (Birch, 2001, p 894)

The results suggest that parents are critical in shaping their child's early food experiences which can be positive or negative. Parents create the foundation for their children to follow.

Dalton explains that parents eating choices will be reflected in the child's eating habits. There are a few that Dalton discusses like permissive, authoritative, and authoritarian styles about food choices. Parents adapting an authoritarian eating style use commands or coercion to get their children to eat. On the other hand food is commonly used as a reward and punishment (Dalton, 2004). A child's favorite food is used as a reward system; restricting that same food is used as a type of punishment. The notion of "cleaning your plate" commonly aids in overeating, and eventually an overweight status (Dalton, 2004, 79). The child will eat to clean the plate disregarding any recognition of fullness they may have. This behavior is followed because this is what the parents enforced. Another example of a command is "You can not go play if you don't eat all your dinner," showing the negative view of eating created from them that parent environment (Dalton, 2004, p.79). This

environments is one where overeating is subconsciously encouraged through those types of commands.

Cultural Attitudes toward Obesity Davis et al. study reveals African American parent view on obesity. The parents of obese children explain their child's condition with the term big boned, explaining that his or her takes after them, or it was caused by DNA (Davis, et al., 2008). Culturally, African Americans use the term "big bone" as an acceptable explanation to their child weight status. Some parents may not know all the consequences associated, but when provided with that information the parents quickly began to change the family environment. In addition, many African American families view obesity as not a huge concern. Moreover, any families view slight weight gain as healthy (Davis et al., 2008). The parent's perceptions need to be altered. If the parent continues to think that same ways the consequences related to obesity will never change.

Family Support for Physical Activity Families that openly support physical activity play a huge role in whether or not; the individual develops obesity (Kimm et al., 2002; Kuo, 2007 & Ries, 2008). If there are few opportunities for physical activity combined with unhealthy eating habits like over eating, obesity is likely to occur. Research indicates that recent increases in obesity are likely to result from the interaction of biological and social factors within a physical environment. This coupled with few opportunities for physical activity along with and eating excessive amounts of high calorie foods is associated with weight (Jebb, 1999, p.341).

There has been a great deal of focus on childhood obesity. According to Dietz (2004), during this time one would think that parents would naturally be more supportive of adolescent physical activities (Dietz, 2004). If the parents and family show interest in activities their adolescents are involved in, they would have more motivation to be active. Kuo et al (2007) further revealed the level at which the family environment can act as a determinate or motivation factor in contributing to physical activity (Kuo et al., 2007). A family that is supportive of active lifestyles will create an atmosphere where an individual is more prone and eager to participant in physical activity.

Summary and Implications of the Literature

Researching youth obesity specifically in the Baltimore area has proven difficult. Strength is that youth obesity in general is a widely researched topic creating abundant sources of information. The measures set to be used in the future study are family intimacy, family environment and family physical activity. The family intimacy scale is very important environmental characteristic when predicting levels of physical activity/non activity in the high school girls but it is not commonly well defined. In contrast, strength is there have not been many studies with predominately African American adolescent. The sample sizes are usually a mix of minority populations. This study will add to the current established literature.

Research Methods

An extensive literature review was conducted on the topic of adolescent obesity. Utilizing the research port www.lib.umd.edu to accumulate information on African American Adolescent obesity was essential to the completion of the paper. Some key search words used are family environment and adolescent obesity trends, urban areas, sedentary behavior and physical activity levels. The Journal of Pediatrics, Obesity Research, PubMed and Academic Search Premier were all utilized to compile the paper. Furthermore, the questionnaires will be Likert Scale based with the foundation of Scale Family Environmental Scale (Moos, 1974). The family environmental scale has various subscales that examine certain aspects of family life.

A qualitative study will be conducted at a local area high school in Baltimore city. Questionnaires will be distributed at the high school and will be voluntary. Parents and children were surveyed about family characteristics, family cohesiveness, parenting practices, sibling and family influences, and access in the home environment to sedentary pursuits. Below are examples of the measures assessed in the questionnaires.

Measures

Data were collected using questionnaires created specifically for each variable. Height and weight was also collected using standard measures. These reliable and valid measures have been tested in previous studies (Young et al., 2006). The family environment variables are family intimacy, family environment, parent obesity status and family support for physical activity.

Family Intimacy

The family intimacy questionnaire (Moos, 1974) consisting of five questions, was measured using the 5-point Likert Scale with (1) strongly agrees through (5) strongly disagree (Dickerson et al, 1996). It proved very effective. The following is an example of a statement: *My family spends a great deal of time in activities that we enjoy doing together.* In addition, Questions 1 and 2 were reverse coded so the response would remain positive.

Family Environment

One questionnaire addressed the family environment with twenty- seven questions that followed rating of true /false (Moos, 1974). Questions are grouped in these categories: cohesion, conflict, active recreational orientation (ARO) with nine questions falling under each (Moos, 1974). The responses from that questionnaire revealed how the participants viewed their families. Some questions also had reversed coding to keep outcomes positive. Two examples of a question that would yield a positive response are (a) *Family members really help add support for one another T (1) or F(0)*, and (b) *Family members hardly ever lose their tempers* (Moos, 1974). The statements overall gave a good description of how the girls viewed their family environment.

Family Support for Physical Activity

Another questionnaire assesses family support for physical activity. Questions were structured around the support given to the girls within the past month. Some were reversed coded to keep the responses positive. Thirteen questions were asked and measured using the 5- point scale with (1) never, (2) rarely, (3) a few times, (4) often, and (5) very often (Dickinson, et al). Examples of questions are: (a) “*During the last month, my family or members of the household exercised with me*” and (b) “*During the past month, my family members changed their schedule so we can exercise together* (Young et al, 2006). The questions addressed data revealing family receptiveness and attitudes toward exercising. Understanding how the family supports exercise creates a better look into the environmental effects.

Parent Obesity

Parent obesity has a strong relationship with adolescent obesity. A medical history table was distributed to gather information on various medical conditions for the mother, father, grandparent, and brother or sister. The various medical conditions are heart disease, stroke, high blood pressure, diabetes, anemia, and overweight or obesity, (Young et al 2006). The girls’ responses of the parents (mother and father) obesity status were used in the data analysis. The responses categorized as follows: *Yes (1) obese, No (2) not obese, Don’t know (9)* (Young et al, 2006).

The above measures have been used in many similar research studies and have proven to be very reliable and valid.



Scholarship and Empowerment in the Age of the Video Vixen: Promoting Black Adolescent Females' Academic Success

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Abstract

Throughout American history, popular culture and some academic disciplines have created limited characterizations of low income, urban, Black adolescent females as hypersexual vixens who are at risk for early sexual activity and low academic achievement. The promulgation of these negative sexual myths may cause Black adolescent females to internalize these myths and perform sexually explicit roles at an early age; consequently increasing their chances of low academic achievement. The purpose of the future ethnographic/self ethnographic study is to explore the ways that cultural framers such as: families (with emphasis on Black mothers) and the media influence Black adolescent females' motivation to obtain academic success, and resist or accept negative sexual myths. The researcher will use the framing theory and expectancy value theory to explore these relationships. The study will observe Black adolescent females that attend public middle schools in urban areas within the Baltimore/ Washington, D.C metropolitan area. The researcher will consider how racial, gender, and class socialization may frame the adolescents' life experiences and the methods that they use to construct their identities, value systems, and resistance strategies to combat negative sexual myths.

Problem Statement

The media and some academic disciplines have continuously attacked Black femininity and silenced Black female voices. They have created limited characterizations of low income, urban, Black adolescent females as hypersexual vixens who are at risk for: early sexual activity, pregnancy, and low academic achievement (Lipford Saunders & Bradley, 2005, p. 299). This problem is worthy of investigation because these Black adolescent girls are "disproportionately identified as 'at risk' (Hill-Collins, 1990)" (Lipford Saunders & Bradley, 2005, p. 299). The promulgation of these negative myths and representations may cause Black adolescent females to internalize these beliefs (Lipford Sanders & Bradley, 2005, 302) and perform these subordinate roles; consequently increasing their chances of low academic achievement. The negative sexual myths made about Black femininity may also lead to the "societal devaluation of their gender" and their status as a "racial minority" (Stevens, 1997, p. 149-150).

Negative representations of Black femininity may hinder Black adolescent girls' success in educational institutions, because the literature continues to analyze adolescent behavioral and academic norms based on the lifestyles and opportunities available to White middle class students. Duncan and McCoy (2007) assert that institutions in American society "convey the implicit message to Black youth... that the White middle class norm is the standard to which they should aspire, in school and in society" (p. 41). This is problematic because this narrative labels Black cultural norms as deviant and unacceptable. When educators label students that do not conform to the White middle class American value system, they are usually labeled as "rebellious," 'surly,' and as having 'attitude' adjustment issues" (Duncan & McCoy, 2007, p. 41). These stereotypes create a culture of low expectations for the demographic's chances of achieving academic success and performing positive Black feminine roles.

Purpose of Proposed Research

Given the aforementioned problem statement, the purpose of the future ethnographic/ self ethnographic study is to explore the ways that families and the media influence Black adolescent females' motivation to obtain academic success, and resist negative sexual myths. The study hopes to give Black adolescent females a voice, by specifically interviewing girls that attend public middle schools in the Baltimore/ Washington, D.C metropolitan area. The researcher will consider how racial, gender, and class socialization may frame the adolescents' life experiences and the methods that they use to construct their identities, value systems, and resistance strategies.

Research Questions

Given the aforementioned purpose statement and problem statement the following research questions may be proposed for future research: How do families and the media, specifically Hip Hop & gangsta rap music videos, influence Black adolescent females' motivation to obtain academic success and perform positive Black feminine roles? The subquestions are:

1. How do Black adolescent females value education and perceive their roles as Black girls in contemporary American society?
 2. What are the negative myths associated with Black femininity?
 3. What strategies do adolescent Black females use to resist negative sexual myths made about them in American culture, and cope with harsh ecological conditions of urban communities?
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Significance of the Topic

Analyzing the ways that families and the media affect Black adolescent females' motivation to obtain academic success, and resist negative sexual myths, may help researchers and advocates understand how these girls construct their identities. If researchers and counselors understand the "normative development and resiliency strategies" (Lipford Sanders and Bradley, 2005, p.299) used by African American girls they will be able to identify methods to help promote their interest and success in scholarship, and empower them to be confident and accomplished women. Providing Black girls with these tools will allow them to close the achievement gap and gradually combat the feminization of poverty. Advocates and policymakers can use this research to create new social programs aimed towards helping parents, communities, and the media promote the importance of scholarship in Black urban communities and increase their chances for success.

Summary of Theoretical Framework

The Framing Theory and the Expectancy Value Theory will be used in this study to explain the ways that Black families and the media frame the value of education and Black femininity in Black adolescent females' lives. Chong and Druckman (2007) state that the framing theory refers to the "process by which people develop a particular conceptualization of an issue or reorient their thinking about an issue" (p. 104). This theory emerges from the "expectancy value model of an individual's attitude (e.g., Ajzen & Fishbein 1980, Nelson et al. 1997b)" (Chong and Druckman, 2007, p. 105). It can be posited that Black adolescent girls construct their identities, attitudes, and values based on the way that the often opposing entities of the family and the media frame femininity, confidence, and the importance of scholarship. Sniderman & Theriault (2004) recognize the power of opposing frames, noting that individuals "are not exposed to just one frame of an issue... rather, they are exposed to competing frames" (Chong and Druckman, 2007, p. 111). Competing messages about Black femininity may confuse Black adolescent girls who have been "socialized" at home to believe that "the [media's representation of] unfeminine connotations attached to strength, persistence, expression of anger, and intelligence (J. F. Brown, 1993, p. 10)" are in fact "positive and functional" (Lipford Sanders & Bradley, 2005, p. 300).

Researchers debate whether individuals' attitudes are framed completely by their values, or if they are easily persuaded by contradictory frames (Chong and Druckman, 2007, p. 112). This may be even more controversial when referring to adolescents, because they are more susceptible to the

normative changes of early adolescence, such as the onset of puberty, peer group influences, and identity negotiation, [which] often result in short-term decrements in motivation and achievement during middle school from which most students, boys and girls alike, eventually recover (Eccles & Midgley, 1989; Simmons & Blyth, 1987)" (Taylor & Graham, 2007, p. 52).

It is likely that Black adolescent girls will value academic achievement and be motivated to succeed if their family and their media references emphasize the “importance, attractiveness, and usefulness of achievement-related activities” (Taylor & Graham, 2007, p. 53). The girls’ values will be shaped by their “cultural experiences” which are shaped primarily by one’s family and community, and “societal influences” (Taylor & Graham, 2007, p. 53) from different media, such as Hip Hop and gangsta rap music and music videos.

Assumptions

I assume that most literature will analyze Black adolescent female development, perceptions of femininity, and academic achievement based on the lifestyles and opportunities available to white middle class students. I have come to this conclusion because limited research has been conducted to analyze the development of Black adolescent girls. I assume that urban Black girls do face barriers to receiving a quality education, and that academic achievement may not always be their first priority if they face other hardships. For the purpose of this study, I assume that the educational institutions are interested in and capable of providing Black adolescent girls with the tools to achieve academic success. I believe that family and the media can frame the way that adolescents value education and perform gender and racial roles. I do assume that there are negative sexual myths made about Black females, and that Black females are able to utilize strategies to resist these myths and emanating roles. The promulgation of these negative sexual myths may cause Black adolescent females, their parents, and teachers to internalize these beliefs; fostering a culture of low expectations, thus increasing their chances of low academic achievement and the feminization of poverty.

In reference to the future study, I assume that the girls in the study will be open to discuss their life and academic experiences if I gain rapport with them and their families. Although I assume that girls from the ages of 15–18 will be the most aware of their sexuality and academic aspirations, I believe that it is most important to conduct ethnographic research on adolescent girls from the ages of 11–14, because they are in the early stages of adolescent/ pre-adolescent development. If researchers are able to understand how they construct their identities and values, families and counselors may be able to build the girls’ confidence and promote their interest in scholarship.

Limitations

The length of the McNair Summer Research Institute served as a limitation to my study. The Summer Research Institute was only scheduled for five weeks, so it was only enough time for me to create this research proposal. I was not able to cover as many of the cultural factors and structural factors that may serve as barriers to Black adolescent females’ academic achievement. Most importantly, there is a limited amount of literature that focuses on barriers to Black adolescent females’ academic

achievement, and how negative sexual myths created about them in academia and the media may serve as barriers. As for the future study, I will have a difficult time conducting extensive ethnographic research with a large sample, because I will be taking other courses in the fall and the spring of my senior year in college. I hope to cover this topic extensively in graduate school.

Delimitations

My study will not attempt to explain curriculum and school practices, nor will it explain the achievement gap among Black adolescent girls and White adolescent girls. I will not attempt to research the differences in academic achievement among Black girls of different social classes. This study will not compare the academic success of Black adolescent males and the negative stereotypes that they face, with those of Black adolescent females. I will not extensively explore the different structural barriers that may hinder Black adolescent female academic achievement.

Scope

My study will explore the cultural factors that may serve as barriers to black adolescent females' academic achievement. I intend to show the relationship between the way the family and the media frames the importance of academic achievement and the performance of positive Black female roles. In addition, I hope to convey how the girls' actually value academic achievement and their roles as Black females.

Definitions

This study will use terms unique to the investigation of ways that families and the media influence Black adolescent females' motivation to obtain academic success, and resist negative sexual myths that may decrease their chances of success.

Academic Success

For the purposes of this study I will define academic success as a student's ability to: work efficiently in an educational setting, gain proficiency in their academic courses, motivate themselves to do their best, learn techniques to continuously improve their skills, learn how to balance their social and academic lives, and possibly earn "B" grade point averages and above.

Video vixen

For the purposes of this study I will define video vixen as a scantily clad woman who appears in Hip Hop and gangsta rap music videos. She is usually depicted as a Black or Latino woman, and is characterized as a beautiful, vindictive, gold-digger whose "sole purpose is to look good and be desirable to men (Emerson, 2002)" (Gordon, 2008, p. 246).

Gangsta rap

For the purposes of the study I will define gangsta rap, as rap music that is characterized as violent and misogynistic (Hill Collins, 2004). This genre of music's lyrics and music videos depict the supposed lifestyles of Black and/or minority gangsters, who are usually males that reside in low income, urban areas.

Feminization of Poverty

For the purposes of the study I will define the feminization of poverty as a phenomenon that “occurs wherever there are insufficient efforts to reduce poverty either through the labor market or social welfare policies and where single motherhood is sufficiently widespread” (Schaffner Goldberg & Kremen, 1990, p. 201).

Culture

For the purposes of this study I will define culture as the traditions, values, and common lifestyles specific to a group of people. Culture is “regularly characterized by ‘the publicly available symbolic forms through which people experience and express meaning’ (Swidler 1986:273)” (O’Connor, 2001, 160).

Social Capital

For the purposes of this study, social capital theory is measured by the “quality and quantity of the networks that connect children and adolescents with the resources of their parents (i.e., resource capital including financial and human capital)” (Mullis, R., Rathge, R., Mullis, A.K., 2003, p. 542).

Sexuality

For the purposes of this study I will use Hill Collins’s definition of sexuality: “Sexuality is not simply a biological function; rather, it is a system of ideas and social practices that is deeply implicated in shaping American social inequalities” (Hill Collins, 2004, p.6).

Black Sexual Politics

For the purposes of this study I will use Hill Collins’s definition of Black sexual politics: “Black sexual politics consists of a set of ideas and social practices shaped by gender, race, sexuality, that frame Black men and women’s treatment of one another, as well as how African Americans are perceived and treated by others” (Hill Collins, 2004, p.7)

Literature Review

This literature review will address pertinent issues that may hinder Black adolescent girls from attaining academic success and confidence. This chapter will address the following topics: a.) Academic Research Silencing Black Female Voices, Sexualizing their Bodies, b.) Media & Hip Hop/ Gangsta Rap Music Videos’

Influence on Black Adolescent Females c.) Families & Black Mothers' Influence on Black Adolescent Girls' Development & Academic Success.

Academic Research Silencing Black Female Voices, Sexualizing their Bodies

Since researchers have often excluded Black adolescent females' perceptions about their roles in American culture and the sexual stereotypes created about them, generalizations have been made about the girls' limited chances of achieving academic success. Lipford Sanders & Bradley (2005) note that "a discussion of African American adolescent girls must also recognize the marginal and often invisible status of African American women in the United States" (p. 302). Some scholars argue that racism and a milieu of "White privilege among counseling scholars (Robinson & Ginter, 1999)" have attributed to the "almost complete erasure of female... students from research on Black adolescent identity and Black youth culture" (Lipford Sanders & Bradley, 2005, p. 302; Duncan & McCoy, 2007, p. 42). The exclusion of Black females from this discourse may be attributed to scholars, even White female scholars, that use "similar racist and ethnocentric approaches with the assumption that gender is the primary locus of oppression for all women... (Jackson & Greene, 2000)" (Lipford Sanders & Bradley, 2005, p. 302). The limited research on this topic has "left [counselors, academics, and politicians] to draw their own conclusions about the identities and experiences of African American women and girls" (Lipford Sanders & Bradley, 2005, p. 302) from various biased media sources.

Duncan and McCoy (2007) note that the "suppression" of Black adolescent female voices contributes to the oppression of "Black communities and the larger society" (p. 42). Angela Dillard agrees with this statement, as she asserts that "the major loser in this shifting discourse about race and identity in America... may prove to be poor blacks, who pathologized and silenced, will continue to be everybody's convenient and favorite scapegoat" (Jordan -Zachery, 2009, p. 28). Duncan and McCoy (2007) emphasize that society's acceptance of "university-trained experts" in the late 19th century, created racist and highly sexualized myths about Black men and women that "reinforced extant popular racial imagery and survive today in the public domain as commonsense notions" (p. 40). Hill Collins (2004) notes that lasting social constructions of racial and sexual differences created in academia and internalized by American society, "distinguish[es] Whites ([as]carriers of 'normal' gender ideology and sexual practices) from Blacks ([as]carriers of 'deviant' gender ideology and sexual practices)" (p.44).

The notions of racial and sexual differences were evident during the 19th century, when a Khoi woman (modern day South Africa), named Sarah Bartmann was caged and placed on display in exhibitions in Paris and London (Hill Collins, 2004, p. 27). She was displayed as a "sexual 'freak' of nature," (Hill Collins, 2004, p. 27) because of her "'grossly overdeveloped labia,' and 'enlarged clitoris,' and large buttocks" (Byrd, 2004, p.11). Researchers labeled her as the "Hottentot Venus," and declared that her oversized sexual organs and body parts proved that Black women were subject to a "'primitive' sexual desire" (Byrd, 2004, p.11). Hill Collins (2004) asserts that Sarah Bartmann's "treatment helped create modern Black sexual stereotypes of the jezebel,

mammy, and the welfare queen that, in the United States, helped uphold slavery, Jim Crow segregation, and racial ghettoization” (p.28). This detestable legacy continues today, as Black females, especially low income and urban Black females, are depicted as high maintenance, gold-digging vixens or as young, lazy, and promiscuous teenage mothers. They have been “forced to negotiate the traces left by these contaminated constructions of black female sexuality,” (Byrd, 2004, p.11) and are left little room in the discourse to create new positive identities.

Media & Hip Hop/ Gangsta Rap Music Videos’ Influence on Black Adolescent Females

Chong and Druckman (2007) state that “frames in communication matter... they affect the attitudes and behaviors of their audiences” (p.109). This is especially true for young children and adolescents, because they are “growing up in a media-saturated environment” (Gentile, Walsh, 2002, p.159). Black youth seem be more exposed to media forms as they have been reported to watch “an average of almost 6 hours of screen media each day (i.e., TV, videos and/or DVDs, and movies), in comparison to an average of 3 hours and 47 minutes for White youth (Roberts, Foehr, & Rideout, 2004)” (Gordon, 2008, p. 246-247). Cole and Guy-Sheftall (2003) convey that patriarchal American media influences females internalization of negative sexual roles, as it frequently represents them as “half-naked, promiscuous, man-hungry, and lacking in self-esteem” (p. 199). Since the media is very influential in the lives of Black youth, this increased exposure may greatly influence Black adolescent females’ ideas of “what women are like and what their role is in society” (Gordon, 2008, p. 245).

During the past 20 years, the billion dollar Hip Hop music industry has framed many “damaging racial/sexual images” (Cole, J. and Guy-Sheftall, 2003, p. 184) of Black femininity, which can strongly influence Black adolescent females’ negative construction of their identities. Hip Hop and gangsta rap popularized the image of the video vixen and refer to Black females as “‘bitches,’ ‘hos,’ ‘freaks,’ ‘skeezers,’ ‘gold diggers,’ and ‘chickenheads’” and “malign Black women, ‘decent’ and ‘street’ alike” (Hill Collins, 2004, p. 82). Hill Collins (2004) conveys Black females’ historical and contemporary roles of marginalization,

One Black female can easily replace another and are all reduced to their bodies. Ironically, displaying nameless, naked bodies had a long history in Western societies, from the display of enslaved African women on the auction block under chattel slavery to representations of Black female bodies in contemporary film and in music videos. (p.128-129)

These prevalent characterizations of women provide Black adolescent females with limited ideas for their future roles in American society. Even if other cultural factors are present in Black adolescent girls’ lives that may teach them to positively shape their identities and values, they are “simultaneously bombarded with negative media images of their racial and gender groups” (Gordon, 2008, p. 245).

Hip Hop and gangsta rap have attacked Black femininity. Its weapons of choice are misogynist lyrics and insulting music videos. These media forms have intruded the homes, televisions, and minds of “young Black boys and girls at an early age. The lyrics, images--- and attitudes that undergird them—are potentially harmful to Black girls and women in a culture that is already negative about our humanity, our sexuality, and our overall worth” (Cole and Guy-Sheftall, 2003, p. 186-187). Even more it attacks females of lower economic statuses, as it exhibits “class biases with respect to women” and a belief that “it’s all right to treat *certain* women disrespectfully and label them ‘bitches’ and ‘hos’ because that’s who they are and that’s what they deserve” (Cole and Guy-Sheftall, 2003, p. 188). Chong and Druckman (2007) state that individuals “should be more susceptible to framing in the early stages of exposure to an issue, when they are less knowledgeable about the consequences of the issue” (p. 118). This explains Gordon’s (2008) notion that “younger adolescents are more vulnerable to media messages about Black women” (p.253). In her study she found that “younger girls expressed stronger agreement with appearance attitudes, suggesting that they are more invested in societal norms about the importance of appearance” (Gordon, 2008, p.253). Ward and Rivadeneyra’s (2002) analysis of mainstream Black music videos “found sexual imagery in 84% of the videos, with the most frequently occurring sexual behaviors involving sexual objectification... Seventy-one percent of women in these videos were dressed in provocative clothing or wore no clothing at all” (Gordon, 2008, p. 246). When Hip Hop and gangsta rap music videos represent Black females in these subordinate roles, the entire group is dehumanized, and provide young impressionable Black girls with a “one-dimensional image of Black womanhood” (Gordon, 2008, p. 246).

Barriers to Academic Success

The state of America’s urban public education system has always been characterized by “low student-performance outcomes, student discipline problems, poor student health, and limited access to supplemental learning resources” (Lewis, James, Hancock, & Hill-Jackson, 2008, p.131). American society has often associated academic success and academic failure with race, gender, and class. Lewis, et al (2008) notes that the “African American family’s culture or deficient family and community practices” (p. 128) have been blamed for causing the achievement gap between Black and White students, but many scholars dispute this factor and blame racism and structural factors. This topic is very controversial, but some scholars are beginning to realize the complexity of the intersectionality of race, gender, class, and location, and how “structure and culture operate simultaneously to affect achievement outcomes” (O’Connor, 2001, 159). An example of the importance of intersectionality is clear when examining how structural differences may be to blame for the achievement gap among “urban students...[and] suburban or rural students, [who] face the added challenge of overcoming limited access to critical educational resources and knowledge” (Lewis, et.al, 2008, p. 131), versus the cultural and ecological factors that may hinder urban students such as “the

community, family, peers, and cultural beliefs” (Mullis, R., Rathge, R., Mullis, A.K., 2003, p. 541).

Adolescents’ attitudes toward school are often affected by their physical development process and their cultural framers. Taylor and Graham (2007) state that the physical and social changes that adolescents experience during middle school such as “the onset of puberty, peer group influences, and identity negotiation, often result in short-term decrements in motivation and achievement. . .from which most students, boys and girls alike, eventually recover (Eccles & Midgley, 1989; Simmons & Blyth, 1987)” (p. 52). Graham and Weiner’s (1996) Expectancy Value theory can be used to explain students’ motivation to do well in school, because it will most likely be based off of “the perceived likelihood that an achievement outcome will be obtained (expectancy) as well as how much that outcome is desired or wanted (value)” (Taylor & Graham, 2007, p. 53). They also assert that way that students value education is framed by their “cultural experiences” and “societal influences” that determine how helpful academic achievement will be to them in the future (Taylor & Graham, 2007, p. 53). It is possible that some low income, urban Black adolescent females will “perceive that racial inequality poses limits on their social and economic mobility” and they may be “less likely to believe that working hard in school will have long-term payoff” (Taylor & Graham, 2007, p. 53).

Since adolescents are easily swayed cultural factors such as the media may influence their motivation to succeed in school. Chong and Druckman (2007) emphasize that “framing can be construed in both positive and negative terms” (p. 120). Communication frames in the media often depict images of Black adolescent and adult roles in American society in negative ways. Tatum (1992) states that, “Often, [Black] African Americans are either invisible [simply omitted from discussion] or represented in ways that are based on negative stereotypes. Absent or distorted images cannot inspire or reinforce the positive outcomes of educational and economic achievement” (Duncan & McCoy, 2007, p. 38). Tatum (1992) also noted that “curricular interventions can influence these students to gain new frames of reference that include those that view academic success as consistent with “a genuine African American identity” (Duncan & McCoy, 2007, p. 38). The media and specifically Hip Hop and gangsta rap music videos do not present images of Black adolescent girls’ academic achievement. They associate genuine Black femininity with sexuality and materialism, not academic achievement. Gordon (2008) states that “the media frequently present the image that women’s primary purpose is to be the young, sexy, and beautiful object of male attention, regardless of their occupation and intelligence” (p.247). If the intelligence of women, especially Black women is not promoted in American media and specifically Hip Hop and gangsta rap music videos, Black students may “adopt oppositional identities that lead them to reject academic achievement as a consequence of these cultural distortions and omissions” (Duncan & McCoy, 2007, p. 38). Gordon (2008) suggests that Black adolescent girls across socio-economic statuses who have a history of high academic achievement may not be at risk for internalizing the negative myths that the media

perpetuates (p. 253). She also asserts that these girls “may have already developed a sense of competency and self-worth that stems from their academic achievement rather than from their appearance. These girls may also view media content through a more critical lens than the average student” (Gordon, 2008, p. 253).

Families & Black Mothers’ Influence on Black Adolescent Girls’ Development & Academic Success

Families help Black adolescent girls frame the foundations of their value systems, beliefs, and attitudes about the importance of Black female roles and academic success. There is limited research analyzing the Black family’s influence on Black adolescent girls. More specifically the available research labels “Black families as monolithic. Few studies incorporate both lower-class and middle-class Black families...” (Ferguson Peters, 2007, p.204). Mullis, R., Rathge, & Mullis, A. (2003) propose that Coleman’s (1988) social capital theory noted that “family and community support are related to academic, social, personal, and economic attributes of students” (p. 542). Social capital theory is measured by the “quality and quantity of the networks that connect children and adolescents with the resources of their parents,” (Mullis, R., Rathge, R., Mullis, A.K., 2003, p. 542) such as access to quality education systems, mentors, and/ or jobs, etc. In low income, urban communities, Black women are often the primary caregivers of Black children and adolescents, and most likely play a larger role in framing expectation values for Black youth. Their role is especially important, because they serve as many Black adolescent girls’ first role models. These women frame their daughters’ understanding of the importance of Black femininity by challenging negative cultural and sexual myths and “redefining what it means to be a black woman” (Ridolfo, 2007, p. 18) in American society. Hill Collins believes that Black women teach their daughters the value of “assertiveness and other ‘unfeminine’ qualities as necessary and functional attributes for Afro-American womanhood...” (Ridolfo, 2007, p. 18). She also states that “‘black women’s self valuation challenges the content of externally defined controlling images’ (Collins 2004:107)” (Ridolfo, 2007, p.18) such as those from Hip Hop and gangsta rap music videos. Stevens (1997) suggests that Black adolescent girls may actually be susceptible to perceiving the “societal devaluation of her gender, but more importantly, societal devaluation of her as a member of a racial minority” (p. 149-150). Querimit and Conner (2003) agree with Hill Collins, emphasizing that Blacks have a “long history of endurance, survival, and coping. Some of the common stressors of Black youth survival are educational biases, paucity of political power, health disparities, and racism (McKenry, Everett, Ramseur, & Carter, 1989; Parham, White, & Ajamu, 1999)” (Querimit and Conner, 2003, p. 1216). They note that this history of resiliency allows “African American adolescent females [to] exhibit many strengths and personal assets even in the face of adversity” (Querimit and Conner, 2003, p. 1216). As Black mothers teach their daughters more resiliency strategies, the girls will be able to challenge negative cultural and sexual myths in American society. Furthermore, these parenting strategies stress that “Black daughters are

expected to work, to strive for an education and to anticipate their future role in supporting their families (Collins, 2000)” (Ridolfo, 2007, p. 22). These lessons will empower the girls to value Black femininity, respectability, and education.

Scholars often debate the magnitude to which a family’s socio-economic status negatively or positively influences adolescents’ motivation to achieve academic success and positive self development. Ridolfo’s (2007) study found that “Black mothers’ socialization may help protect and promote a positive self-concept during adolescence, [but] young minority girls still face a number of disadvantages based on their race and socioeconomic statuses” (Ridolfo, 2007, p. 56). Although this is true, a growing number of scholars assert that parents frame the importance of adolescents’ academic success “through their expectations for achievement. Adolescents whose parents expect them to do well tend to live up to those expectations...” (Mullis, R., Rathge, R., Mullis, A.K., 2003, p. 542) and this can be independent of socio-economic status. Studies have found that “younger adolescents who enjoy supportive, harmonious, egalitarian home environments are usually better prepared to benefit from schooling (Juang & Silbereisen, 2002)” (Mullis, R., Rathge, R., Mullis, A.K., 2003, p. 541). It is clear that children and adolescents who are raised by more wealthy and educated parents will have “more advantages and opportunities for achievement,” (Mullis, R., Rathge, R., Mullis, A.K., 2003, p. 541) because they have more access to social capital and financial resources. It has been noted that “parents in all socioeconomic status groups are frequently reported to value education and want their children to succeed,” but more affluent parents “tend to be more active in their children’s education and have higher expectations of their children’s career choices (Alspaugh & Harting, 1995; Gutman & Eccles, 1999; Juang & Silbereisen, 2002)” (Mullis, R., Rathge, R., Mullis, A.K., 2003, p. 541). Some scholars suggest that affluent and educated parents who have “achieved career and economic success can be role models of achievement for their children (Wentzel & Feldman, 1993)” (Mullis, R., Rathge, R., Mullis, A.K., 2003, p. 541) and serve as a source of social capital. These classist ideologies will remain, but there seems to be a consensus that “parental monitoring, fairness, and warmth” and parental involvement in students’ lives can promote “higher academic achievement” (Mullis, R., Rathge, R., Mullis, A.K., 2003, p. 541).

Research Design and Methodology

Role of the Researcher

I plan to use ethnographic research methods in the future study. During the fall I plan to interview four Black adolescent girls, from the ages of 11-14, at a public middle school in the Baltimore/ Washington, D.C. metropolitan area. I want to learn about their life experiences and how their families and the media, specifically Hip Hop & gangsta rap music videos, influence their motivation to obtain academic success and perform positive Black feminine roles.

Data Collection Strategies and Data Sources

To complete the literature review, I searched for books on the University of Maryland, College Park's library website. I used the online catalogue to search for books that were related to my research topics and questions. I used words such as <adolescent black girls>, <development>, <education>, <academic success>, <academic barriers>, <media>, and <framing theory> to conduct the online searches. Once I found the books that I needed I went to the University of Maryland, College Park's McKeldin Library, and found the books in the library stacks. I utilized the University of Maryland, College Park's library website and the Research Port to find several scholarly journal articles. I used some of the same terms listed above to find the articles.

In the future research project, I will use qualitative research methods, such as ethnography and self ethnography, to observe and analyze how families and the media frame the importance of academic achievement, and positive Black feminine roles for Black adolescent females. Caughey states that it is imperative to "explore how cultures work at the individual level and how people manage their cultural conditioning" (Caughey, 2006, p.8). Exploring the adolescents' life history narratives would reinforce the fact that race, gender, and class socialization are important factors in understanding individuals' life experiences and resiliency strategies. I will be cognizant that everyone adopts multiple cultures and lifestyles based on their life experiences.

I will conduct ethnographic interviews with Black adolescent girls, from the ages of 11-14, at a middle school in the Baltimore/ Washington, D.C. metropolitan area. I will consult the principal of the school and the parents of the possible students, and students, and ask for their permission to conduct the ethnographies. I will ask the teachers to randomly select four girls for me to interview during an afterschool program.

Data Analysis Strategies

I will analyze the data that is found from the ethnographic/ self ethnographic research through transcription analysis and thematic analysis. This will allow me to expand my conceptual framework and analyze the main topics that the girls' discussed in the ethnographies.

Strategies for Minimizing Bias and Error

Lipford Saunders and Bradley are frustrated because most research conducted in the social sciences studies low income, Black adolescent females, and help to perpetuate negative stereotypes about Black families (Lipford Saunders & Bradley, 2005, p. 299). While conducting research I will be sure to note that although the informants were raised in Black families of low socio-economic statuses, their experiences should not be used to represent the experiences of all black girls. As

bell hooks stated, “there is no one story of African American girlhood” (hooks, 1996, p. 13).

Sanders and Bradley (2005) note that “development for children of color is best understood using a multidimensional focus inclusive of gender, race, ethnicity, and social class (p. 299). I will be sure to consider all of these concepts while observing the participants and analyzing their responses. I will also utilize self ethnography to ensure that I understand how my own life experiences of being a Black girl, growing up in a low income, urban community, may affect my analysis of the girls’ experiences and academic aspirations. I will also consult my mentor to make sure that I am not making biased assumptions.

Ethical Considerations

Confidentiality and respect will be essential to this study, especially because I will be working with pre-adolescent / adolescent youth from the ages of 11-14. I will be sure receive permission to conduct the interviews with the girls, from the middle school principal, parents, and the female students, and will require everyone to sign consent forms. I will make all parties aware of the type of questions that I will ask the girls, and inform them of the nature of the study. My goal is to ask age appropriate questions, but they will be personal questions, so that I can gain a better understanding of the participants’ entire life stories. I will not force the girls to answer any questions that they do not feel comfortable answering.

Findings, Conclusions, and Recommendations for Future Research

Findings from the Literature

The main research question of the study was: *How do Black families, especially Black mothers, and the media forms of Hip Hop & gangsta rap music videos, influence Black adolescent females’ motivation to obtain academic success and perform positive Black feminine roles?* Limited research has been conducted to answer this direct question. In fact, limited research has been conducted to analyze the way that the two entities separately frame the value of academic success and positive Black female roles for Black adolescent females.

The first sub-question is, *How do Black adolescent females value education and perceive their roles as Black girls in contemporary American society?* The third sub-question is, *What strategies do adolescent Black females use to resist negative sexual myths made about them in American culture, and cope with harsh ecological conditions of urban communities?* I did not find literature that directly addressed these questions. This is most likely because of the limited amount of research conducted on Black adolescent girls’ normative development and resiliency strategies (Lipford Sanders & Bradley, 2005). I did find that Black women and mothers teach their daughters resiliency strategies, and as a result the girls are able to value education and gain a strong work ethic (Ridolfo, 2007).

The second sub-question asks, *what are the negative sexual myths associated with Black women?* I found that Black women were represented as having a “‘primitive’ sexual desire” in comparison to chaste white women (Byrd, 2004, p.11). Hill Collins (2004) notes that some of the “modern Black sexual stereotypes” are those of the “jezebel, mammy, and the welfare queen” (p.28). She suggests that these representations fostered an American society that supported “slavery, Jim Crow segregation, and racial ghettoization” (Hill Collins, 2004, p.28). Today these images have been redeveloped and mass produced through Hip Hop and gangsta rap music videos. These music videos have characterized Black females as “‘bitches,’ ‘hos,’ ‘freaks,’ ‘skeezers,’ ‘gold diggers,’ and ‘chickenheads’” and “malign Black women, ‘decent’ and ‘street’ alike” (Hill Collins, 2004, p. 82). As a result, young Black females have been forced “to negotiate the traces left by these contaminated constructions of black female sexuality” (Byrd, 2004, p.11).

Conclusions Based on Analysis of the Literature

Jordan -Zachery (2009) emphasizes that race and gender are two social constructions that have been dependent on each other throughout history to segregate individuals and portray some groups as “dominant and ‘normal’ and others as subordinate and ‘other’” (p. 26). Researchers, politicians, and Hip Hop and gangsta rap artists have continually constructed Black females as ‘other’ to “maintain these power relations and structures” through “cultural myths and symbols---which are often based on stereotypes” (Jordan -Zachery, 2009, p. 26). Gordon (2008) notes that the cultural myth and symbol of the “sexually promiscuous Jezebel, [was] an image created and popularized to justify the sexual exploitation of Black women during and after slavery (Patton, 2001; Simms, 2001)” (p. 246). Jordan-Zachery asserts that “overtime these multiple marginalizations have resulted in the development and redevelopment of a number of cultural symbols and icons used to represent black womanhood” (p. 26-27). Today the jezebel has transformed into one of the most ubiquitous symbols of Black womanhood, the video vixen.

The video vixen has appeared in Hip Hop and *gangsta* rap music videos for the past 20 years, but her role has been popularized during in the 21st century. This term has not been used by many scholars in recent literature, and the word is still very exclusive to the mainstream Hip Hop world. This prevalent negative sexual symbol of Black femininity is consumed by many Black adolescent girls in contemporary American society. Scholars have noted that “African American children are... susceptible to media influence because they tend to identify closely with and imitate the behavior of characters, especially Black characters (King & Multon, 1996; Stroman, 1984),” (Gordon, 2008, p.247) since there is a limited amount of Black women represented in the media. Gordon (2008) agrees and suggests that Black adolescent girls will therefore be “vulnerable to internalizing media messages that emphasize the importance of beauty and appearance for girls and women,” (p.247) instead of messages of self worth and intelligence. Black adolescent girls do have the capability to resist these negative cultural myths, but they will need strong familial support systems to empower them to create their own positive identities. Ridolfo

(2007) suggest that Black women help frame their daughters' understanding of the importance of Black femininity by challenging negative cultural and sexual myths and "redefining what it means to be a black woman" (p. 18) in American society.

Since "framing can be construed in both positive and negative terms," (Chong and Druckman, 2007, p. 120) the family and the media will have a great influence on the ways that academic achievement and positive Black feminine roles will be internalized and performed by the adolescent girls. Using the framing theory, it can be posited that communication frames such as Hip Hop and gangsta rap music videos, often "[manipulate and deceive]" Black females so that they will "acquire common beliefs" (Chong and Druckman, 2007, p. 120) about their subordinate roles in patriarchal society. These media forms frame the girls' empowerment as unnecessary, mainly because they frame Black female roles as powerful, but *only* through their sexual prowess and ability to seduce men. If Black adolescent females are not valued for their intelligence and/ or humanity, they may "adopt oppositional identities that lead them to reject academic achievement as a consequence of these cultural distortions and omissions" (Duncan & McCoy, 2007, p. 38). Jordan-Zachery (2009) suggests that internalizing these subordinate racial and gender roles will cause Black females to be marginalized "in their relationships with black men" (p. 26). The symbols created in Hip Hop and gangsta rap music videos frame a future of destructive Black sexual politics. The promulgation of images of video vixen will negatively influence boys' and girls' expectations for relationships, which are built off of soft pornographic sexual fantasies, and will result in harsh realities for female empowerment. In addition, the internalization and performance of these negative sexual roles can lead to Black adolescent females' placing themselves at a greater risk of becoming pregnant, contracting STDs, HIV, and/or AIDS, dropping out of school, and living in poverty as adults. Today's adolescents will have a greater chance of being at risk of "being victimized by poverty, crime, abuse, health problems, and lack of relevant educational and employment opportunities" (Watkins and Iverson, 1998 p.169). Querimit and Conner (2003) suggest that youth can be empowered to fight the barriers that they may face to attaining academic success by teaching them to about "the social inequities and oppression" (p. 1216) that their ancestors endured in the past. If advocates and families teach Black adolescent females about the history of Black females' marginalization, in addition to Black females' success in American society, they may be able to learn resiliency strategies to combat attacks on Black femininity and barriers to their academic and economic success.

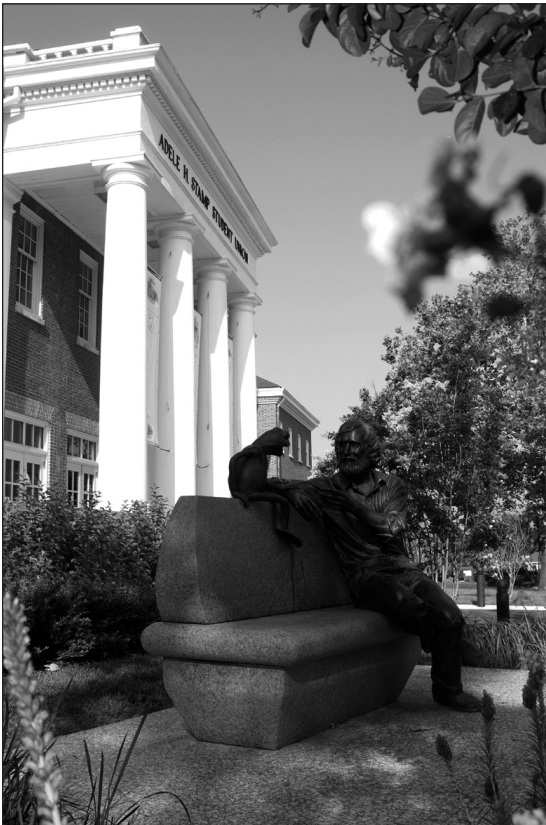
Recommendations for Future Research

In addition to the current research proposal, I would like to conduct more ethnographic research on the ways that Black adolescent females' peer groups, school environments, and communities influence Black adolescent females' motivation to attain academic success and perform positive Black feminine roles. This is important because there is currently a limited amount of research that analyzes these topics, and understanding these relationships will help advocates empower young Black females to construct positive identities and achieve academic success.

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Brain Behavior is Related to Motor Behavior During Competition

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Abstract

In this study the alpha band waves of low to moderately skilled pistol shooters are evaluated to examine the performance of the individuals under a competitive environment. The factors that cater to success in the autonomous stage of learning are different for the athlete. There has been investigation of the brain patterns of experts, while performing a task is efficient and in accord with Fitts and Posner's claims of what it takes to be successful while in the last stage of motor learning (Hatfield & Hillman, 2001). The problem being addressed in the study is examining Fitts and Posner's cognitive stage of motor learning. The first question being studied is how does low alpha power relate to variability in the performance of a pistol shoot? The second question being studied is how does high alpha coherence relate to jerk in the performance of a pistol shoot? The first hypothesis to prove is that higher cortical arousal (i.e. lower alpha power), will be associated with better performance (i.e., less variable pistol trajectories). The second hypotheses to prove is networking to the motor planning region (i.e. higher coherence) will be positively associated with increased levels of jerk. The results of the study find that those who performed better (less variability and more jerk) exhibited brain patterns associated with relying on external cues, events and responses.

Problem Statement

The problem being addressed in the study is examining Fitts and Posner's cognitive stage of motor learning. Such that, we would expect cortical dynamics associated with actively guiding behavior to be associated with increases in performance. We also expect that cerebral cortical activity will be positively related to fine motor (target shooting) performance. Further, consistent with the neural efficiency hypothesis, we would expect increased effort (more cortical arousal and networking to the motor planning region) to be associated with more work (i.e. better performance) in relation to the low to moderate skill leveled test subjects. Another problem being addressed is how is the frequency of alpha band waves in the brain related to shot performance in relation to variability and jerk?

During the cognitive stage it is necessary to rely on external cues and explicit guidance of movement (Fitts and Posner, 1967). In contrast, during the autonomous stage, successful task completion relies on more internal models. Such that, when experts engage in an external focus their performance is compromised. When elite athletes perform under stressors and have noise added the system they can partake in an action that is referred to as choking. According to Baumeister's (1984) definition, choking is when a pressure is applied to the circumstance and the performance decrements and pressure is considered any factors that place a significant importance on performing well. Causes that factor into choking include self-talk and excess rumination. This can "cause performance degradation by generating nonessential brain activity and interfering with task-specific attentional and motor process" (Hatfield & Kerick, 2007, p.92). Studying the stages of learning by Fitts and Posner will give more insight into the functions of individual in the cognitive stage of motor learning. This problem is being addressed to contrast the information and research on elite athletes and how the novice athlete is expected to have different neurological functions.

Research Questions and Hypothesis

This section will discuss the research questions of the study as follows. In the study being performed competition is a proxy for stress perturbation. The addition of competition is the venue for the experiment allowing the researchers to record the effects of the competition in relation to alpha band waves. The first question being studied is how does low alpha power relate to variability in the performance of a pistol shoot? The second question being studied is how does high alpha coherence relate to jerk in the performance of a pistol shoot? The following study is being done to prove or disprove the following hypotheses. The first hypothesis to prove is that higher cortical arousal (i.e. lower alpha power), will be associated with better performance (i.e., less variable pistol trajectories). The second hypotheses to prove is networking to the motor planning region (i.e. higher coherence) will be positively associated with increased levels of jerk.

Definitions

When reading the literature some terms are used in explicit ways that cater specifically to the study that is being conducted. This same notion is applied to the study that is being conducted for this research. The terms that are specific to this experiment are as follows.

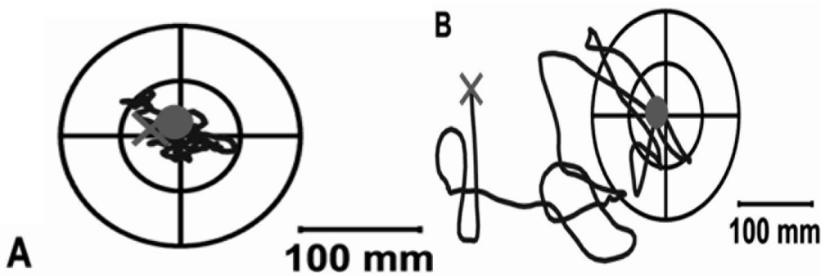
Electroencephalogram (EEG). An EEG is a test that is conducted by a doctor to measure the electrical activity of your brain during the activity that you are performing. To give an EEG, sensors are attached to your head (sometimes the subject wears a cap that the sensors are attached to) and the sensors are then hooked to wires that connect to a computer. The computer records the brains electrical activity. These recordings look like wavy lines put down on a piece of paper. The

wavy lines of electrical activity captured by the EEG are then interpreted to give results of the test (Rhodes, 2009).

Alpha Band Power. In this experiment the alpha band power are the band waves that are being studied from the EEG's collected from the brain during the designated task of shooting. The alpha band wave ranges from 8hz-13hz. The lower component of alpha waves (8-10hz) is characterized to be representative to changes in the overall arousal of the brain. The higher component of alpha waves (10-13hz) is characterized by representing task-specific arousal and/or "relaxation" of the brain (Klimesch, 1999 and Smith et al., 1999 in Deeny, Hillman, Janelle, and Hatfield, 2003).

Performance Accuracy. All test shots are based on the performance outcome. There is a preset target that subjects shoot at and the subject's shots are evaluated with the variables of score, variability, and jerk. Figure 3 is an example of a good and bad shot.

Figure 3



Shot A is a good shot and shot B is a bad shot.

Coherence. Coherence is the interconnection of the parts of the brain and their relationship to other aspects of performance. According to Deeny et al. (2009), "coherence values indicate the magnitude of correlation between the respective amplitudes derived for a given frequency (or band) from the two time series" (p.107). According to Weiss and Mueller (2003) the high coherence in an individual implies communication between areas of the brain. It is also stated that the low coherence implies regional autonomy.

Jerk. Jerk is the ability to make rapid movements in an effort to stay on target when making a shot.

"Noise". In the study being executed, the EEG captures brain waves that are relayed to the computer as lines. These lines are then deciphered to be brain waves of different nature like alpha, theta, and gamma brain waves. The intensity of the various different brain waves is referred to as "noise" in the brain. According to the Centre of Geriatric Care on ScienceDaily stated on July 7, 2008, the "brain noise is a term that has been used by neuroscientists to describe random brain activity that

is not important to mental function.” The “noise” in the brain referred to in this study is supported by the literature from ScienceDaily.

Significance of Research

The common person is interested in the elite athlete. When individuals start to learn a motor task they generally are not good at it. The elite athlete has had the time and experience to make themselves an expert at a certain motor task. The media captures the motor skills of elite athletes when they are performing. Examples of this are the National Football League, professional chess tournaments, Nascar, and even the Olympics. The general public is not, however, as fascinated with the individuals and athletes that have not yet reached the autonomous stage of motor learning. With this acknowledgement, it is important to focus on the individual who is in the cognitive stage of motor learning. All individuals who learn a motor skill have to start in the cognitive stage before they progress up the pyramid of motor learning. There has been investigation of the brain patterns of experts, while performing a task is efficient and in accord with Fitts and Posner’s claims of what it takes to be successful while in the last stage of motor learning (Hatfield & Hillman, 2001). There has been very little investigation into the individual that is performing in the cognitive stage of motor learning. This stage of motor learning is important to understand so researchers, coaches, and the individuals performing in motor stages above the cognitive stage have background on what it takes to learn a motor skill. It is also important to study the cognitive stage of motor learning because people will be able to provide the successful novice/beginner learner with the proper environment and tools that are essential to being successful in the cognitive stage of learning.

The field of sports psychology is a fast developing field of study that examines the social and neurological characteristics that are related to sports and skill level. The significance of the research done in this study focuses on the neurological happenings occurring in the brain during a specific task required in shooting a target in athletes that are all engaged in the same motor learning stage. The findings from the study can be helpful in finding relationships between the cortical activity in the brain during the performances that are considered successful and non-successful. The findings from the research can be used to give support to what the individual in the cognitive stage engages in to be successful. This study will either support or oppose the activities that Fitts and Posner said that the novice athlete has to engage in to be successful.

Assumptions, Delimitations, Limitations, and Scope

Assumptions of the experiment are that the test subjects have all had the same amount of experience and are all on the same skill level. The subjects are starting at the same skill level based on the selection criterion. Any differences recorded were attributed to environmental manipulation. Test subjects are all in the cognitive stage of motor learning.

This study is not focused on the other frequencies that are present in the brain because alpha power is the primary measure of interest. The study does not take different skill levels into consideration as a variable since all the test subjects are in the cognitive stage of motor learning.

Limitations of the study have been set by using EEG to record the brain frequencies. The spatial resolution of an EEG is said to be relatively poor because “of volume conduction, or the spreading of electrical charge through out the liquid medium of the brain so that the signal is also detected by sensors beyond those overlying the region of interest” (Hatfield & Kerick, 2007, p. 88). The EEG has poor spatial resolution which makes it hard to tell regional specificity as confidently as fMRI. Another limitation to the study in relation to the research question is that with time constraints the researcher was not able to evaluate all aspects of the study and all sets of datum.

The scope of the study is set to the subset of the data that was analyzed to address a specific research question. The total experiment has been ongoing for numerous years but for the sake of the research questions only a portion of the experiment is analyzed. Another aspect of the scope is the time constraint that the Ronald E. McNair Post Baccalaureate Achievement research program has put on the McNair Scholars.

Literature Review

Many experiments have been done to test the relationship between the functions of the brain and the results of performance in the autonomous stage of motor learning. This does not stand true the cognitive stage of motor learning. The literature based on neurological functions and its relationship with athletic performance varies depending on what variables are being tested. The literature that focuses on alpha band power brain frequencies and accuracy of performance is rich and supportive.

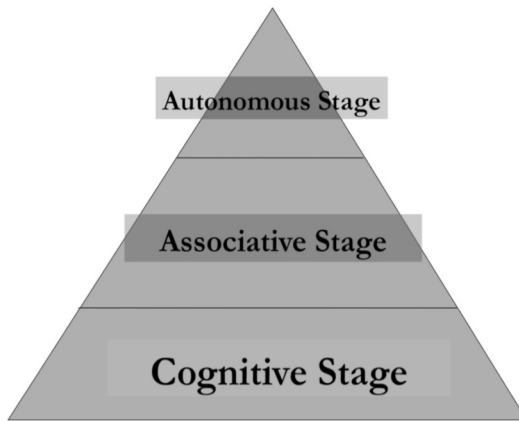
Stages of Learning

Athletes and individuals are not born being an expert at any motor task. From learning how to walk, to throwing a baseball, to hitting a home run, we all progress from one stage of motor learning to another to become better at executing that task. Fitts and Posner proposed the stages of motor learning in 1967. The beginning stage of motor learning is the cognitive stage, the second stage of motor learning is the associative stage, and the final stage is the autonomous stage of motor learning. Figure 4 is an example of the stages of motor learning. During the cognitive stage it is necessary to rely on external cues and explicit guidance of movement. In contrast, during the autonomous stage, successful task completion relies on more internal models. Such that, when experts engage in an external focus their performance is compromised. EEG evidence in experts supports Fitts and Posner's claims about the autonomous stage. Less task-irrelevant activation and networking both cross-

sectionally, experts compared to novices, and longitudinally, individuals learning a task.

This is also consistent with the neural-efficiency hypothesis. Less effort is associated with more work. However, if individuals are in the cognitive stage the cortical processes that are irrelevant in experts may be essential to novice performance. Thus, we would predict increased cortical arousal in areas associated with task production as well as an increase in networking between task relevant areas and the motor planning region to be associated with increased performance. This is not in conflict with the neural efficiency hypothesis, although when there is more effort put forth, there is also a concomitant increase in the amount of work (i.e. increased performance).

Figure 4



Fitts and Posner's stages of motor learning from the beginner cognitive to the later autonomous stage.

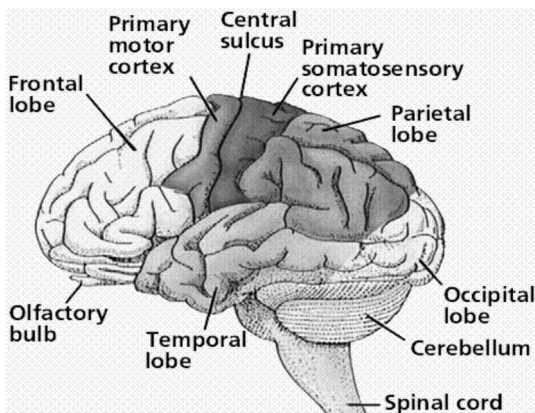
Parts of the Brain

One of the most popular ways to record cortical activities is using the EEG. EEG basically means “electrical brain writing” (Springer & Deutsch, 1947, p. 74). One of the first rhythms to be recorded is alpha power rhythm (Springer & Deutsch, 1947). Neuroscientists have done ample amounts of research to study areas of the brain and conclude that brain areas are task specific. Different regions of the brain are used during specific activities and all areas of the brain relate to each other differently. Scientists have performed many split-brain experiments where the corpus callosum in the brain has been severed. From these experiments researchers were able to study how the individual is affected when the two different hemispheres are not connected. It was found that the left hemisphere is responsible for verbal-analytical functions and the right hemisphere is responsible for visual-spatial functions (Springer & Deutsch, 1947). The importance of the two hemispheres is that activation of the different hemispheres will be related to the activity that is being performed. For

example, when a soccer player is preparing for a corner kick the right hemisphere of their brain will be more aroused than the left hemisphere. This would be opposite for a student competing calculus problems. For the study being conducted, the task of pistol shooting is a visual-spatial task. From the evidence of hemispheric activities, we would expect the right hemisphere of the test subjects to be more aroused.

Those parts of the brain that are in each hemisphere also have individual activities they are responsible for. The frontal lobe is “associated with reasoning, planning, parts of speech, movement, emotions, and problem solving” (Grobstein, 2009). The parietal lobe is “associated with movement, orientation, recognition, [and] perception of stimuli” (Grobstein, 2009). The occipital lobe is “associated with visual processing” (Grobstein, 2009). The temporal lobe is “associated with perception and recognition of auditory stimuli, memory, and speech” (Grobstein, 2009). Figure 5 displays the different areas of the cerebral cortex. When EEG’s are taken from the brain they are set up to record readings from the different lobes of the brain. Having this knowledge of brain specificity allows researchers to know when one part of the brain is more aroused than others, which is the case for task specific activities.

Figure 5



Parts of the cerebral cortex. Each area of the brain has a different task they complete in motor activities (Molumby).

Stress, Arousal, and Anxiety

In the study the test subjects perform the shooting task in a competitive environment. Stress, arousal, and anxiety are imposed on athletes during competition and these factors can affect athlete’s performance in a negative way if the athlete does not know how to cope with them. Coping with these factors takes experience, practice, and technique. In a study done by Deeny et al. in 2009 it was found that

a decrease in state anxiety may result in a corresponding decrease in nonessential cortico–cortical communication with the motor cortex, which would then emerge in the form of refined (i.e., more efficient) motor unit activity. Such refinement and simplification in the central nervous system and peripheral musculature would likely result in more accurate and consistent performance. (p.106)

This study is supportive of the individual in the autonomous stage of motor learning. All athletes cope with a competitive environment in different ways. Elite athletes have the ability to cope with the stress the environment is posing on them which will result in less networking and arousal of the brain during the motor performance. This however is not the same for novice athletes. These athletes have to focus harder on the task in order to be successful. This would result in an increase in cortical arousal and increased effort put into the task.

Performing Alone versus Performing in Competition

When performing in competition an athlete needs to know how to cope with all of the environmental factors. Those athletes competing have circumstances happening around them that require the athlete to focus on only what is important to the task at hand. The literature on athletes during competition is centered on the tasks that elite athlete undergo to ensure they perform at their optimal performance. Weinberg & Gould (2003) and Gould, Eklund, & Jackson, (1992a,b) have examined the techniques that elite athletes undergo to focus themselves on competing including a higher level of self confidence, thoughts that are more task oriented and positive, better concentration, lower levels of anxiety, and more positive imagery. These techniques elite athletes engage in allow them to perform better when in competition. These coping factors have been proven to be supportive of the elite athlete. They, however, do not support the novice athlete. The study being done is determining the factors that make individuals in the cognitive stage of motor learning successful at a motor task.

Coherence and “Noise” in The Brain

When performing a sport or activity it is important to be focused to ensure that you do the best you can. The literature on “noise” in the brain focuses on novice athletes having more cortical activation during a performance when compared to the brain of an elite athlete.

Literature that supports the concept that elite athletes have less activity in their brain when competing was done by Babiloni et al, (2008) recording the EEG’s of novice and elite gymnasts as they examined videos of gymnasts performing various rhythmic gymnastic moves. The findings of the experiment “showed that low–(about 8–10 Hz) and high–frequency (about 10–12 Hz) alpha ERD in occipital and temporal cortex (ventral pathway) and in dorsal pathway were lower in amplitude in the elite rhythmic gymnasts compared to the non–gymnasts...with respect to

the non-athletes, the athletes showed a spatially selective cortical activation (neural efficiency) (p. 519).” This study supports the notion that individuals in the cognitive stage of motor learning have more cortical activation with increased effort to be successful in this stage.

Strengths, Limitations, and Implications of the Literature

The literature to support the study is rich with numerous different studies that all provide background and a foundation to the study that is being conducted for this research. The limitations of the research are that the majority of the information on the subject of alpha band waves in relation to motor skill level is all focused on the individual who is in the autonomous level of motor learning. The expected results of the experiment are going to contradict that of the individual portraying automaticity but the literature now does not support the individual in the cognitive stage of motor learning. The implications of the literature affect the study such that the delimitations of the literature are framing the research questions that are being studied. Since the literature does not explore sufficient material and results with individuals in the cognitive stage of learning the study has been designed to fill in those gaps of the literature.

Research Design and Methodology

Participants

The experiment contained 16 male subjects recruited from ROTC training program at the University of Maryland. All participants are right hand dominant and ipsilateral-eye dominant. Participants were between the ages of 19 and 30, with a mean age of 22.31. All participants were screened with a health history questionnaire to ensure that they were free of neurological and psychiatric disorders and psychotropic medications. Prior to testing, all participants provided written informed consent and they were free to withdraw from the study at any time. The procedure was approved by University of Maryland Institutional Review Board.

Instrumentation

All participants were asked to complete a shooting task under a competitive environment. During practice sessions, participants used their right (dominant) hand to shoot a dry-fire pistol and an optical shooting simulator. Participants assumed a standard shooting posture; feet were positioned approximately shoulder-width apart and nearly perpendicular to the shooting lane to minimize sway. Participants extended the shooting arm while aiming and sighted the target with their right eye; the left eye was occluded by a patch over the shooting glasses. Feedback was provided on all trails (shots) in the form of a shooting score and a “clock face” reference to identify the position of the shot on the target.

Physiological Record

Scalp electroencephalographic data was collected using tin electrodes housed within a stretchable lycra cap, (Electro-Cap International, Inc.). Data was acquired from 30 unipolar sites, labeled in accordance with the 10-20 international system (Jasper, 1958). At all sites of interest (Fz, F3, F4, C3, C4, P3, P4, T3, T4, O1, O2), impedances were maintained below 10 k Ω , signal was referenced to linked earlobes and a common ground. All channels were amplified 500 times using Neuroscan Synamps 1, linked to Neuroscan 4.3.3 acquisition/edit software on a Gateway Pentium computer running Windows XP operating system. Bandpass filters were set at .01-100 Hz with a sampling rate of 1,000 Hertz. Electrodes were placed above and below the left eye over the Orbicularis oculi muscle to record eyeblinks. An electronic pulse was sent into the EEG by the shooting simulator to mark onset of the trigger pull into the continuous EEG recording.

Procedures

Participants were asked to refrain from consuming any alcoholic or caffeinated beverages on the day of testing and asked to get 7-8 hours of sleep the prior night. Participants were prepared for electrocortical (EEG) monitoring. Participants were allowed 10 sighting shots prior to each testing session. Feedback was provided in the form of their score and a “clock face” reference to indicate shot placement. The subjects then executed the 40 test shots for the session. The competitive test shooting trials included shooting against another study participant.

During the competition, participants took turns shooting and alternated between shooting order such that in one trial, shooter A shot first followed by shooter B, but the next trial shooter B shot first, etc. Participants were instructed to set the gun down between each shot and to remain standing throughout the shooting session. After each trial, scores were presented to the competitors and a winner of that trial was declared. During competition the following psychological pressures - in addition to peer-competition - were imposed on the subjects: 1) social evaluation by a superior officer who conspicuously took notes and evaluated participants' shooting stance and accuracy; 2) financial loss or gain of 50 cents per round, from a starting sum of \$20 (in the case of equal scores, the sum at stake carried over to the next shot), a dollar bonus for a bull's-eye and a dollar loss for missing the target completely; 3) a 30 second time constraint for each shot, beginning when the subject grasped the pistol; 4) video camera recording; and 5) participants were placed on teams such that their score contributed to overall team score, both of which were displayed outside the ROTC field house. Participants were informed of all of these pressures during the instructional period prior to task execution and were told to attempt to “beat” their competitors' score.

Signal Processing

Hypothesis I: Power. Spectral analysis was calculated in Neuroscan using preprocessed data. Power was computed in Neuroscan for each epoch using a

Hamming window with a 50% overlap. The 1 Hz bins were then averaged to obtain power estimates for the frequency bands of interest: Low Alpha 8-10Hz. These estimates were then log transformed to ensure a normal distribution.

Hypothesis II: Coherence. Amplitude coherence calculated in Neuroscan using preprocessed data. This was done using traditional 5 homologous pairs to electrode Fz. The 1 Hz bins were then averaged to obtain coherence values for the frequency bands of interest: High Alpha 10-13Hz. Values were fisher-z transformed in order to approximate normality prior to statistical analyses.

Statistical Design

The statistical design for the experiment was regressing motor performance variables (variability and jerk) on different cortical processes (arousal and networking to the motor planning region). These regressions were then used to determine the results of the study.

Strategies for Minimizing Bias and Error

The following methods were used to reduce bias and error. In order to reduce the influence of eye blinks on the EEG data an ocular artifact reduction filter was applied (Semlitsch, 1986). The 4-s period of continuous data prior to the completion of each shot was then partitioned into four successive 1-s epochs. The termination of the final epoch was coincident with the trigger pull (i.e., the numbering of epochs was based on a temporal sequence during the aiming period so that Epoch 4 represented the initial 1-s period preceding sequentially Epoch 3, Epoch 2, Epoch 1, and the shot). The data were then baseline corrected and linear detrended. A final visual inspection of all sweeps was performed to remove any epochs that still contained artifact.

Ethical Considerations

In the experiment performed humans were used to perform the test shots. The test subjects were shown no harm and were safe at all times. The pistols used in the experiment did not contain real bullets and were therefore not a safety hazard. All subjects gave their informed consent before participating in the experiment.

Role of Researcher

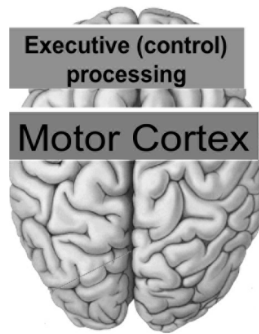
The role of the researcher was to analyze the alpha band waves of the EEG of the 16 test subjects for one second before the pistol was shoot. The researcher did not actually perform the experiment with the pistol shooters as they went through the performance alone, intervention, and competition phases. The researcher took the datum from the EEG readings from the subjects during the competition phase to analyze for the purpose of this study.

Results, Conclusions, and Recommendations for Future Research

Results

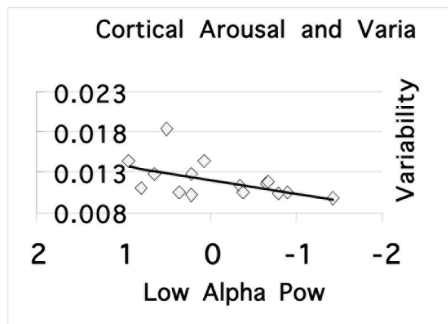
When analyzing the results of the study, there are very distinct results. The EEG brain waves of high alpha coherence and low alpha power were evaluated from all 16 test subjects. The first hypothesis stated was: higher cortical arousal (i.e. lower alpha power), will be associated with better performance (i.e., less variable pistol trajectories). This hypothesis has been proven true. Those individuals that had more engaged/aroused brains performed better. The more aroused the test subject was the less variable the shot was. Specifically, more cortical arousal at the control part of the brain and the motor centers of the brain were associated with less variable shot trajectories. ($p < .05$). See figure 6 and graph 1.

Figure 6



The motor cortex and control center of the brain are the areas that have the highest cortical arousal during the pistol shooting resulting in less variability.

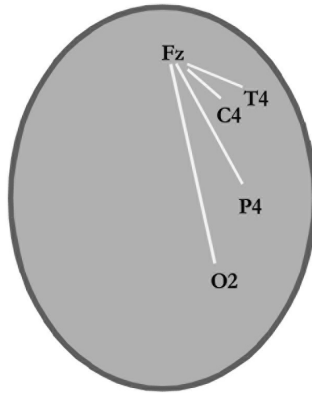
Graph 1



As the low alpha power decreases (i.e. cortical arousal increases) the variability of the shot decreases as well.

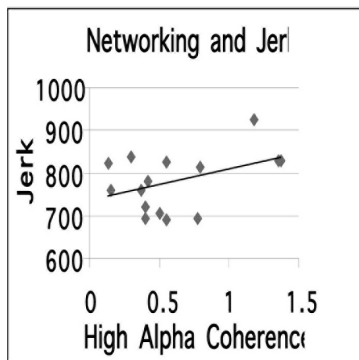
The second hypotheses to prove was networking to the motor planning region (i.e. higher coherence) will be positively associated with increased levels of jerk. It has been found that those individuals that had more communication to the motor planning part of the brain performed better. Specifically, more networking from the visual-spatial brain areas (right hemisphere) were associated with an increased ability to stay on the target. ($p < .05$). See figure 7 and graph 2.

Figure 7 Visual-spatial side: Right hemisphere



Networking is high in the areas of the brain in the right hemisphere. The task is a visual-spatial task which makes the right hemisphere network more during the cognitive stage of motor learning.

Graph 2



As the high alpha coherence increases the jerk of the pistol shot increases as well. The higher the jerk of the shot is the better the shot is.

Conclusion

As stated above in chapter one, the lower component of alpha waves (8-10hz) is characterized to be representative to changes in the overall arousal of the brain. The higher component of alpha waves (10-13hz) is characterized by representing task-specific arousal and/or “relaxation” (Klimesch, 1999 and Smith et al., 1999 in Deeny, Hillman, Janelle, and Hatfield 2003). The alpha power represents cortical activation for the specific task of shooting the pistol at the target. As high alpha coherence increased in the right hemisphere the jerk of the shot increased also. The increase in jerk is a positive action due to the fact the test subject was actively engaged in the task. The increased jerk shows that the test subject was rigorously trying to keep the shot on the target. This exerted effort to hold the pistol shot on the target before shooting results in more rapid movement, hence a higher jerk in the performance.

The results also found that when low alpha power is low the variability of the shot is low as well. The decrease in low alpha power shows that the cortical activity had increased in the brain. The increase in cortical activity is due to the individual in the cognitive stage of learning being aroused and engaged in the pistol shooting activity. As the test subjects are performing the shooting experiment they are thinking about all of the steps that they have to take in order to make a successful shot. The test subjects are also paying attention to the external cues, environment, and the stakes that have been put forth for the competition. All of these factors affect the performance of the novice athlete. These same factors would not play as big of a role in the elite athletes and therefore would not affect them as significantly since they are in the autonomous stage of learning.

This study supports Fitts and Posner’s model of successful performance during the early stage of motor learning. Specifically, these brain processes were: increased activation of task relevant brain areas and networking to the motor planning region of the brain from visual-spatial brain areas. Those who performed better (less variability and more jerk) exhibited brain patterns associated with relying on external cues, events and responses. That is, active, engaged, and highly networked brain processes were associated with superior motor performance at this early stage of learning.

Recommendations for Future Research

Future research can be done to expand on this study. In this study, only the alpha band waves of the test subjects were evaluated. Although only these waves were interpreted, there are other brain waves that show changes and are significant during a task in a competitive environment like beta, gamma, and theta. It is important to evaluate the different brain waves because each brain wave can give different insight into how areas of the brain are affected by stressors in the cognitive stage of motor learning since each frequency wave represents a particular action. For example, the beta brain waves are representative of alertness, concentration and cognition (Howell, 2009).

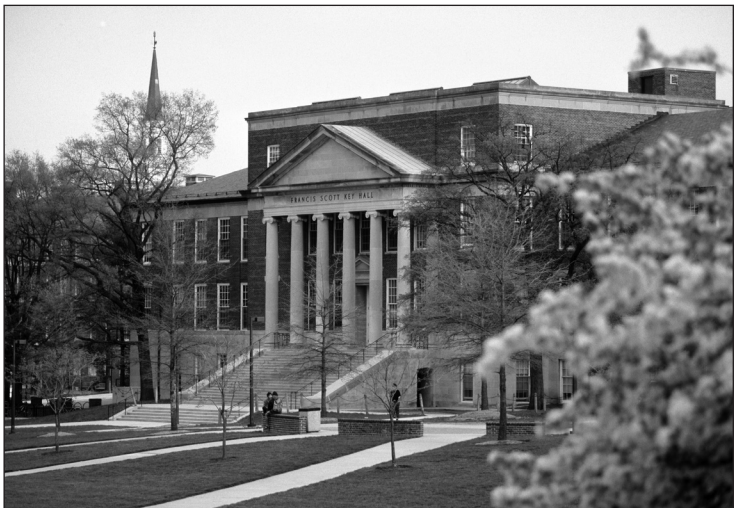
Another recommendation for future research is that related to the stages of motor learning proposed by Fitts and Posner that were so deeply studied in the previous study. There is ample amount of supporting evidence for the individual in the autonomous stage of motor learning. This study here has found evidence to support the notion of a successful individual in the cognitive stage of learning. A future study can be done to find evidence to support the middle stage of the motor learning stages. The individual in the associative stage executes motor tasks a specific way to be successful. Doing an experiment to test the proposal done by Fitts and Posner will add more evidence and insight into the individual during this stage of motor learning. Having all three stages examined and studied provides more support for the motor learning stages.

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Comparing the Psychological Functioning of Those Diagnosed ADHD and ADHD-Not Otherwise Specified (NOS)

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Abstract

The *Diagnostic and statistical manual of mental disorders*, DSM-IV, states that Attention Deficit Hyperactivity Disorder is an impairment of average functions before the age of 7. The manual gives the title *Attention Deficit Hyperactivity Disorder-Not Otherwise Specified* (ADHD-NOS) to anyone diagnosed after the age of 7. Research has been done to challenge this criteria of ADHD-NOS. However, some researchers believe ADHD symptoms remit with age. This project intends to report the findings that challenge the criteria, along with age remission, in order to do a meta-analysis of the literature in the future. Barkley's theory gives guidelines for the behavioral impairments for ADHD. These studies can validate ADHD-NOS late onset if they are able to find the same impairments as those identified by Barkley in adults. This project will address several questions including (a) how is ADHD-NOS treated, (b) how does behavior, diagnoses, and treatment of ADHD-NOS compare to ADHD, (c) what are the major differences between ADHD and ADHD-NOS. This project will analyze the literature to answer these questions and find correlations with Barkley's theory. The literature surveyed in this project does suggest that ADHD-NOS is valid and impairing to average adult functions. Some researchers have found that ADHD-NOS is less impairing than full syndrome ADHD. However, the available research suggests that the DSM should revise their criteria to include a change in the age of onset criteria for full- syndrome ADHD.

Job Satisfaction: Among LGBTQ Faculty Members

Nakia De Jesus

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Abstract

The purpose of this inquiry is to create a safe working environment for Lesbian, Gay, Bisexual, Transgender, Queer, and Straight (LGBTQS) employees. This paper will challenge the prejudice notion of heterosexism, homophobia, and AIDS phobia within the workplace and how this affects productivity for both the company and LGBTQS employees. Specifically, this research will examine job satisfaction among LGBTQS staff. I will examine job satisfaction among the LGBTQS staff by utilizing the conceptual framework of faculty job satisfaction. The specific framework I am utilizing is called the two-factor theory of job satisfaction. Introduced by Frederick Herzberg and his colleagues (Herzburg, Mansner, Peterson, and Capwell, 1957; Herzberg, Manusner, and Snyderman, 1959) during the late 50's. Herzburg theory explicates how there are two factors contributing to job satisfaction in which he defines one as being a motivator and the other as a de-motivator, resulting in either satisfaction or dissatisfaction. Utilizing this conceptual framework will enable me to elucidate the motivators and de-motivators that LGBTQS employees encounter within the workplace. The aim of implementing this conceptual framework is a work environment that accommodates the needs and concerns of LGBTQS employees.

Studio Thinking: Integrating the Visual Arts into Pre-School Mathematics Curriculum

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Abstract

There is growing evidence of the achievement gap in the mathematical knowledge of children from low-socioeconomic backgrounds and their more affluent peers. The gap in mathematics is larger than the gap and reading, appears as early as preschool, and persists and increases in each successive grade. The visual arts are valuable forms of knowledge which enhance other disciplines, including mathematics. This study will investigate whether art instruction can be utilized to promote foundational math concepts to provide concrete opportunities for low-income children to take active part in the learning process. The participants in this study will be low-income preschool children from local Head Start programs, ranging in age from 3-5 years. Students will be administered measures of knowledge, in the form of pre-tests and post-tests tasks, before and after engaging in a visual arts activity. Participants will be randomly assigned to a creative arts train number line activity or checkers number line activity where they will play in groups of 5 while an experimenter supervises and offers general assistance. After analyzing the data collected from the pre-tests and post-tests it is expected that participating in the creative arts number line activity will promote a greater increase in numerical knowledge in comparison to the basic number line activity.

Developing a Risk Assessment for Pre-Release Suspects in Baltimore

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Abstract

After offenders have been arrested, they are brought before a pretrial officer. This officer will assess the potential risk of releasing this offender back into the community pending their trial or appearance in court. The offender will either be characterized as a low-risk offender or a high-risk offender. The pretrial officer gathers information about the defendant's possible risk in failing to appear at trial in order to make an informed decision about pretrial release, (Lowenkamp et al., 2008). The pretrial officer then gives his/her recommendation to the judge who takes the recommendation into account when weighing the final decision whether to release the offender pending court appearance or not. The problem to be solved is the current pre-trial release procedures in Baltimore City. The current pretrial risk assessments are worthy of study because the system has not been as effective as planned and the current risk assessment instrument is ten years old. The procedure needs to be updated because the predictions it gives are not as accurate as they could be. We will attempt to answer the following questions from the literature: What factors/variables play into the risk assessment of an offender before being released on bail? Why does the pretrial release officer have so much power in the decision over another human's life when they can commit human errors? How is the pretrial risk assessment created and validated?

Delayed Treatment Seeking for Social Anxiety Disorder

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Abstract

This research focuses on social anxiety disorder (SAD, also known as social phobia), a psychological disorder characterized by intense fear and persistent anxiety in social situations. SAD is characterized by high levels of chronic shyness and anxiety that is severe enough to interfere with daily life and produce a debilitating effect. It is one of the most common anxiety disorders, affecting an estimated 15 million people in the United States (Rapee, 1995). The effects of the disorder range on a spectrum from mild to severe, with both psychological and physiological symptoms with negative effects affect everyday life and social interactions. Despite the fact that social anxiety disorder is now categorized as one of the most common anxiety disorders (Hofmann, Otto, 2008), it is also one of the least well known and is subject to much misunderstanding. The purpose of this proposed research is to study the impact of established safety behaviors developed in the absence of treatment as well as reasons behind deliberate delays in seeking treatment.

Determine if there is a Correlation between Adolescents who Experience Abuse and Neglect and those who Engage in Violence

Nichelle Newton

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Abstract

Parental abuse, child neglect, and adolescent violence are significant social and familial problems in the United States. Given the importance of the problem, this conceptual paper explores and examines the literature related to parental abuse, child neglect and adolescent violence. More specifically this paper will focus on correlation between parental abuse, child neglect and adolescent violence. Results from reviewing and analyzing the literature will be used to answer the following question: (1) How are parental abuse and child neglect related to violent adolescent behavior? and (2) What are predictors to violent adolescent behavior? Examining the relationship between parental abuse, child neglect and adolescent violence is a worthy and significant topic because abused and neglected children are 11 times more likely to be arrested for criminal behavior as a juvenile, 2.7 times more likely to be arrested for violent criminal behavior as adults, and 3.1 more likely to be arrested for one of many forms for violent crimes (U.S. Department of Health and Human Services, 2008).

Postpartum Depression and the Cultural Differences Between African Americans and Caucasians

Omolola I. Olakanye

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Abstract

During pregnancy, there are many changes that are going on in a woman's body. There are even mental changes that mothers go through, especially new mothers. Some of these mental changes are women realizing the significant changes that will happen once their child is born, financial issues, marital issues that may come about, and occupational changes in their life that may occur. These factors can cause negative affects to the mothers during and after pregnancy. When pregnant mothers have a lot of stress on them during pregnancy, the problems tend to get worse once they have given birth (Grote, 2007). The effects of their problems may lead to Postpartum Depression. The purpose of the study was to exhibit and show if there are cultural manifestations among African American and Caucasian women when it comes to PPD. The research focused on different samples of mothers between the two cultures and their experiences during their depression stages. There were six themes that were included such as stressing out, feeling down, losing it, seeking help, feeling better, and dealing with it (Amankwaa, 2003). This study found that there were indeed separate behaviors that were shown among the mothers due to the cultural differences. The differences were seen among the six themes that were identified previously. Research proved that African Americans are more reluctant to expose their symptoms of PPD, where Caucasians tend to report it at a much higher rate. By African Americans reporting their symptoms at a lesser rate, they are more reluctant than Caucasians to obtain PPD.

Associations of Demographic Characteristics and Parental In-Law Acceptance with Marital Satisfaction, and Domestic Abuse among Married Couples in Beijing, China

Shauntia D. White

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Abstract

According to the Beijing Institute of Marriage and Family (1994), about one-quarter of Beijing women have been abused by their husbands. Little research, including Western studies, has been conducted to examine the degree to which in-law relationships is an unaddressed problem for distressed couples (Horsley, 2006). However, even though existing studies support a correlation between women's conflict with their mother-in-law and the occurrence of intimate partner violence among married couples in Hong Kong (Chan, Brownridge, Fong, Wing-Cheong, 2008), there has been little research on the problem of psychological abuse among Chinese couples. This study is a secondary analysis of 204 community couples, previously collected data by Professor Xiaoyi Fang of Beijing Normal University. Results will involve the occurrence of psychological and psychological abuse between couples, levels of marital satisfaction, and the associations of measures of parent's demographic characteristics and acceptance of by their parents-in-law in Beijing.

Private School Attendance and Students' Health Behaviors

Rudan Zhuo

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Abstract

After the successful marketing of education vouchers, more parents have been sending their children to private schools with the expectation that private school education will bring about greater academic achievements. Whether private school education has the same positive effect on students' health behaviors has not been thoroughly researched. Due to the limited amount of existing literature on private school attendance and health behaviors, this comparative literature review examines several health behaviors simultaneously: sexual health behavior, alcohol and tobacco use behavior, and diet and exercise behavior. With the exception of one study, majority of the literature suggests that private school students have greater sexual health knowledge, and are less likely to engage in risky sexual behaviors than public school students. A future study, based on the Ecological System Model has been proposed. The study will focus on the microsystem level of the model, which states that school is a critical environment for promoting children's health. The proposed study will look at students' health behaviors in two Washington D.C. schools – one private and one public – which are in close proximity to each other. The study will be a cross-sectional survey design, wherein approximately 30 students will be randomly selected to fill out a 20 minute survey questionnaire. A chi-square analysis of the survey data will indicate differences in private school attendance and health behaviors.
