

UCSB McNair Scholars Research Journal



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**The UCSB McNair Scholars
Research Journal**

**University of California, Santa Barbara
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Ricardo A. Alcaíno

Director of the Office of Equal Opportunity
3217A Phelps Hall
University of California, Santa Barbara
Santa Barbara, CA 93106-2060
(805) 893-4504

Cover photo:
Tony Mastres, UCSB Photo Services

McNair Program Staff

Principal Investigators

Dean Melvin Oliver
Executive Dean, College
of Letters and Sciences

Dr. Beth E. Schneider
Professor of Sociology

Program Director

Dr. Beth E. Schneider

Assistant Director

Monique Limón

Program Coordinator

Micaela Morgan

Graduate Mentors

Shardé Davis
Holly Roose

Writing Specialist

Dr. Ellen Broidy

Journal Editors

Dr. Beth E. Schneider
Dr. Ellen Broidy

Journal Layout/Design

Carlos Jimenez

UCSB McNair Scholars

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Letter from Executive Vice Chancellor Gene Lucas

It gives me great pleasure to welcome you to Volume III of the UCSB McNair Scholars Research Journal. This journal recognizes the research accomplishments of a select group of 18 undergraduate scholars from a wide range of disciplines across the campus, who have successfully completed our McNair Scholars Program. Their contributions to this journal are a result of their hard work and intellectual creativity, and are representative of the quality of students engaged in this program. We anticipate and expect they will ultimately be leaders in their respective fields, and go on to become faculty mentors who exemplify the dedication of our campus to undergraduate success.

Our McNair Scholars Program aligns with our twin campus goals of improving both the diversity and quality of our students, and preparing them for success beyond their undergraduate experience. By combining undergraduate research with faculty mentoring and academic support services, the McNair Scholars Program provides a path to graduate school for students from families that have not traditionally considered even a college education. In the process, the students develop a strong bond with their mentors, who serve as role models to help the students see what their success can look like.

We're very proud of the success of our students. This dedicated collection of scholarship for publication is something they can and should be proud of as well. I congratulate the McNair Scholars, applaud the faculty mentors, and extend my appreciation to the staff of the McNair Scholars Program for their dedication and work in helping these students achieve success.

With warm regards,

Gene Lucas
Executive Vice Chancellor

Letter from the College of Letters and Sciences Executive Dean L. Melvin Oliver

Welcome to the third issue of the UCSB McNair Scholars Research Journal. The work of the scholars in the two issues of Volume III represents the fruits of an apprenticeship relationship that they shared with a faculty mentor to better understand and learn to carry out research in their respective fields of specialization. The research they have produced represents the result of applying creative ideas to research questions using systematic and rigorous methods of established research protocols in several areas, ranging from the social sciences to mathematics and engineering. I am certain you will agree with me that this research is both impressive and engaging.

The UCSB McNair Scholars were encouraged to advance their education in hopes that they will become the next generation of college and university professors. We have seen scholars in previous cohorts go on to prestigious graduate and professional schools and we have no doubt that, as a consequence of their McNair experience, these scholars too will excel in their graduate program. As first generation, and often underrepresented minorities, they are an important resource for higher education as our student population becomes more diverse and our nation's productivity becomes increasingly reliant on the academic, economic and social success of this multiethnic mosaic.

The UCSB McNair Scholars program has historically been situated in the College of Letters and Sciences, indicating the importance of this effort as part of the College's core belief that diversity and excellence are both necessary to advance knowledge in the 21st century. I salute the Director, Dr. Beth Schneider, the Assistant Director, Monique Limon, Writing Specialist Dr. Ellen Broidy, staff, graduate mentors, and the array of faculty mentors who have selflessly given of their time, for creating the kind of supportive and nurturing environment that has made the production of this journal possible. And finally, I want to salute the McNair scholar

authors who, I hope, will look fondly upon this publication as one of their first in a long line of research publications in a stellar academic career!

Sincerely,

Melvin L. Oliver

Executive Dean, College of Letters and Sciences and
SAGE Sara Miller McCune Dean of Social Sciences

Letter from McNair Program Director, Dr. Beth Schneider

Volume III of the UCSB McNair Scholars Research Journal is now in the hands of our students, alumni, faculty mentors, campus allies, and McNair colleagues in California and around the country. As the Director of the McNair Scholars Program since its inception, it is a pleasure to showcase the work of two cohorts of students, some who graduated in 2012, and a majority who graduated in 2013.

These student scholars and authors spent two years with the UCSB McNair Scholars Program. Performance expectations are very high for the UCSB McNair scholars, and all these students met them, presenting their faculty-mentored scholarship at one McNair Scholars National Research Conference as well as offering two or three poster sessions in various venues. Some presented at professional conferences as well. This current group of authors not only presented their work, but they all applied to graduate school in their senior year. Of the six contributors to this Volume from among the 2012 seniors, all are currently in graduate school. Of the 12 contributors from the 2013 graduating seniors, eleven applied to graduate school and of those, all will start their programs in September 2013.

The papers published in Volume III are the final versions of manuscripts our graduates were willing to see through to publication. They went the extra mile, writing and rewriting their research papers in response to a steady stream of comments from their mentors and the journal editors. Often, the final revisions were completed during a first term of graduate study, a sacrifice reflecting a serious labor of love. As undergraduate research papers, we expect that these publications will be the first of many manuscripts published by these eight students during their graduate training and in their first academic positions.

The eighteen McNair scholars whose work is showcased in this issue displayed perseverance, patience, and diligence that will serve them exceedingly well in their continued professional training. For all first-generation, low income, and underrepresented undergraduates, the existence of the journal and

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the labor it represents will hopefully be an inspiration to seek research opportunities, develop successful mentorships, and take seriously a future in which the McNair Scholars Program played and continues to play an important part.

With special thanks to the UCSB McNair Scholars staff, and great pride in our scholars.

Professor Beth E. Schneider
Director, UCSB McNair Scholars Program

Letter from the Editors
Drs. Ellen Broidy and Beth E. Schneider

The McNair Scholars Program at UCSB is pleased to bring you the second issue of the third volume of the UCSB McNair Scholars Research Journal. A cooperative effort of faculty mentors, McNair staff, and most especially a dedicated cadre of student scholars, the Journal represents months of research, writing, editing and reviewing on the part of all the participants. We are extremely gratified that we received so many high quality submissions that we decided to take the extraordinary step of publishing volume 3 in two issues.

For our scholars, preparation of their manuscripts for publication in the Journal began as a challenging experience and ended as a rewarding experience. Novices when they started the process, the scholars embarked on lengthy adventure in what it takes to produce academic work suitable for publication. With good humor and extraordinary patience and fortitude, they experienced the frustration of being asked to revise and revise again and then the feeling of elation that comes with a final acceptance. Through this process, the McNair staff was able to provide scholars with a practical hands-on introduction to the types of writing and revision expected of graduate students and academics.

We have never made submission to the journal a requirement for completion of the UCSB McNair Scholars Program so we were enormously gratified that the large number of our students, representing both the current 2013 senior cohort and scholars who graduated in 2012, decided to allow their work to put under the editorial microscope. As was the case with volume 3, number 1, previous publications arrangements with faculty mentors meant that some scholars were unable to submit their work while others, having left UCSB to start their graduate programs, were simply not able to take on the additional tasks involved in manuscript revision. The scholars who did contribute worked diligently on their papers, rethinking, rewriting, reorganizing, and in some instances, reconceptualizing core ideas. We applaud them all for their hard work and commitment.

We trust that you will enjoy reading the work of the UCSB McNair Scholars represented in this second of two issues of the third volume of the Journal. We look forward to bringing you the voices of new generations of scholars in subsequent volumes and thank you on behalf of the authors, mentors, and editors who made this publication possible.

Best,

Ellen Broidy

Writing Specialist, UCSB McNair Scholars Program

Beth E. Schneider

Professor, Department of Sociology

Director, UCSB McNair Scholars Program

Gang Intervention Activists' Perspectives on Young Black Women in Los Angeles' Gangs

Afiya Browne

Mentors: Dr. Clyde Woods and Dr. Claudine Michel
Department of Black Studies

Dr. Beth E. Schneider
Department of Sociology

Abstract

Traditional gang research on African American gang members has mainly focused on young black men, ignoring the involvement and experience of black girls and young black women. This research project examines the conditions faced by black girls and young black women in the gang culture in Los Angeles, California. It explores the nature, scope, and consequences of their experiences within Los Angeles' gangs. Interviews with gang intervention activists seek to identify how their work with and understanding of the involvement and experiences of young black women in gangs illuminates feminist perspectives within criminological scholarship that focuses on the competing processes of victimization and agency within gang culture. Initial results from interviews show that the involvement and experiences of the young black women within Los Angeles' gangs are best explained by a complex mix of both the victimization and agency perspectives. Additional interviews with gang intervention specialists will be followed by interviews with girls who have been or currently are in gangs to develop a more nuanced portrait of their experiences.

Introduction

There is a specific image that comes to mind when one thinks about a gang; however, there is no an absolute definition for what a gang is. The designation and definition of gang has been dependent upon who does the defining and for what purpose. The Bureau of Justice Assistance (1997), for example, defines a gang as:

1) three or more individuals associate periodically as an ongoing criminal group or organization, whether loosely or tightly structured, 2) the group has identifiable leaders, although the leader for one type of criminal activity may be different than the leader for another, 3) the group has a name or identifying symbol 4) the organization's members, individually or collectively, currently engage in, or have engaged in, violent or other criminal activity and 5) the group frequently identifies itself with, or claims control over specific territory (turf) in the community, wears distinctive dress and colors, and communicates through graffiti and hand signs among other means.

Though the definitions and characteristics of a gang are gender-neutral, traditional gang research on African American gang members has mainly focused on young black men. However, the increasing rate of unemployment and poverty in low income communities resulting from the recession coupled with institutionalized racism and sexism, has resulted in young black women entering criminal activities, gang activities, and the criminal justice system. According to 2007 national demographics compiled by law enforcement agencies, approximately 6.6 percent of gang members were females (National Gang Center 2009). As supported by earlier research on female gang membership, a majority of these female gang members exist in gender-mixed gangs (Burris-Kitchen 1997). For young black women, gangs have

become an accessible alternative lifestyle to combat the lack of resources and opportunities present within their low income communities (Burris-Kitchen 1997; Miller 2001).

Though young black women's involvement in gangs is evident in the United States, there is still little research being conducted on their gang experiences. Therefore, the central empirical question in this study is what is the nature, scope, and consequences of young black women's involvement in gangs, with a specific focus on gangs in Los Angeles. In this study, I present findings from qualitative interviews with three gang intervention activists who work with Los Angeles' gangs. The three provide unique perspectives on gang girls that differ from what is presented within contemporary gang research or the voices of gang girls themselves. From their responses I argue that gang culture places black girls and young black women in a precarious position where they constantly risk being victimized but at the same time, still feel a sense of empowerment. This analysis draws upon from feminist perspectives within criminological scholarship that focus on the competing processes of victimization and agency within gang culture.

Literature Review

Lack of Research on Female Gang Involvement

Traditional gang research has focused on the nature, scope and consequences of young men's involvement and has ignored the involvement and experiences of young women. As a result, the majority of early research presented a perspective that is unavoidably sexist (Chesney-Lind 1993; Messerschmidt 1999; Taylor 1993). The early work which did address the presence of female gang members was based on a male-centered perspective as gang researchers asked male gang members their point of view on female gang involvement (Chesney-Lind and Hagedorn 1999; Wang 2000). The dominant theory for research conducted on female gang involvement proposed by contemporary gang

researchers (Burris-Kitchen 1997; Campbell 1991; Chesney-Lind 1999; Chesney-Lind and Shelden 2004; Giordano 1978; Messerschmidt 1999; Miller 2001; Miller 2008; Wang 2000) focused on their individual maladjustment, their inability to act out their femininity, and their role as sexual tools that served male gang members.

The initial groundbreaking work on female gang involvement can be credited to Frederic M. Thrasher, the first sociologist to conduct research on females in gangs. Thrasher's 1927 book, *The Gang*, was a case study of Chicago gang culture during the 1920s. He concluded that gang involvement was male behavior. Thrasher only found five to six independent female gangs and characterized female auxiliaries of male gangs as either tomboys or sex toys. According to Thrasher ([1927] 1999), the lack of female participation was due to:

“The social patterns for behavior of girls, powerfully backed by the great weight of tradition and customs, are contrary to the gang and its activities; and secondly, girls even in urban disorganized areas, are much more closely supervised and guarded than boys and are usually well incorporated into the family group or some other social structure” (P. 15)

The presence of male-centered perspectives within this field of research can also be seen in William Bernard's ([1949] 1999) study of gangs in the Bronx and Brooklyn, New York. Bernard found that female gang involvement was centered on their male gang counterparts. According to Bernard, important duties of female gang members were carrying weapons, in addition to supplying alibis to help the boys escape confiscation and charges. The auxiliary female gangs also had to fight rival girl gangs and provide their boy gang members with sexual favors. Like Thrasher, Bernard explicitly focused on the promiscuity of these girls. Even though Bernard shows broader understanding of female gang

involvement, his study still confined the study of females' delinquents to their relationship with male members of the gang.

As more studies were conducted on female gang involvement, this male-centered perspective continued to dominate the literature. Scholars produced research that was gender biased, either by ignoring female experiences or using the viewpoints of male gang members for their research. It became clear, however, that female gang members' involvement in gangs was more complex and went beyond just being instruments of male gang members, as seen in Waln K. Brown's 1977 article "Black Female Gang Members in Philadelphia." Similar to Thrasher, Brown believes that females are not socialized to join gangs and young black females were sheltered from the gang subculture in Philadelphia. According to Brown, gangs became appealing to girls because it brought them excitement, friendships, and a sense of belonging. Brown also compared all male gangs to all female gangs by examining the lifestyles of "Holly Whores," an all-black female gang. Unlike Thrasher, Brown found that the Holly Whores participated in very aggressive and violent actions and participated in the same amount of crimes as all-male gangs (1977). This complexity of female gang involvement described by Brown and other researchers like John C. Quickers who did research on Chicana gangs, increased as the research on the field moved closer to a feminist approach which ushered in a new era of examination of female gang involvement (Brown 1977; Chesney-Lind and Hagedorn 1999; Quicker 1999).

The Role of Feminist Perspectives

The contemporary U.S. women's movement has allowed for a change in the research conducted on female gang involvement, encouraging criminologists to take an interest in women's involvement in crime, including female gang involvement, since the 1980s. As the amount of research increased, the existence of female gang members became more evident. Not only did the

women's movement influence an increase in research, it also changed the direction of the research with the introduction of feminist perspectives. Feminist perspectives differ from male-centered perspectives because they use the point of view of female gang members' themselves rather than their male-counterparts (Chesney-Lind and Hagedorn 1999; Miller 2001). According to James Messerschmidt ([1997] 1999), the feminist perspective aimed to present research that did not "belittle women and punish them intellectually for stepping beyond the bounds of emphasized femininity; we [feminist scholars] require theory sensitive to how women/girls as women/girls occasionally commit violence" (119). Feminist scholars believe that the application of a feminist perspective is the only way to present research on female gang involvement clearly (Chesney-Lind and Hagedorn 1999).

The influence of a feminist perspective can be seen in Laura Fishman's (1995) case study on the Vice Queens Gang. Similar to the earlier work of Thrasher and Bernard, Fishman presented the auxiliary relationship of the Vice Queens to their male counterpart gang, Vice Kings. However, Fishman also focused on the autonomous behavior of the Vice Queens which allowed her to present a multi-dimensional description of this female gang. The Vice Queens partook in aggressive and violent behavior and criminal activities like fighting with rival girl gangs, robbery and car theft. The Vice Queens were also focused on making their own money through prostitution and drug selling, a topic that the male-centered perspective assumed the Vice Queens were doing for the male gang members. According to Fishman, the Vice Queens undertook these non-traditional "female" activities because they provided a way to counter the inequalities they faced in relations to the Vice Kings and general society due to their gender, race, and class. As a result, Fishman concluded that "the Vice Queens utilize the female auxiliary gang as a means to acquire some knowledge of such adaptive strategies as hustling and fighting in order to be prepared to survive as independent adult women within their community" (P. 83).

Competing Theories within Feminist Scholarship

With the advent of feminist perspectives and feminist scholarship, the theories used to understand the reasoning and experiences of females in gangs expanded. In traditional female gang research, like the studies conducted by Thrasher and Bernard, female gang involvement was the result of individual maladjustment and therefore there wasn't a need to analyze why females joined gangs and how those reasons influenced their experience within gangs (Chesney-Lind 1999). However, the presence of feminist perspective scholarship brought to the forefront two new themes: victimization and agency among young women in gangs.

Victimization of gang girls. The introduction of feminist scholarship into gang research brought a focus on the victimization of young black women and how this influenced their involvement and experiences within gangs. My working definition for victimization is adversity resulting from being made into a person who suffers from a destructive or injurious action (Chesney-Lind and Hagedorn 1999; Miller 2001; Miller 2008). As a result, research on female gangs began to examine and analyze how young black women could be victimized by the many different factors influencing their lives.

Race, gender and class are influential factors that appear regularly in the newer research on the victimization of young black women in gangs (Miller 2001; Miller 2008; Burris-Kitchen 1997; Wing and Willis 1997). Race and gender have been used to devalue black women's existence as evidenced in the images that have shaped the way black women are perceived in American society (Monnat 2010; Burris-Kitchen 1997). For example, the "Matriarch" narrative faults black women for the breaking up of the black home. In this narrative, women are saddled with the role of both mother and father. They must have access to employment to support the family. However, they are portrayed as emasculating

their male counterparts. However, since unemployment rates are highest for black women in low-income communities, these women are often dependent on welfare for daily survival. With the responsibilities of both the mother and father within harsh economic environments, black women are forced to be aggressive, assertive and therefore unfeminine (Burris-Kitchen 1997). According to Burris-Kitchen, black women's different identity tropes have resulted in gangs being a common way for them to survive within their surrounding: "it is possible that the structural position and the [resulting] behavioral alternatives...have contributed to the nature of African-American female gangs" (1997:51).

As young black women turn to gangs as a way to counter the adversity they face due to their race, gender and class, their involvement in the gang only increases their victimization. The social-injury hypothesis which claims that the structure of gangs only increases gang girls' chances of victimization helps explain this (Chesney-Lind 1999; Hagedorn and Devitt 1999; Miller 2001). Violence is an essential part of gang culture for both male and female gang members. However, studies indicate that female gang members are subjected to violence on a higher level than non-gang females, non-gang males and male gang members (Burris-Kitchen 1997; Chesney-Lind 1999; Miller 2001; Miller 2008; Wing and Willis 1997). "Violence among Girls: Does Gang Membership makes a Difference," by Elizabeth Piper Deschenes and Finn-Aage Esbensen (1999) studies the difference between non-gang and gang girls' involvement in violent criminal activities and experiences with victimization. The study which surveyed eighth grade girls from different schools in multiple locations asked respondents to self-report delinquency, victimization, and gang affiliation in order to identify who was a gang member. The authors found that a higher number of gang girls reported involvement in violent crimes and victimization from violent crimes than non-gang members. Female gang members in gender-mixed gangs are subjected to even more violence due to having to fight rival female gangs and

sexual assaults from rival and fellow male gang members (Giordano 1978; Miller 2001).

Burris-Kitchen's (1997) and Chesney-Lind and Sheldon's (2002) studies on young black women's involvement in drug selling illustrates the social-injury hypothesis. Burris-Kitchen found that economic disadvantage was a major reason for young black women to join gangs because they were unable to find employment within their low-income communities. As a result, young black women participated in drug dealing as a way to access money. However, their involvement in drug selling only increases their victimization since they are constantly robbed by rival gang members. Chesney-Lind and Sheldon found that gang involvement was harmful for young black women because it encouraged them to adopt traits that were unacceptable in formal working environments: "Toughness, meanness, and aggression are qualities that African American women must possess in the drug selling business but are not encouraged to have in formal economy environment" (2002:76).

Agency for gang girls. Feminist scholarship also introduced the concept of agency to research conducted on female gang involvement. Agency is the ability to be self-sufficient and independent. Considerations of agency among female gang members focused attention on the different ways gang involvement increased self-empowerment and opportunities for female gang members. Researchers have argued that young black women used gang involvement as a strategy to overcome the factors that cause their victimization (Miller 2001). Gang involvement provided a sense of empowerment as young black women learn to adapt to their oppressive living conditions, gain economic means and challenge their subordination to men (Miller 2001).

The actual structure of the gang and the activities of fighting can provide agency among young black women. Young black women tend to feel a sense of empowerment knowing that

their friends from the gang are there as protection and can attest to their status within the gang. Hagedorn and Devitt's (1999) study of female gangs in Milwaukee, WI illuminates this point. They conducted interviews with the founding members of Milwaukee female gangs in order to collect information about their experiences in the early and mid-1980s, specifically about their experience with violence, drugs and drug-dealing. As an organizing strategy for their data, they separated the respondents' answers based on their ethnicity and found that female members from African American gangs demonstrated greater autonomy than the Latina gang members. Hagedorn and Devitt found that the young black women who participated in group violence saw it as a prideful activity for their gangs: "What had to be called a virtual celebration of fighting in our interviews seemed to be close to a liberated feminist position, with our respondents rebelliously insisting that, like men, women can fight" (272).

Agency among young black women in gangs can also be expressed by the liberation hypothesis. The liberation hypothesis as defined by criminologist Freda Adler (1976) states that as women gain more social status in society as the result of women's movement demands, their participation in masculine gender activities, like crime and violence, will increase. According to Miller (2001), this hypothesis depicted women as committing the same amount if not more crime and crimes of violence than men.

The liberation hypothesis is evident in James Messerschmidt's explanation of how female gang members create femininity suitable to their lifestyles. Messerschmidt (1999) found that female gang members are distinguished from non-gang females through fighting. Their willingness to fight and be good at fighting gives female gang members the identity of the "bad girls:" their own feminine identity within the gang culture. According to Messerschmidt, females in gangs had to be willing to fight, assault, and release their aggression if they wanted to have reputation, status, and acceptance; he observes that "Gang-girls violence in this situation is encouraged, permitted, and privileged by both boys

and girls as appropriate feminine behavior” (129). Messerschmidt concluded that violent behavior by females in gangs should not be characterized as their attempts to be “male” and “pass” as the other gender, but as a way for females to gain acceptance within the parameters of allowable femininity in gang culture.

Carl Taylor’s 1993 book *Girls, Gangs, Women & Drugs* examines black female gang culture through the liberation hypothesis. Through several case studies with female gang members from Detroit, he concluded that female gang members in various gangs used gang culture to experience their own liberation within conditions of poverty, racism, and sexism. He explains that the narcotics business allows young black women to produce income which helped to release them from their dependence on men and overcome challenges created by their surroundings. According to Taylor, black female gangs participate in drug selling and violence in order to protect themselves in a dangerous environment. Through their gang involvement, black women are gaining and enjoying the power they receive from their aggressive and violent lifestyles. This form of agency among young black women may be the reason for the rise of independent female gangs and their growing autonomy within mixed-gender males.

Methodology

Feminist scholarship’s competing theories of victimization and agency has increased the portrayal of gang girls’ in contemporary gang research. These theories have been used as tools to define and understand the experiences of gang girls. However, there is still a need to explore which theory, either victimization or agency, can best explain the nature, scope and consequences of young black women’s involvement in gangs. In this study an attempt was made to contrast what is known about the social context of at-risk black girls and young black women in Los Angeles’ gangs to the feminist scholarship on the topic.

Description of Sample

Structured interviews were administered to gang intervention activists from the Western and downtown Los Angeles area during July 2011. In the time allotted for this phase of the research, only three participants were chosen to interview. Access to these participants was made possible through exploring and contacting different gang prevention organizations on the internet. Once organizations' websites were examined, emails were sent out to the staff members asking for their participation in this study. Some staff forwarded the email to other gang intervention activists allowing at least 6 gang prevention organizations within Los Angeles to consider this project. The three participants selected have considerable expertise in the subject under consideration. Although I would have preferred to interview actual female gang members and plan to do so for future research, gang intervention activists have a unique perspective, both as insider and outsider, on gang involvement which allows them to present a complex analysis of the experience of at-risk black girls and young black women in Los Angeles' gangs.

This phase of the research interviewed only African American gang intervention activists, two men and one woman. All participants had been gang members during their youth and the two male participants had been incarcerated. The 2:1 ratio of male to female participants is reflective of the male dominance presence within gangs and gang intervention work. It is possible that the male participants' may represent a male-centered perspective that presents the involvement of black girls and young black women as centered on the needs of male gang members. It is also possible that the female participant would offer a feminist perspective since it is conceivable that her own gang involvement may allow her to present a unique and complex representation of black girls and young black women. All participants have been gang intervention activists for a minimum of five years and have held leadership positions within their gang prevention organization.

The first participant was Skipp Townsend, one of the founders of 2nd Call, an organization with the goal of giving black

communities a “Second Chance at Loving Life.” 2nd Call is a community based organization that helps at risk-youth, gang members, ex-felons, and parolees develop the skills needed to live a more satisfying and productive life. Like the youth he helps, Skipp Townsend was once in a Los Angeles gang; however he is now a violence reduction specialist at 2nd Call. The organization takes a grassroots approach to alter the mindset and social behavior of young adults within primarily the West Adams/Arlington Heights Communities. 2nd Call helps young adults gain life skills and employment opportunities through their many empowerment and personal development courses.

The second participant was Milow LeBlanc of Common Unity Reaching Everyone (C.U.R.E), a non-profit community movement that aims to help children navigate, survive, and appreciate life in their dangerous communities. Milow, a former gang member now works as the office manager and youth mentor for C.U.R.E. He received gang intervention training from the Professional Community Intervention Training Institute in Los Angeles. Founded in 2001, C.U.R.E. is a grassroots organization that works to end warfare between rival gangs within the West Athens neighborhoods of South Los Angeles. Through educational, sports and community programs, C.U.R.E. continues to create safer lifestyles for at risk children and families.

The final participant was Renee Reaser, founder of Women of Morals Empowering the Neighborhood (W.O.M.E.N.). This is a community-based organization that focuses on educating and providing a safe environment for young women within the community. Renee, who was also once a gang member, aims to help at-risk black girls and young black women build their self-esteem and develop an identity they can be proud of. Through W.O.M.E.N., Renee hosts life skills workshops at public schools and mentors girls in the Southern Los Angeles area.

Procedures

The three gang intervention activists participated in individual face-to-face interviews that lasted for approximately forty-five minutes to an hour. The interview consisted of fifteen open-ended questions organized around four central themes: gang involvement, victimization, agency, and gang prevention. Most of the questions focused on the involvement of black girls and young black women and how their involvement led to their victimization or ability to have agency within their gang. Questions that focused on the victimization experienced by gang girls asked the participants to explain the type of abuse gang girls may experience due to their gang involvement. Questions that focused on the black girls and young black women's agency within the gang asked the participants to explain the types of gang-related activities that made the gang girls feel empowered.

Measures

The interview questions were tools to analyze the similarities and differences between how gang intervention activists and feminist scholars understand and critique black girls and young black women involved in gangs and their experiences with the competing processes of victimization and agency within gang culture. In order to measure the gang intervention activists' perspectives, all the questions were open-ended, allowing the participants to present their own understanding of what gang-related activities consist of within the communities in which they work. Gang girls' experience with victimization was measured in terms of the social-injury hypothesis which posits that the opportunities females gain from their gang involvement only increases their chances of being victimized. According to previous studies, black girls and young black women are most likely to be victimized by fighting and other activities that increase the use of violence and produce physical abuse. Activities involving sex and drug usage such as prostitution, are also seen as causing victimization (Burris-Kitchen 1997; Chesney-Lind and Hagedorn 1999; Deschenes and Esbensen 1999; Hagedorn and Devitt 1999; Miller 2001; Miller 2008; Wing and Willis 1997). Gang girls'

experience with agency was measured in terms of the liberation hypothesis which states that as women gain more social status and position their participation in masculine gender activities like crime and violence will increase. According to previous studies on the liberation hypothesis, black girls and young black women are most likely to experience agency by participating in activities that involve violence, like fighting, and making money, like distributing drugs.

Findings

Gang-Related Activities

Gangs and gang-related activities are usually centered on men. Female involvement in gangs typically has been portrayed as based on their relations to their male counterparts and their ability to commit feminine crime. However, the respondents indicated that gang girls are involved in both traditional and non-traditional female crime such prostitution and shop-lifting. According to the three respondents, black girls and young black women's gang involvement includes: fighting, carrying of weapons, drive-by shootings, robbery, distributing drugs, using drugs and alcohol, prostitution and providing sex to male members of the gang.

Though the activists agreed on the types of gang-related activities black girls and young black women were participating in, there was a clear difference in their understandings of the involvement. For Skipp Townsend, the participation of young black women in gang-related activities is centered on their neighborhood structure. According to Townsend, the gang is just a fragment of the community so the gang naturally participates in whatever community activities are taking place; "Well some of these activities they partake in would be BBQs, picnics at the park, low rider functions where you go to other communities and there's a bunch of people and say if a fight starts, well you have to fight with your community." Townsend shows that gang-related activity can be occur in any environment if there is a mixture of different

communities in one place. According to him, gang violence can occur whenever a community member is threatened, “You know if one of the community members is fighting, whether they are a gang member or not, the community will surround themselves with those individuals who they know and love and not let someone else hurt them.” By constructing the gang as just a portion of the community, young black women’s participation in fighting is justified by seeing them as protecting their friends and families instead of committing an act of deviance. For young black women, knowing that your community will have your back, regardless the situation is very appealing and encourages young black girls to do acts that will guarantee their protection within their community (Hagedorn and Devitt 1999).

The only female participant, activist Renee Reaser, also had an understanding of the gang as being a part of the community, but her description of female gang involvement could be examined in terms of the feminist perspectives within contemporary gang research. Reaser explains how female gang involvement is changing because gang girls are now directly participating in violent crime:

“Normally through fighting you get put on and stuff. Or some even get put on by doing drive-bys. Some girls are even starting to be the driver now and the shooters. It used to be that the girls would be in the backseat and come out later but now it’s starting to be that they are running the whole thing. ‘Oh I’ve decided I’m going to go get this person’ and they earn their stripe.”

According to all three activists, young black women are actively participating in gang-related activities that have been traditionally done by males. They are calling the “shoots” and displaying independence that’s not traditionally seen in gangs. Unlike the male-centered perspective where female gang involvement is centered only on their sexual behavior (Bernard 1949; Thrasher 1927), Reaser’s response shows that gender does not limit black girls and young black women from participating in

certain violent gang-related activities. Their participation is often required and favored by many as a way to enter and stay within their gang (Hagedorn and Devitt 1999; Messerschmidt 1999; Miller 2001).

Victimization within Gang Culture

The feminist perspective is dominated by the theory of victimization within gang culture. In order to measure the presence of victimization within black girls' and young black women's experience in Los Angeles's gangs, the activists' responses were compared to the social-injury hypothesis of victimization. After understanding what types of gang-related activities gang girls are participating in, I posed questions that focused on the possibility of victimization based on these activities. Judging by the activists' responses, activities like fighting, using drugs and alcohol, prostitution and providing sex, lead to the victimization of black girls and young black women.

Similar to the cases of victimization demonstrated within the social-injury hypothesis, all activists agreed that there is a lot of sexual activity involving gang girls. According to LeBlanc, age is not a factor when it comes to young black women's participation in sexual activities within the gang:

“Most of the prostitutes working with these pimps now are these youngsters. They are just out of high school working on the streets and strip clubs. And a lot of these dudes are trying to get in a relationship with these strippers and these girls don't want any relationship, they want some money. And that's why we be working in the middle schools and stuff because that's where all the experiments be happening right there, their first experiences with sex and drugs right there.”

LeBlanc's observation is supported in contemporary research that finds that at-risk black girls and young black women are learning about sex and these risky behaviors at a very early age (Giordano 1978; Miller 2001; Miller 2008). By the time these girls enter the gangs, they may fall into prostitution as a way to be financially stable and establish their membership in the gang. According to the activists and social injury-hypothesis, this behavior is very dangerous because gang girls are vulnerable to the possibility of being raped, attacked or pressured to commit criminal acts. For example, Townsend discussed how sex can get a girl into the gang but doesn't secure her status because, "A lot of times young girls are often victimized by other girls too. Saying you had sex with all these guys but you haven't done anything for the community. So a lot of girls would pressure them into doing something violent or committing criminal acts or smoking or drinking." Risky sexual behavior establishes young black women's reputation in the gang and at the same time can lead to disrespect by outsiders and as well as members of their own gang.

The dangers associated with the risky behavior of these gang girls are expressed within the social-injury hypothesis and by the activists. However when asked if the young black women Reaser mentors ever express a history of victimization due to their gang involvement, Renee explained that the girls don't view their behave in that way:

"I don't think they realize it [their victimization] until they're about 30 years old. Or if they have some kids because they're like 'I got kids here.' Or I shouldn't be doing any drive-by; there could have been kids in the house. Some of them calm down after having kids but it don't really haze them until they 25 or something like that. They not thinking of these activities as being dangerous or damaging to their future; they not thinking of that at all. It doesn't even cross their mind because they are having fun."

According to Reaser, and the other activists, the fast pace of gang culture often blinds young black women to the victimization they face due to their involvement. It isn't until gang girls experience a turning point in their lives, like having a baby or death of a close friend, that they realize the dangerous consequences of their action. For black girls and young black women, all that matters at that moment is their present reality and the excitement that comes from their gang involvement.

Agency within Gang Culture

Since gang girls' experiences of victimization are so clear to researchers and the community, the agency theory is often ignored as a way to explain their experience. According to the gang intervention activists, however, the validity of agency theory is apparent. Based on the activists' responses, activities like fighting, carrying weapons, distributing drugs, robbery, and providing sex, do create agency for black girls and young black women in gangs. According to three activists, not only do gang girls enjoy fighting, but they also cause most of the conflict that happens between rival communities. Reaser offers a clear articulation of all three gang intervention activists' understanding of gang girls' agency when she says:

“Some of the girls are little bit more violent than the guys and yes, they enjoy it. A lot of the times girls start it. You know, ‘I don’t like her. So I’m going to get her after school.’ You know she lives down the street and she thinks she is more than the rest of us. I’ll catch her afterschool and they get her. This applies to the guys too. They get into fights with guys. It doesn’t make any difference they feel that if you are in a gang and you need to get got then that’s what’s going to happen.”

Black girls and young black women are not afraid to fight; in fact, they are actively participating in fighting. The excitement and agency that comes from fighting can be explained by the liberation hypothesis since fighting is seen as masculine behavior. Fighting is fundamental to gang culture; gang girls understand and embrace the presence of violence within their gang experiences (Hagedorn and Devitt 1999). According to Reaser, just being a part of a gang gives black girls and young black women a sense of power:

“Belonging to a hood is just a power thing in itself. It’s just you know this is my hood right here. I have my big homies with me and my little homies with me. You rolling down the street and you got 4, 5 people with you, they not gonna say anything. They go to school and other kids know that you are a part of a gang so they know that if they jump on you there’s a chance that they might get jumped on too by 5 or 6 of them or somebody from their hood might shoot me. They know there’s a power there.”

The ability to walk around your environment, whether it is your gang or school, and not have to worry about your safety is empowering. Gang girls know that their gang will have their back and therefore they can create conflict and react to conflict in ways that allows them not to think about how they may be putting themselves into danger. Having a support system allows gang girls to experience a sense of power because they know that they are protected and therefore able to move freely within their community.

Low Self-esteem and Prevention Work

The activists believed that low self-esteem influenced black girls and young black women influenced to join their gang. For Reaser, low self-esteem and lack of attention at home were her reasons for joining a gang and she sees no difference for the girls

she counsels. Reaser explained that most of the girls she mentors are surrounded by gang members due to unstable situations in the home. This results in young black women viewing gang culture as a better environment than their home which might be filled with domestic and drug abuse or lack of guidance from parents.

When you have low self-esteem, being able to see yourself as being important is critical and is something that gangs provide to girls who join. The need for attention enhances the appeal of gang culture for black girls and young black women. . They see their friends participating and therefore the gang seems cool and exciting. Participating in gang activities becomes a way to gain the attention they aren't receiving at home or school. The role of low self-esteem is also present in the participation of black girls and young black women in conflict and sexual activities. According to Townsend, some gang girls use sex as a way to build their self-esteem:

“There’s a lot of sexual activity. Those girls with low self-esteem find themselves having sex with several community members for acceptance. It used to be said that this is a way to getting into a gang, to be sexed in, that’s just not the case. But they still are looking for acceptance. Like if I have sex with the big guy on the block and everybody will respect me because I’m with him. However, when he leaves her now she needs to gravitate to somebody else for that acceptance. So a lot of the 19-20yr old girls in the community have found that they been there for seven or eight years, well they have had sex with several individuals cause they were looking for acceptance.”

In order to counter the influence of low self-esteem, the gang intervention activists’ organizations all focus on improving and developing gang girls’ life skills and image of self. At 2nd

Call, Townsend hosts weekly meetings with members of the community focusing on behavior modification and social development. These weekly meetings cover such topics as learning to handle depression, building self-esteem and effective communication. LeBlanc's organization, C.U.R.E., focuses on providing the youth in their community with tools and skills necessary to finish school. They hold after school tutoring programs that provide computer training taught by volunteers and a leadership program that offers youth opportunities to volunteer within their community and learn to gain pride in themselves and their neighborhoods. Reaser, who used to work for C.U.R.E., still hosts their Butterfly Program through her organization. This program is a weekly course that provides guidance, resources, social services and whatever else is needed to help improve the life skills and opportunities for at risk girls. The program focuses on helping the girls become self-sufficient and self-empowered. Through these programs, the three intervention activists' believe that they can help young black women and at-risk youth in general find alternatives to gang involvement. In order to stop the violence and criminal activities that result from gang involvement, the activists feel that it is essential to empower these youth and provide them with opportunities within their community.

Discussion

The results of this study show that it is critical to apply both the victimization and agency theories to explain the involvement and experience of black girls and young black women in gangs. This is contrary to feminist scholarship that explains female gang involvement in terms of only one of the theories. However, as elucidated by the gang intervention activists, the gang-related activities that lead to gang girls experiencing victimization and the activities that lead to them gaining a sense of agency are often the same activities. As a result, we can conclude that the structure of the gang leads to support for both theories in explaining the experiences of black girls and young black women. The structure of gangs gives young black women agency because it gives them a

sense of empowerment, excitement and the ability to navigate through their harsh communities. However, the same structure increases gang girls' chance of being victimized within their communities because they are subject to injury from fighting, peer-pressure and sexual abuse. As the gang intervention activists explained, providing sex leads gang girls to experience agency because they get to feel accepted and receive attention that they feel will help give them a name for themselves. However, according to the activists, providing sex also causes the gang girls to experience victimization because they may be subjected to rape and run the risk of becoming pregnant. What the activists made clear is that even though they can see how gang girls are victimized, the girls themselves cannot. In a sense, black girls and young black women in gangs view their involvement as a way to gain agency. They see their involvement as a way to respond to the lack of attention, their low self-esteem, and the inequalities that they face on a daily bases. However, they fail to realize that the opportunities they believe the gang provides often lead them to being victimized and to experience hardship in the long run.

The information gained from the gang intervention activists' indicates that feminist scholarship must begin to examine the gang involvement of black girls and young black women through both theories. In order to expand on these findings and develop a better understanding of how the two competing theories can be used, I plan to conduct in-depth interviews with gang girls themselves. I also plan to conduct ethnography research on the gang prevention organizations that participated in this study. My goal is to examine how gang prevention organizations try to provide alternatives and opportunities for black girl and young black women. It is necessary to understand how gang girls view their gang involvement in relation to the work of gang prevention organizations because this can provide useful tools to help prevention organizations achieve successful prevention rates within the Los Angeles area. Preventing the involvement of at-risk black girls and young black women in gangs is critical because

these are the future mothers and leaders within black communities. An understanding of the involvement and experiences of black girls and young black women in gangs can also add to the knowledge about male gang involvement. I hope my research can enhance the opportunities provided to gang prevention organizations in Los Angeles and therefore expand the opportunities for a richer and more rewarding life to young black women and the larger black community.

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Minority Women in STEM: Exploring the Reasons for Exit And Methods for Retention

Olivia Turnross

Mentor: Dr. Beth Schneider
Department of Sociology

Abstract

Science, Technology, Engineering, and Mathematics (STEM) fields continue to have disproportionate representation of racial-ethnic minority women, both in higher education and the workforce. While female and male elementary through high school students take mathematics and science courses in equal numbers, there is a rapid drop in female students who pursue STEM fields at the university level. Likewise, minorities and women who have selected STEM majors are less likely to persist and graduate in those disciplines. Recent literature highlights a surfeit of reasons for high attrition rates in higher education. In this paper I review the primary barriers to racial-ethnic minority women in STEM including academic background, gender stereotypes, the nature of research science, limited role models, family-related constraints, and a draw to service-oriented professions. Results from an informal survey conducted amongst female minority undergraduate and graduate students who have participated in the McNair Scholars Program at University of California at Santa Barbara are introduced in a discussion of recent research on attrition. An assessment of current methods and programs with the aim of gaining and maintaining racial-ethnic minority female STEM presence provides a conclusion and potential solutions to this indisputable concern.

Introduction

The landscape of the job market is rapidly changing, and opportunities in the Science, Technology, Engineering, and Mathematics (STEM) are burgeoning. A 2011 report from the U.S. Department of Commerce on STEM employment highlighted a growth in STEM jobs three times faster than growth in non-STEM jobs. Likewise, STEM occupations are expected to grow 17 percent from 2008 through 2018, versus a 9.8 percent growth for non-STEM fields. Accompanying this increase in job opportunities is the critical analysis of a lack in diversity within the STEM workforce. While there is increasing minority representation in STEM within the job force, these numbers are much less than the

number of these individuals who enter college intending to pursue a career in a STEM discipline. Independently, women and minorities are even less likely to persist in a STEM field major during college than are male and non-minority students (National Science Board, 2007). For example, underrepresented racial and ethnic minorities (URM) which include African American, American Indian/Native Alaskan, and Hispanic represented 8 percent of the Master's and Doctorate degrees granted in 2009, of which 34 percent were awarded to women, according to the National Center of Education Statistics (NCES, 2011). Likewise, a NCES report from 2009 indicated that African American and Hispanic students had lower bachelor's degree completion than White students (NCES, 2009).

A continual underrepresentation of women and racial-ethnic minorities in the job force due to notable attrition of these scholars from STEM as they advance in their studies is also evidenced in a recent National Academics report showing that in 2007, racial-ethnic minorities comprised nearly 40 percent of the K-12 public school enrollment, yet only 26 percent of the United State's undergraduate enrollment and 18 percent of those earning science and engineering bachelor's degrees, independent of gender. The *Fisher v. University of Austin at Texas et al.* amicus briefs cite a plethora of evidence of the benefits of diversity within academia ranging from improved cognitive abilities to increased inter-group understanding (Segura and Schneider, 2012). Research findings have also demonstrated how diversity reduces the negative impacts of tokenism and isolation of racial-ethnic minorities, which can be extensive in more homogenous undergraduate populations. Considering the disparity of female (and male) underrepresented racial and ethnic minorities in STEM higher education, and the importance of these students to the social and intellectual climate of academia, the key questions to be considered at present are: why are some students still largely underrepresented in these fields and what accounts for the attrition rates that drastically reduce URM graduate and undergraduate

students who begin down this career path?

Two models have been developed that address continual underrepresentation of female and minority presence in STEM: the pipeline (Kulis et al. 2002) and deficit (Sonnert and Holton 1996) models. The pipeline model is a metaphor in which the pipeline represents a student's travel from grade school to obtaining a tenure-track faculty position. Each transition, for example from undergraduate to graduate school, represents a potential "leak" in the pipeline. This model addresses both the sustainment and supply of the underrepresented. According to the logic of this model, more racial-ethnic women receiving doctorates will increase their presence in faculty positions. However, recent research has shown that despite increased presence of STEM racial-ethnic minority women pursuing doctorates, this has not yet been reflected at the faculty level. According to the pipeline model either gender and minority disparity at hiring, or attrition rates are to blame.

The deficit model examines the social, political, and cultural obstacles for STEM racial-ethnic minority women. The combination of fewer opportunities, minimal support, and pay and leadership inequality are suggested as the primary reasons for attrition and underrepresentation within this model. Both models are interlocking, and demand further study as both the number of students initially interested in STEM and the socio-political climate are highly relevant to the continued attrition and underrepresentation of racial-ethnic minority women within STEM.

In this paper I review the primary barriers to racial-ethnic minority women in STEM including academic background, gender stereotypes, the nature of research science, limited role models, family-related constraints, and a draw to service-oriented professions. Results from an informal survey conducted amongst undergraduate and graduate students who have participated in the McNair Scholars Program at University of California at Santa Barbara are introduced in a discussion of recent research on

attrition. I conclude with an assessment of current methods and programs that aim to gain and maintain racial-ethnic minority female STEM presence.

The Barriers

Over the past two years media coverage of issues surrounding racial-ethnic minority STEM women has increased. For example, a “Girls In STEM” blog within the online *Huffington Post* is updated at least weekly with crucial discussion, conversation, and review of recently published journal articles. Likewise, many blogs, newspapers, and Twitter accounts or Facebook pages belonging to organizations in support of underrepresented individuals, including females and minorities, are consciously increasing their social media presence now more than at any point in the past decade. In the following paragraphs I utilize popular news sources, many focusing on summarizing popular literature, to discuss what have been noted as long-standing reasons for attrition of minority female STEM scholars: academic background, gender stereotypes, limited role models, and family-related constraints, and a draw to service-oriented professions. This discussion calls attention to the intersectionality of multiple systems of oppression that are relevant to studies on minority attrition including but not limited to gender, race, class, and ability.

Academic Background

Academic background, the basis of a student’s transition through the academic pipeline, has often been discussed as a chief area of disparity both between genders, and between minority students and the majority. Academic background encompasses the subpar education and academic opportunities as well as differential academic preparation (as measured via standardized testing, or other performance measures) evident by gender and race.

However, it is important to recognize correlation does not necessarily imply causation when considering students' background and performance. Substandard performance on standardized exams and low grades are two areas of academic performance frequently used to explain the lack of racial-ethnic minority females in STEM (Fryer and Levitt 2009). Is a lack of preparedness for the rigors of a STEM degree leading women to pursue different paths? Would a decrease in gender and minority inequality in academic preparedness mediate much of the attrition seen currently? A recent study discussed in *Science Daily* (2013) elucidates that males and females have similar scores in math and science, with Asian Americans exceeding all ethnic groups, and African American and Latino males receiving the lowest scores (Else-Quest and Higgins, 2013). This study disparages gender stereotypes as an explanation while highlighting still relevant racial ones. More powerful is the conclusion that aptitude for a STEM career is equal among women and men, and underperformance of females has not been legitimized in research studies as a primary reason for gender disparities. Additionally, this article notes that in addition to similar performance in science and math, females excel in English in comparison to their male counterparts suggesting that this strength may guide their major and career choices (Riegle-Crumb *et al.* 2012). Thus, women are as capable as men, but may be choosing to follow a path in a subject that is their primary strength. An article in the *Scientific American* (2013) suggests that should we "bring more storytelling to science" women would be more drawn to STEM (Kuchman, 2013). More research to evaluate the choices and performance of female minorities is needed.

Gender and Racial Stereotypes and Inequality

In the discussion of attrition, the relationship of gender stereotypes to academic background and performance is frequently mentioned. While many claim that gender stereotypes may not be exceedingly relevant today, STEM gender inequalities in representation, pay, perceived academic merit, and beyond is still rampant. A *Popular Science* article discussing a *Nature* journal

special issue points out the extent of pay inequality, specifically “In 2008, the median salary for women in science and engineering was \$60,000 a full \$24,000 less than the equivalent male salary” (Ferro, 2013). What for some may be a startling reality is the symptom of a greater, institutionalized dilemma within STEM. *Nature* captures this problem concisely in stating that, “Despite some progress, women scientists are still paid less, promoted less, win fewer grants and are more likely to leave research than similarly qualified men” (*Nature*, 2013). What the article refers to as “institutional sexism,” a deep-rooted and widespread sexism, is furthering all sorts of inequalities, gender inequality in particular. Oftentimes, women are initially unaware of these pay inequities, and questioning others about their pay would be grounds for firing.

Additionally, gender and ethnicity-based wage gaps will lead to continued, if not increased, attrition. As women become more aware of when their pay is representative of their skills and experience, and where to find the job or education opportunities in which they will receive equal pay and opportunity, they likely will take these opportunities in greater numbers. A recent study addressing how minorities are impacted by stereotype threats found significant results. By definition a stereotype threat is when an individual is aware of a negative group stereotype and this cognizance reduces their performance or interest in a task or activity. Results from this study conducted on undergraduates found a significant positive relationship between stereotype threat and attrition of minorities and women from STEM (Beasley and Fischer, 2012). While many of these stereotypes are very well established within their respective fields of STEM, there is the opportunity for role models, in particular tenured faculty, to make these threats obsolete and irrelevant through positive encouragement and demonstration.

Limited Role Models

The pipeline model is particularly relevant to a discussion of role models for URM females within STEM. While many girls do begin the STEM career path, a “leaky pipeline” is evident in the disparate numbers who ultimately stick with this career path. The university is sorely deficient in role models who identify as URM women. A *Huffington Post* article, “Investing in Women in STEM: Because Girls Grow UP” considers solely the presence of women, noting that,

While women have been earning a high percentage of STEM degrees for some time, their levels drop off by about a quarter between each rung of promotion through the academic system. In science and engineering, women make up half of all graduate students and post-doctoral fellows, 41% of the assistant professors (pre-tenure), 34% of associate professors (post-tenure), and less than 20% of full professors (Schrader, 2013).

It is important to note that these numbers represent an average across STEM fields, and in some fields, engineering for example, only 8% of the faculty is female. The article does not address URM females, whose numbers, one could hypothesize, are significantly less within university faculty.

Why are URM women role models necessary? While a role model of any minority or gender is better than none, the importance of a role model who can counteract pervasive stereotype threats both by example and in conversation may be crucial. In the *Pittsburgh Post-Gazette* article “Duquesne among those retaining women, minorities in STEM” discusses critical steps to retaining minority female presence in the transition from undergraduate to graduate programs. One female URM mentor noted the necessity of her mentorship to, “counteract discouragement that comes from stereotypes of the scientific abilities of women and minorities. One transfer student she mentors said a white male professor at another university told her

she was better suited to be a model instead of a chemist” (Mauriello, 2012). Evidently, not only do these women benefit from witnessing URM women who have succeeded in the graduate to faculty path, but also from assurances they are not a stereotype.

Lastly, in a Huffington Post Blog, “Path to Innovation: Women, Mentors and STEM Success,” author Heidi Kleinbach-Sauter mentions that mentors outside of academia can be equally important and “encourage students to see STEM in a different light” (Kleinbach-Sauter, 2013). Whether URM females ultimately end up in academia, industry, or pursuing some other STEM career, awareness of the multitude of career paths available may help retain them.

Family-Related Constraints

“Having it all,” is a phrase that has been frequently used to describe the tenure-track or tenured female academic who had devoted a portion of her life to raising a family (Slaughter, 2012). One of the most discussed reasons for attrition of URM females from academia, STEM in particular, is the interest and at times cultural obligation of having children and finding a balance between work and family life. According to an Association for Women in Science (AWIS) blog entry on *The Huffington Post*, “Investing in Women in STEM: Because Girls Grow Up” notes that while men primarily leaving jobs due to salary-related issues, “Women... generally leave because of caretaking conflicts or hostile workplace climate” (AWIS, 2013). This article notes that the STEM industry sector has become increasingly aware of the importance of “paid maternity leave, company-sponsored childcare, flexible scheduling, family healthcare benefits, and

paternity leave” in retaining female employees post-childbirth. However, there is still much room for improvement on this front.

Within academia, the situation for postdoctoral research associates and faculty members is often grim. For example, “Married women with children and a Ph.D. are 35% less likely than a married man with kids to get tenure, and 28% less likely than women without kids to get tenure” (AWIS, 2013). Both gender inequalities, and inadequate support provided by universities for women faculty with children, are at fault. Likewise, many URM women chose to leave STEM prior to beginning a family, as they are aware of the frequently unmanageable burden that will be placed upon their partner post-childbirth. Research studies have noted that,

Those who desire to pursue professional careers may expect to defer forming families, both via marriage and parenting, though such intentions may vary by sex. Similarly, because balancing professional employment and parenting may seem daunting, those with strong career aspirations may decide to either forego parenting, or limit the number of children they have (Sassler et al., 2011)

Attrition of URM females due to family-related concerns is not a phenomenon exclusive to STEM fields. In fact, support of working women who are raising children has been an issue of much activism since women joined the workforce en masse during World War II. In the present day, as the definition of traditional family is changing and gender roles are expanding, more women are able to manage or independently choose the lifestyle that is a career in higher academia. However, often unconsidered is the disparate importance of a family and child rearing to women of racial-ethnic minority background.

Differences in the cultural significance of childbirth and expectations of starting a family result in terrible quandaries for

many URM women who find themselves grappling over the decision between family and career, or trying to “have it all”. For example, Dr. Caryl Ann Becerra in her article “Fixing the Leaky Faucet: A Discussion on Women of Color in STEM...with Children” expresses that “as a Filipina American, having children was something that not only did I want, it was reinforced by my culture as the *most important* goal in life.” Dr. Becerra, and many other URM females are burdened with the decision of when and how to navigate childbearing and/or rearing, and their professional development. Likewise, for many of these females family commitments are always a priority, which may put a STEM career in jeopardy without the right support. Dr. Becerra notes the disparity among academic institutions in policy regarding families with some workplaces having no support for faculty, postdoctoral researchers, or graduate students or a combination of these. As women are reaching key steps in the STEM pipeline as graduate students, postdoctoral researchers, and then faculty they are also often at the best period, biologically, to start a family. Considering that family-related constraints are the major reason for attrition of women from STEM, and family is often a heightened priority for URM women, a focus on providing support should be a priority.

Draw to Service-Oriented Professions

Several studies suggest that a major harbinger of the attrition of racial-ethnic minority females from STEM is their interest in service-oriented professions (Grandy 1998, Schrader 2013). While there are service applications of many STEM careers, many females within this sector chose sciences that are more readily linked to making some sort of tangible societal impact including biology, in particular marine biology, chemistry, and science as a whole versus technology professions. However, an article, “STEM Education: Where the girls are not” from February 2013 in the *St. Louis Post Dispatch* noted that “71 percent of the new STEM jobs in 2018 are projected to be in the computing fields” and calls for

mentors who can demonstrate both the role of this profession in serving society, and the ability of women to succeed and excel in this male-dominated field. This draw to service-oriented professions may be an artifact of early exposure to the sciences, or specifically a lack of exposure compared to male counterparts (Thomas, 2013). While attrition of women from STEM has been frequently linked to lacking connection of STEM disciplines to readily apparent change or service, this is a subject that has not been thoroughly discussed in media, or represented in the literature. Increased study, and reversal of this reality are crucial in any strategy intended to market, structure, and attract URM females to STEM academia and industry.

This review of recent media available to the public points clearly to those issues which are of primary concern in understanding the reasons for attrition of URM females from STEM higher education. These media outlets including *The Huffington Post*, *The Atlantic*, *Popular Science*, *Scientific American* and others reach far beyond the eyes of STEM academics, and can thus garner more support and awareness than scholarly or academic literature. There were, as expected, notable differences in media coverage of particular causes of attrition over the past two years. Receiving most attention were family-related constraints, role models, and gender inequalities/stereotype threats. Racial inequalities, academic background, and draw to service-oriented profession were covered less. Notable in these media articles was the intersection of multiple reasons for attrition, and their relevance across multiple environments—from classrooms to university departments, research laboratories, and more. The core issues raised in these sources informed the creation of a survey presented to a small number of URM female undergraduate and graduate STEM students at the University of California, Santa Barbara.

Methods

In order to collect a small set of data reflective of the views

of racial-ethnic minority women in STEM, a survey was disseminated to a group of thirteen minority STEM women who have participated in University of California, Santa Barbara's McNair Scholars Program. A survey containing thirteen questions was designed using *SurveyMonkey.com*. The questions were compiled based on the literature cited in the popular media that discusses the primary reasons for female minority attrition from STEM. Participants were assured confidentiality and that all identifiable information provided by the women would be changed. Six surveys were completed. Of the six students that responded, four were current undergraduates, and two are enrolled in graduate programs.

Results and Discussion

Academic Background

The students' undergraduate majors reflect the wide spectrum of STEM fields and included environmental studies, mathematics, chemical engineering, physics, computer science, and biological science. A question addressing what influenced these scholars to pursue higher education in STEM points to two themes: excelling in mathematics and a positive mentor and/or STEM experience that developed into a passion. One student explained, "I have always been interested in math. I started excelling at a young age and stayed ahead of the curve through high school. It was so easy and I understood it, so I was naturally interested". Positive encouragement, whether from academic success in high school and/or from a mentor was a factor in all but one of these women's decisions to pursue a college education in a STEM major.

Limited Role Models

Two students had never encountered a racial-ethnic minority female mentor in STEM. Only one of the four who encountered a racial-ethnic female STEM mentor was aware of more than one such mentor within her field of study and current and previous academic experiences. While all the undergraduates plan to attend graduate school, more than half of the students attributed part of this decision to an adult mentor. For example, “I had an AP Bio class in high school that really sparked my interest. The AP Bio teacher made the class exciting and interesting. He is a big reason why I chose this major”. The lack of a supportive mentor, whether or not this mentor shares the same or any minority identity, is likely crucial in retaining these women in STEM. Without someone to look to for encouragement and who can disprove the concern that arises from stereotype threats, particularly relating to academic background, female minorities are at a disadvantage.

One of the mathematics scholars had encountered two mentors within her field, and these mentors were integral to her choice to attend graduate school:

“She was so knowledgeable about the research and her experiences. She spoke with conviction and feeling and always pushed me (I am only 1 of 2 Black people in the program. At the end of her course she personally spoke with me about pursuing a PhD and almost told me that I need to do it.”

The limited racial-ethnic female mentors these women have available to meet with and to emulate, in comparison to a Caucasian white male, is undoubtedly intimidating, causing concern about ability to succeed and to find a work environment cohabited by peers to whom they could relate.

Family-Related Constraints

Two of the undergraduate students expressed concern about finding a comfortable work environment in their graduate studies, particularly with regard to having diverse peers to whom they could relate. As one student expressed it:

“The most challenging aspect I would have say would be the fact that there is a lack of diversity in the STEM fields, therefore it will be hard for me to keep true to my heritage and culture. I find that as I climb the educational ladder, I stray further away from the ones I grew up with, including my family. It is difficult, to say the least, being the only person in your family history (including extended family) striving for a PhD. I know that I will not be amongst people that have gone or will go through as many adversities as myself in graduate school...”

This passage echoes the sentiments of many minority females within STEM. An accelerating isolation from peers, family, and culture as one continues in higher education is undoubtedly a factor in the attrition of many high-achieving scholars. The survey administered did not question the scholars about concerns about pursuing a career in STEM related to childrearing.

Gender Stereotypes and Inequality

Only one of the surveyed scholars was unaware of stereotypes surrounding minority females within STEM. One woman stated:

“I know that females in the STEM field are seen as less [competitive and prepared] than men in the sense that men are capable of excelling in the

STEM fields over females. The reasoning behind this statement comes from the stereotypical view upon gender roles in society.”

Another scholar noted, “African American women are not really seen in STEM. Women do English and Social Sciences and men do the STEM.”

Three of the women had experienced discrimination and racism in the academia, in most cases from male peers or colleagues. For example, the experience of one woman is known to many Latinas:

“...it usually relates to my ethnicity. It is assumed certain things of how I am able to understand material. Additionally, when presenting in front of class I have been told that I should just say that it’s my accent that doesn’t allow me to correctly enunciate a word.”

What these scholars have experienced in both overt and covert racist insults or remarks are examples of microaggressions—essentially the projection of stereotype threats upon students. Microaggressions, ranging from blatant insults to underhand remarks about lower expectations and lesser potential, have been shown to significantly impact the academic racial climate for students of multiple races (Solorzano and Yosso, 2000).

When asked what changes they would like to see most in the graduate STEM laboratory environment, three issues were mentioned: reduction in racial discrimination, availability of minority discussion or support groups, and reduction in stereotype threats. The changes that were of lowest priority to these scholars were more funding opportunities, and a more diverse professoriate. Findings from recent research (Grossman and Porche 2013, Beasley and Fischer 2012, Syed et al. 2011) have echoed the sentiments of these young women, pointing to stereotype threats

and discrimination in conjunction with inadequate support systems for women and URM women as crucial barriers to their progression in STEM higher academia.

That potential change in the STEM laboratory environment was ranked lowest by the survey participants was quite surprising. Many studies have touched on deficiencies within the STEM laboratory climate ranging from inflexible and excessive work hours to outright sexism (Heilbrunner 2013). For example, a recent study found many respondents using the term “old boys’ club” to describe departments, research groups, and laboratories (De Welde and Laursen, 2011). Men often dominate STEM research laboratories, literally and authoritatively, and URM women are mandated to spend many hours in this environment to earn a graduate degree, or obtain an undergraduate research experience. This hostile work environment of the STEM research laboratory parallels the classroom environment in many ways, in particular concerning gender inequalities, stereotype threats, and microaggressions. Likewise, practices that are stereotypical of masculinity, such as competitiveness, are fostered within STEM disciplines (Etkowitz, Kemelgor and Uzzi, 2000). Cutthroat competitiveness is deemed “professional”, and used as criteria to evaluate other’s “professionalism,” perpetuating hostility and hierarchy instead of collaboration (Rhoton, 2009).

Secondly, while more funding is often available in STEM graduate programs in comparison to those in the humanities and social sciences, it would seem that funding concerns would be on par with, if not greatly surpass, the desire for availability of minority discussion or support groups. When considering the sample group for this study, four undergraduates and two graduate students, the lack of concern with funding is more understandable. As McNair Scholars, undergraduates have access to research funding, and are informed of and supported in application for campus-wide and national funding opportunities. Additionally, small-scale or collaborative projects that these undergraduates may

undertake may be low cost or be covered by funding of a faculty mentor. Thus, my sample group may be unaware of the potential post-baccalaureate funding competition and scarcity. Likewise, this unanticipated response could be evidence of a greater dissatisfaction with social than financial aspects of the graduate laboratory environment. Little interest in a more diverse professoriate that could potentially serve as mentors for these scholars could be a reflection of the minimal experiences with racial-ethnic minority female STEM mentors they have had the opportunity to interact with up to this point in their careers.

These responses, while limited in scope and not amenable to statistic analysis, nonetheless have much value in creating a picture of motivation, mentorship, and research climate encountered by today's minority female STEM students. These scholars have all participated in the McNair Scholars Program, one of several programs that have been established in an attempt to promote the diversification of the professoriate through mentorship of underrepresented, low-income, or first generation scholars interested in pursuing a doctorate and beyond. The findings point to the need for continual evaluation of programs similar to McNair. Are the resources provided in an attempt to retain underrepresented students in academia addressed to their primary needs for role models, funding, or minority discussion and support groups?

Discussion and Conclusion

Recent media, professional literature and data collected from present and previous URM women of University of California, Santa Barbara's McNair Scholars' Program have provided further insight into the chief causes of attrition. This research highlights the importance of gender and racial inequalities and stereotype threats, a lack of role models, and family-related concerns in attrition. Despite the longstanding underrepresentation of URM women in STEM, there has been much progress towards a more equal representation of all women and URM women specifically. A multitude of programs have been established to

mentor, fund, inspire, and provide a range of resources to URM females interested in a STEM career. These programs have targeted scholars of all ages.

While many programs have been established, there has been limited and insufficient evaluation of these programs (Leggon and Pearson, 2009). Below I utilize a primary literature article by Leggon and Pearson, “Assessing Programs to Improve Minority Participation in STEM Fields: What We Know and What We Need to Know” as a basis for a brief review of the diversity of programs currently available, and the future impact and challenges these programs may have.

The Louis Stokes Alliance for Minority Participation Program (LSAMP) and the McNair Scholars Program are two national programs focused on the undergraduate population. Established by the National Science Foundation in 1991, LSAMP aims to increase the number of URM minority students who both obtain degrees and pursue graduate studies in STEM. To achieve this goal, the program has created partnerships among colleges, universities, and national research laboratories that provide substantial financial and social support for the students (Leggon and Pearson, 2009).

Similarly, the Ronald E. McNair Post-Baccalaureate Program is funded by the federal government. The United States Congress established the McNair program in 1989 in part to pay tribute to the African American astronaut killed in the 1986 USS Challenger Space Shuttle disaster. The program’s stated goals are to prepare low-income and first-generation, and minority college students for graduate education with the goal for the scholars to obtain doctoral degrees. This program offers academic support, graduate admissions assistance, Graduate Record Examination preparation services, a summer research internship opportunity with a faculty mentor, undergraduate research conferences with support for travel, and sponsored graduate campus visits (Greene,

2007). Limited, small-scale studies have shown the success of these programs. For example, approximately 80% of LSAMP participants pursued post-baccalaureate education, and 66% later enrolled in a graduate degree program to pursue some higher degree (Leggon and Pearson, 2009). Available data indicate that among all active McNair scholars' cohorts in 1997-98, 95% of these students completed their bachelor's degree by 2001-02 (U.S. Department of Education, 2005). While the above data are examples of crucial success, and the meeting of some of these programs goals, much more evaluation is needed. The limited data available can in part be attributed to the relative youth of many of these programs, including the LSAMP and McNair. Notably, while both of these programs target URM scholars, none specifically target women or STEM degrees.

The National Consortium of Graduate Degrees for Minorities in Science and Engineering (GEM) was the only graduate-level program that was noted as exceptional by Leggon and Pearson (2009). Unlike the programs at the undergraduate level, GEM focuses primarily on finding the financial resources and funding for minority STEM students, as this has been noted as a chief determinant as to whether minority students are able to complete a graduate degree. This focus on finances is quite different from the undergraduate programs that offer support in myriad ways, including social support.

Program analyses measuring the success and failures of these scholars programs in meeting their goals is of considerable concern. Future research linking primary reasons for the attrition of scholars from STEM and other disciplines directly to the amount and type of resources provided would both ensure funding agencies are using their monies most efficiently and effectively, and scholars are receiving support that is both wanted and needed. For example, if studies indicate that gender inequalities and stereotype threats are a major cause of URM female minority attrition from higher education, these scholars programs have both the space and opportunity to address students of both genders, and

provide resources and mentorship for scholars who facing discriminatory conditions in higher education.

While there is considerable room for further study, modification, and establishment of programs that aid URM females specifically, an excellent foundation is currently in place. Data being collected now and in the future will hopefully indicate great success of many of these programs as well as areas for improvement. Working together, providing emotional and intellectual support, and communicating about positive and negative experiences in STEM will help pave the way forward for greater representation of URM females in STEM.

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Shared Shackles: How College Students are Affected by the Incarceration of a Sibling

Janai Harris

Mentor: Dr. Victor M. Rios
Department of Sociology

Abstract

This study examines the effects of incarceration on current college students who have a sibling in the system. Extensive research has been conducted on the effects on the “criminal;” however there are limited studies examining the experience that this incarceration has on the individual’s family, specifically those who have siblings attending a university. I have begun analyzing the effects on twenty African-American students currently enrolled in California colleges/universities. I will analyze my interviews by examining how the incarceration of a loved one impacts their worldview and perspectives about the criminal justice system and its effects on marginalized communities. Findings have begun to indicate that having a sibling that has been or is incarcerated affects the students’ financial and academic life, social interaction with others, and influences them to take an active stance in critiquing the criminal justice system. My research will also look at the effects that labeling and tracking played in shaping the paths of both of them, and the critiques that the college students present in attempt to change the structure of the criminal justice system.

Introduction/Literature Review

It is an alarming statistic that one in three African American males in the United States of America is or has been under the control of the criminal justice system and one in fifteen is in prison. Although African Americans comprise only about 14% of the general population in the U.S., Black males make up about 50% of the overall prison population, with 25% more Blacks in prison than in college (Davies, 2007). There are only 22,000 college-aged Black males in college compared to 44,000 college-aged Black males in prison, showing the large disproportionality in the criminal justice system and the ways in which African-American males are criminalized in this country (Rios, 2011).

Over the last 30 years there has been a dramatic shift from the “rehabilitative ideal” to the “get tough” approach within prisons in California (Gabbidon, 91). This policy was heavily supported in the Los Angeles community dating back to the late 1970’s as many residents were beginning to feel that crime was spiraling out of control and the criminal justice system was ineffective as criminals were taking advantage of “revolving door” justice (Steinberg, 175). In other words, offenders would commit offenses, serve minimal time in prison and return to the streets to commit more crimes. This growing sentiment led policy makers within the state to attempt to resolve this problem by hiring more police officers, creating stiffer prison sentences and undertaking the largest prison construction program in the history of the country. California’s answer to calming the fears of citizens and solving the growing crime problem was essentially to build more prisons.

The African American community was the primary target for this new form of criminalization and one of the first areas of the Black community to feel the impact of heightened policing was the youth. With the establishment of the Street Terrorism Enforcement and Prevention Act of 1988 “California established a

mandate directing all local law enforcement agencies to identify street gang members and enroll them in a statewide database. This law enhanced the sentences imposed on those whom enforcement had identified as street gang members. Upon future encounters with law enforcement, listed persons face additional charges based on their alleged status as gang members, (Gilmore, 679). It is evident that this was a systematic maneuver by white policy makers to incarcerate minorities, particularly African American males as, “a gang member who was arrested would be charged with both the alleged offense and with being a gang member who had committed the offense” (Gilmore, 680). This additional charge could increase incarceration for a conviction from one to five years of extra time. This tactic was often abused when white officers targeted young African American males who are not gang affiliated and put their information in the database to create a false criminal record. Additionally, the “notorious LAPD has been known to use excessive force in their efforts to reduce crime in minority communities, as evidenced by the level of brutality incidents in such communities targeting them for unnecessary stops and searches” (Gabbidon, 87).

Moreover, the war on drugs, which has been waged disproportionately in poor, urban and nonwhite areas has exacerbated the systematic imprisonment of young urban black men in California (Davies, 248). Law enforcement officials instituted drug recriminalization instituting and enforcing laws that resulted in harsher penalties for crack than cocaine and other strict drug policies that carried stiff punishments as a result of the “war on drugs.” These, coupled with mandatory sentences for drugs that had not been decriminalized and for new drugs such as crack cocaine, pushed controlled substance commitments back up throughout the 1980’s (Gilmore, 680). The so-called war on drugs magnified the sentencing disparities because the enforcement of drug laws in communities heavily populated by racial and ethnic minorities was especially aggressive. This filled the prison system with increasingly large numbers of Black and Brown bodies.

African Americans became the targets of “draconian” sentences under these new policing policies (Gabbidon, 92).

One of the major racialized sentencing disparities resulted from the law enacted differentiating between crack cocaine and powder cocaine. This law called for those arrested with 500 grams of cocaine and 5 grams of crack cocaine to receive the same punishment (Gabbidon, 92). This absurdity was a deliberate effort by white politicians to incarcerate African Americans as crack cocaine is more commonly found in lower income urban areas whereas powder cocaine is viewed as more prevalent among white middle class Americans. However, “there is no cause for alarm among the White-dominated Congress when significant numbers of ethnic and racial minorities waste away in correctional institutions because of irrational and racist sentencing policies,” (Gabbidon, 96).

In addition to new laws designed to control drugs and gangs, California launched a high-profile “three strikes” campaign. The California version of the “three strikes” law includes prior nonviolent convictions among eligible “strikes,” sets no age, temporal, or jurisdictional limitations on prior convictions and allows prosecutors to use their power to “wobble” charges in order to make current misdemeanors into felonies and therefore strike-able (Gilmore, 680). In other words, the system was designed to increase the chances that an African American male would remain incarcerated for the majority if not all of his life for an accumulation of petty charges. For instance, “in 1996 43% of three strikes prisoners were Black while 32.4% were Latino and 24.6% were white,” (Gilmore, 682).

The laws were initially supported by minority residents in the inner cities who were fearful of crime; that is until residents began to experience and witness the law’s actual intent and unevenness with which they were applied. These new laws widened and deepened the capacity of police, prosecutors and judges to identify, arrest, charge and convict African Americans

and remand them to California Department of Corrections and Rehabilitation (CDCR) custody. Since the shift from an emphasis on rehabilitation to “punitive justice,” longer sentences have been disproportionately handed down to racial and ethnic minorities in Southern California” (Gabbidon, 91). Scholars suggest that this is no coincidence but rather a strategic systematic oppression by white America conspiring to eliminate black men (who are viewed as a surplus population) from society.

With data from the literature on these disproportionate incarceration rates, I turn to the effects this hypercriminalization and incarceration has on the families of these inmates, specifically siblings of these inmates who are college students. In contrast to the amount of scholarship on rates of incarceration, very limited research exists on the familial impacts of incarceration and the collateral consequences family members suffer and virtually no research has been conducted on the effects incarceration has on college-going siblings. These “invisible punishments,” as Jeremy Travis calls them, should be brought into the open to be understood as the critical elements of incarceration (Mauer and Chesney-Lind, 17).

The consequences of incarceration and the direct impact it has on college-going siblings is an issue that must be addressed to formulate a solution to a problem that many African-American students face on college campuses nationwide. This project seeks to understand the short and long-term stresses and effects on college students when dealing with an incarcerated sibling and suggests solutions as to what can be done, not only to assist college students, but to prevent youth from being tracked into the prison system as well.

Methods

This project takes an epistemological approach to examining the relationship between the siblings, focusing on the differences between each of their “real” worlds or worldview perspectives. In addition, this project seeks to understand and critique certain structures and institutions that play a role in each sibling’s outcome. The research focuses on the element of power and the role it played in the relationships, stresses, and issues that arose with having an incarcerated sibling.

I used a qualitative methodology, focusing on interviews with and experiences of college students and observing the interactions between the siblings in the form of letters and phone calls exchanged between the two. I interviewed six college students, three males and three females, each with a sibling that is or has been incarcerated. The interview questions asked respondents to reflect on their childhood in comparison to the childhood of their sibling, looking at and understanding the power of the labels associated with each of them. Questions such as these were included in the interview to obtain a better grasp of the similar, yet different backgrounds of the siblings, how these paths came about, and how their sibling’s path has affected them.

Interview questions included:

1. How long was/has your sibling been in jail?
2. What year did the situation that they were sent to jail for, occur? Is this the first time they have been away?
3. What age were you when he/she was incarcerated?
4. What effects has your sibling’s incarceration had on your:
 - a. Social life
 - b. Academic life
 - c. Finances
 - d. Psychological Wellbeing
5. Who has their incarceration impacted most?
6. How does that make you feel?

7. How has his/her incarceration impacted your relationship with him/her?
8. Did you two grow up in the same home and attend the same schools?
9. What programs (sports, academics, etc.) were you involved in (by your parents or teachers) as a child?
10. Do you feel that there were programs available to you, but not your sibling? Why so?
11. What programs was your sibling involved in (by your parents or teachers) as a child?
12. What, or who do you credit for getting you to college?
13. Do you feel that you received attention from teachers or other grown-ups that your sibling didn't?
14. What, or who do you believe played a role in your sibling's path to incarceration?
15. How do you feel about the criminal justice system? Do you believe that the institution where your sibling is at provides them with the necessary resources so that upon release they will not return to prison?

In addition to interviews, I observed two letters and two phone calls between the college student and his/her sibling. During these observations, I focused specifically on the stresses on the college sibling that could be interpreted in their tone, writings, or direct statements made to their sibling. These observations served as confirmations of and provided additional "evidence" to support what the respondents told me during their interviews of the day-to-day stresses they faced with having an incarcerated sibling.

Respondents were identified through a snowball sample, beginning with individuals whom I knew had an incarcerated sibling; from there respondents were referred by individuals who were familiar with college students with an incarcerated sibling. This project takes an epistemological approach to examining the relationship between the siblings, focusing on the college students' "real" worlds, or worldview perspectives, and how this was

affected by having an incarcerated relative. The research focused on the element of power and how it played a role in the relationships, stresses, and issues that arose with having an incarcerated sibling.

One of the most important things to note is that all thirteen respondents had a male sibling who was incarcerated. Although this was not a central focus of the study or a requirement for participation, it does correlate with data that shows how disproportionately males are pipelined into the prison system, especially African-American males.

Observations

In each phone call and letter that I observed, I noticed the stress that the sibling's incarceration had on the sibling in college. Words of wisdom such as "stay safe," "stay outta trouble" and "don't get caught up" were commonly expressed to the incarcerated siblings. I also observed the financial stresses placed on the siblings and their families as the incarcerated siblings asked for money to be put on their "books," minutes for their phone calls, and care packages for their hygienic needs. The letters that the incarcerated individuals wrote encouraged their siblings to "keep grindin" in school and make sure not to end up like them. In my observations of the phone conversations and letters, the difference in lifestyles was apparent as well as a subtle disconnect due to their completely opposite worlds. However, the siblings, especially the ones in college, strived to keep their two worlds connected by updating their siblings on the current, positive news taking place in their community as well as trying to understand the politics of the prison in which their sibling was confined. These observations allowed me to see the way siblings try to remain a close bond with each other although they live in two completely different worlds.

Ashley reported:

“I don’t know how you say it, but receiving the education that I have received in my little sociology courses and being able to teach that to him and he listens, he’s like “yeah [Ashley], you’re right,” I don’t know, I feel like me and my brother have grown and although we’re like not in the same area and we’re not able to be in each other’s lives 24/7 like me and [Mike] are, I feel like we’ve been able to bond because we actually care about each other’s lives now that we’re distant. We’re more worried, we wonder more what’s going on in each other’s lives so we make more of an effort to call when we’re distant than when we’re closer together and when we’re always with each other. And I also think that those classes have impacted my understanding of my brother and where he comes from and it makes the talks much easier. At first I did not understand what he talked about, so I always belittled him like “dude, you’re just stupid” but now it’s like “hey, I’ll never be able to understand what you’re going through because I never went through the experience, but I’m definitely gonna support you through your experiences and help you get out of what you’re ready to get out of.”

An understanding of her brother’s situation did not take place until he had been incarcerated for a long time. In addition, Ashley learned a great deal about the prison-industrial complex while in college. Her brother’s sentence actually brought them closer to understanding each other’s struggles.

Findings

There were four major areas that college students indicated most affected them about having an incarcerated sibling: in their social relations, their academic life, concerning their finances, and their psychological well being. It is important to note that effects in these areas were different for the male and female respondents. In addition to the impacts in these four areas, I examined how tracking and labeling played roles in the paths each of the siblings took, that is, how one arrived on a college campus and the other at a prison. My research revealed that the key factors that played a role in these two different paths were gender, age, and outside support.

Impact in Four Areas

Social Relations

All of the students reported feeling some type of shame or embarrassment because of having an incarcerated sibling, making them less likely to discuss their family for fear of being judged or stigmatized by their campus community. Growing up, they were all judged negatively for having a “trouble-making” sibling, influencing their decision to not speak about family while in college.

When speaking about moving from a predominantly Black and Latino neighborhood that was familiar with the sad reality of incarceration to the predominantly white UCSB, Jackie states:

“...I’m really struggling with that. I come from a high school where it is Hispanics and Blacks. And now here it’s like majority Asians and Whites. So I’m now trying to adjust to it and I notice a lot of the people like wouldn’t understand my background because this is where I come from.”

In addition, some respondents reported feeling excluded from their family due to their sibling’s incarceration. Being labeled

as the “good child” had its benefits until their sibling began to get in trouble with the law; at that point the “good child” was left alone to figure out their education and other needs. All of the college students reported ‘themselves’ as the sole person responsible for getting them to college. They also observed that they felt alone at times with all of the attention focused on their incarcerated sibling.

When talking about receiving help on writing personal statements and filling out college applications, Ashley discusses how she had to seek outside sources for help, not only because her parents had never been through the college application process, but because of their focus on helping her brother stay out of trouble.

“... if I did not have that lady helping me write my personal statement, I don’t think I would have done it cuz my parents had too much other stuff to worry about and they couldn’t help me with something they’ve never been through, they were just like “baby, I hope you do it... figure out a way while I help your brother, but I hope you do it.” The fact that people helped me get here is definitely a blessing.”

Academic Life

The female respondents reported that having a sibling in the system fueled their passion for working with “at-risk” youth in their future careers. All of the women I interviewed indicated an interest in working in fields such as social work, education, and even law, in order to change the policies that are systematically designed to target and criminalize minority youth. When discussing how it has affected her life academically, Sara says

“...it affects me and it really makes me sad. It also affects me because then I wanted to do more to help other young men that have grown up like him. And so now it has pushed me to be more involved with the community and efforts to help people who are involved in gangs, or come

from broken homes, and have problems expressing themselves in others ways that are not violent.”

A collateral consequence of a sibling’s incarceration is that it may have skewed and potentially minimized the career options that African-American female students choose to pursue.

The males reported that their incarcerated sibling had no effect on their academic life; however one specified that having a brother who is “locked up” makes it hard for him to focus in school. His focus is usually on the hypermasculinized, aggressive, violent nature of the prison system and he feels a sense of helplessness by not being able to assist his brother if anything was ever to occur.

Finances

All of the respondents reported having their finances affected either directly or indirectly by their incarcerated sibling. Most respondents reported that their parents were unable to fund their college education; money that might otherwise have gone to offsetting the cost of college was spent on lawyers, bail money, or travel expenses visit their incarcerated sibling, making it hard for the students to figure out how their education would be funded. Other respondents reported that they have become responsible for taking care of their sibling, either by sending them goods or putting money on their books. Some joke that they actually have a dependant while still being a college student.

Tracy discusses the way her brother’s incarceration has affected her financial life, as well as that of her mother and father:

“Umm, let’s see... I currently have two bails on my credit right now from December of last year and July of this year. So paying bails, umm so he's affected my finances and I’m helping my mom because she still has her tuition she's paying back

and bail that she's paying back. My father just finished paying off two of his bails because like I said he goes sooo frequently. It's like as soon as he gets in there we try to bail him out and it's like 'oh my gosh they don't realize this is thousands of dollars every single time he does this'."

Psychological Well Being

The women I interviewed reported that having an incarcerated brother has affected their relationships with males. They have stated that they are hesitant to get in relationships with men for fear of them being taken from them at any moment; the women in my study have seen many men in their family fall victim to the criminal "justice" system and this has affected their trust of men and the prison system as a whole.

Fear was a constant emotion that college siblings reported. Knowing the hypermasculine and violent nature of the prison system, respondents constantly expressed the fear that their siblings would be victim to brutality from not only other inmates, but from prison guards as well. This feeling of fear affected both male and female respondents in their social, academic, and psychological worlds.

John expresses how having an incarcerated brother has affected him:

"...Umm, for me I think it's been a mental and a emotional rollercoaster... um like I said in the beginning you know it was just confusion like I really didn't understand what was going on and why my older brother wasn't around, wasn't there anymore because he was there one minute and honestly I felt like it was at a blink of an eye he was gone permanently and uh I woke up days, days, and days thinking he would be there and he wasn't. And so as his letters and our visitations

really had a significant, you know like really an emotional affect on me to where I would cry and be emotional about it. You know, as I have matured in my own mental understanding of the situation, and him and I have continued to have a kind of a dialog that we didn't have before and that we have now.”

Each of the respondents has taken a critical stance toward the criminal “justice” system, pointing out its flaws and explaining how it is designed to fail the people it claims to rehabilitate. Having an incarcerated sibling has made them aware of the many flaws within in the system and what changes need to be made to the Department of Corrections.

Labeling/Tracking

The female respondents reported receiving more attention from parents, teachers, and community members simply because they were girls and stated that in early childhood, females always received more attention. In addition, the respondents who were younger than their incarcerated sibling reported receiving more attention and special treatment as well. As the younger sibling, they received more support from the community since their older sibling had already been labeled as the “problem-child.” Another issue mentioned was the availability of programs; most of the female respondents were involved in sports and dance programs that were coordinated outside of school, while their brothers were part of school sports teams that got eliminated due to budget cuts, leaving their siblings with no extracurricular activities.

The labeling of students who later became incarcerated affected their performance and acceptance at school. With this label, they were ignored and not taken seriously in classes, making them not want to attend school. This, in addition to the racial wars and gang affiliations occurring in California high schools, also pushed them further away from education. In comparison, their

siblings who were tracked down a positive academic and social path, encountered very few (if any) of the negative aspects of growing up in the underserved communities they are from.

The environment the respondents grew up in played a role in the ways they were tracked. Growing up in working-class/poor areas, the respondents and their siblings were surrounded by negativity constantly, however, the older siblings (those who later became incarcerated), experienced these ills more directly and profoundly, forcing the parents to make the critical decision to move the entire family out of those areas, or at least change the schools and activities that younger siblings attended. The older siblings became a sort of “test run” for the parents, and the younger siblings reaped the benefits of their parents correcting mistakes in how and where to raise their children. This change in location played a large role in the ways the college siblings were able to make it college.

The intersection of gender, age, and location played a significant role in shaping the paths of both siblings. Understanding how the lack of funding and community support is central to attempt to change the outcomes of the next generation of young children.

Discussion and Conclusion

The data already collected indicates that the collateral consequences of incarceration go way beyond what the existing literature has shown. The issues that college-going siblings face have been neglected in the literature and are important in understanding the in the role that incarceration has played in shaping the career paths of African-American students, as well as understanding the magnitude of the issues Black students with an incarcerated sibling face while in college. Through these preliminary findings, I have attempted to bring greater awareness to these issues. In addition, it is important to work on the creation of spaces, programs, and resources, not just for the incarcerated individual, but for their siblings as well.

I hope to continue this project and obtain many more respondents to ensure that I can focus on the many different aspects of this problem in an attempt to assist in the best solution for future generations. In future research, I plan to focus more on how the labels assigned to youth and the ways that they are tracked in educational and social structures plays a role in their outcomes.

I would like to focus on creating effective programs and centers that work with youth and rehabilitate those who have been labeled “at-risk” or, in fact, have been incarcerated and are transitioning back into society. The lack of programs, education, resources and support are the main factors that force marginalized youth to commit crime as a means of survival. With access to resources, I argue that crime and the disproportionate numbers of Black males in the prison system would decrease, and ultimately, the numbers of African-American students attending and graduating from college would increase. I hope to influence public policy in restructuring certain programs that currently only assist youth with high GPA’s, in addition to creating partner programs that work with average/below average performing youth to track them into college as well.

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**Hidden in Guatemala City: the U.S Public Health
Service Experimentation on Undesirables with
Venereal Disease, 1946-1948**

Angel Rodriguez

Mentor: Dr. Gabriela Soto Laveaga

Department of History

Abstract

This paper argues that racism within the United States Public Health Service (USPHS), combined with access to institutionally marginalized groups in Guatemala, facilitated human exposure to venereal diseases. It briefly describes the collaborative relationships between the USPHS and Guatemalan government officials which opened the door to access to and experimentation on marginalized Guatemalan populations. In the experiments, USPHS doctors exposed their subjects to syphilis or gonorrhea through the use of infected commercial sex workers or directly through inoculum made from tissue taken from syphilitic humans and animals. I focus primarily on accounts of the USPHS physicians and themes such as informed consent, universal human rights, race, citizenship, and class status to understand the significance of U.S medicine in Guatemala.

When Maria Luisa lived in Guatemala City, she earned her living as a commercial sex worker. In 1947 Guatemala, prostitution was not uncommon; in fact, it was legal. After discovering she had contracted a common venereal disease, gonorrhea, she sought free treatment at the Venereal Disease

Public Hospital (VDPH) located in the main business section of the city. Rather than receiving treatment at the VDPH, the Guatemalan doctors referred her to the military hospital just outside Guatemala City. There, she was approached by an American doctor who offered Maria \$25 to sexually service seven men, but restricted her from washing between each episode of sexual intercourse. The same American doctor utilized Maria's services for an entire year, during which she had sexual relations with a total of 105 men¹. Unaware that she infected her sexual partners or that she was a part of a United States federal scientific experiment, Maria Luisa never received any treatment for her acute gonorrhea. Maria's story is one example of the manipulation of Guatemalan human beings in this experiment, a project that was kept in the shadows and remains a dark chapter of U.S history.

This paper argues that racism within the United States Public Health Service (USPHS), combined with access to institutionally marginalized groups in Guatemala, facilitated human exposure to venereal diseases. It exposes the collaborative relationships between the USPHS and Guatemalan government officials which opened the door to access to and experimentation on marginalized Guatemalan populations. While easy access alone did not determine the use of human test subjects for degrading experiments, U.S racial attitudes supported by racialized conceptions of venereal disease, justified degradation and allowed officials from both the U.S. and Guatemala to disregard the concept of informed consent. In addition, it illustrates the USPHS' explicit violation of human rights, contravening the Nuremberg Code promulgated in the wake of Nazi medical experiments.

In 1946, across the Atlantic, the memory of Nazi Germany was still vibrant. Attempts to address the evils of the National Socialist regime resulted in the Nuremberg Medical Tribunal's

¹ This is based on a Subject Profile released by the Presidential Commission report on the Guatemalan experiments. All other names of human subjects or information were not released from the Archives.

prosecution of twenty-three physicians. They were accused of complicity in concentration camp experiments, medical malpractice, and degradations that were designed to support the Third Reich's war effort. As a result, the tribunal helped develop human research ethics and established a universal set of human rights globally applied to all people. According to the *first* and *sixth* right:

“The voluntary consent of the human subject is absolutely essential. This means that the person involved should have legal capacity to give consent; should be so situated as to be able to exercise free power of choice, without the intervention of any element of force, fraud, deceit, duress, over-reaching, or other ulterior form of constraint or coercion.”

“The degree of risk to be taken should never exceed that determined by the humanitarian importance of the problem to be solved...”²

These two examples of the Nuremburg Code were designed to prevent scientific experiments from abusing subjects and to protect people by providing full disclosure so as not to deceive or infringe on basic human rights. Specifically these code sections stressed that the results of any experiment had to “yield fruitful results for the good of society” (Nuremburg Code, sec. 2) The goal of universal human rights was to safeguard marginalized groups such as Jewish communities in Europe that were victims of Nazi atrocities.

The activities and trials at Nuremburg were widely reported in the United States. *The New York Times* published a note on April 1947 by science editor Waldemar Kaempffert describing the intentional exposure of human beings to syphilis prophylaxis

² The Nuremburg Code. (1949). In trials of war criminals before the Nuremburg Military Tribunals Under Control Council Law No.10, Volume 2. Washington D.C, Government Printing Office, pp. 181-182

(prevention) that would yield great results, but concluding that it would be “ethically impossible” to conduct such research and experimentation.³ The fear of resurrecting experiments and research that mirrored the cruelties of Nazi physicians helped shape public opinion concerning human test subjects within the U.S. The piece in the *Times* illustrated public support towards the Nuremburg Tribunals and popularity within the country. But for USPHS research, Nuremburg established a new set of barriers in the pursuit of scientific discovery. Despite the fact that the use of human subjects for venereal disease experimentation in the United States was deemed “ethically impossible,” the USPHS had begun its descent on Central America; the region’s underdeveloped and third-world characteristics made it harder to apply the sanctions of the Nuremburg Code. An experiment in Guatemala City was underway far outside the reach of the Nuremburg Tribune Council and more importantly, U.S public scrutiny.

The U.S Public Health Service is comprised of federal agencies responsible for all health and human services within the United States. The origins trace back to 1798 when a federal act was passed creating an entity designed to care for sick marine seamen. Since its founding, the PHS has retained strong ties to the U.S military, serving as a research arm that focused on infectious disease.⁴ In the mid 20th century, two of its researchers Drs. John Mahoney and John C. Cutler, were at the forefront as clinicians who led the fight against venereal disease in the U.S. Dr. Mahoney, Medical Director of PHS’ Venereal Disease Research Laboratory (VDRL), was instrumental in promoting the use of penicillin as an effective treatment for syphilis. Both of these doctors would help the PHS lead U.S experimentation involving human subjects.

³ Kaempffert, W. (1957). Notes on Science; Syphilis prevention. *New York Times*. April 27

⁴ Ralph Chester Williams, *The United States Public Health Service 1798 to 1950* (Washington, D.C. : Commissioned Officers Association of the U.S. P.H.S., 1951)

The PHS also had an extensive history of involvement throughout the Americas. In 1901 it was instrumental in organizing the Pan American Sanitary Bureau (precursor to the Pan American Health Organization). From 1901 until 1936, U.S. Surgeons General acted as directors of the PASB and also as heads of the PHS. Historians have argued that the PASB functioned as an external arm of the PHS in the Americas.⁵ In 1945 the PHS established the Office of Inter-American Affairs to assist in providing medical resources to developing countries in Central and South America. With these two international health organizations, the PHS carried out a “good neighbor” medical policy towards the global south.⁶ Acting as good neighbors with the Latin American region and Guatemala in particular, the U.S. provided aid for medical resources and development of health services. For example, in 1943 it trained Guatemalan physician Dr. Juan Funes, who became Director of the Venereal Disease hospital in Guatemala. One year later, the USPHS supported construction of a 300-bed general hospital in the center of the capital.⁷ Yet the reality of the U.S. “good neighbor” health policy to act as provider of medical resources abroad resulted in the forging of medical dependence, authority, and loyalty within underdeveloped countries such as Guatemala. As the USPHS became a strong source for public health, it established close ties between the U.S. and Guatemalan public health officials.

From New York to Guatemala City

⁵ Marcos Cueto, “Introduction,” in *Missionaries of Science: The Rockefeller Foundation and Latin America* (Bloomington: Indiana University Press, 1994) xiii.

⁶ Marcos Cueto, “Introduction,” in *Missionaries of Science: The Rockefeller Foundation and Latin America* (Bloomington: Indiana University Press, 1994) xiii. I use it to describe the medical exchanges it promoted; less commercial exchanges as the policy was intended to do.

⁷ Vought, R.L. (1946). The administration of an Inter-American Cooperative Health Program. *Public Administration Review*. This hospital, named Roosevelt Hospital after President FDR, currently is one of two major public hospitals providing free care in the country.

Thirty-one year old Dr. John C. Cutler arrived with his wife in Guatemala City in the summer of 1946 to assume the position as USPHS lead researcher and to oversee venereal disease experiments in Guatemala. The Guatemalan physicians received Cutler with eagerness and excitement. He had been in constant contact with former colleague, Dr. Juan M. Funes director of the Venereal Disease section of the Guatemalan *Servicio de Salud Publica* (Public Health Service). The two men had been colleagues the previous year when Dr. Funes traveled to Staten Island for a one-year VDRL fellowship⁸. Their acquaintance and shared expertise on venereal disease allowed Cutler to navigate the inner circles of Guatemala's high government and medical officials. Access to and familiarity with the inner circles of the government was critical in order for the U.S to proceed with the experiments.

The Guatemalan officials who collaborated with Dr. Cutler included high ranking individuals with positions in the *Direccion General de Sanidad Publica* (Ministry of Public Health) and members of the *Ejercito Nacional de la Revolucion* (Guatemalan National Army). Collaborative efforts allocated authority to U.S researchers in institutions across the Guatemalan government including the medical and other authorities of the public health service rapid treatment center for venereal diseases, governmental hospitals, medical installations and officers of the military, with institutions caring for the orphans and the insane, and with the penal system.”⁹ Fostering this relationship or cooperative agreements marked the beginning of interdependency between the high Guatemalan officials and the U.S Public Health Service. By providing Dr. Cutler with unrestricted access to and support for the use of various institutions, permission was implicitly granted to proceed with the experiment and a “large, stable, and easily

⁸ John Cutler. (1955, February 24). Final Syphilis Report. PCSBI HSPI Archives

⁹ John Cutler. (1955, February 24). Final Syphilis Report. PCSBI HSPI Archives: Dr. Cutler added that they would have access to “excellent facilities for close follow up on syphilis” in the Military Hospital and Penitentiary. Correspondence (1946, September 3)

accessible population” was placed at his disposal.¹⁰ In return, Dr. Cutler would provide venereal disease treatment programs for the Guatemalan army and medical training for military physicians.

The cooperative agreements between USPHS physician John C. Cutler and esteemed Guatemalan officials created an avenue to access Guatemala’s most vulnerable populations. Access to the Central Penitentiary, the National Asylum, and the Military Barracks were critical to conducting the experiments. These three locations within Guatemala City supplied the medical personnel to assist the USPHS researchers. Although USPHS physicians were given access and full autonomy to use prisoners, institutionalized mental patients, and soldiers, it was the discourse of race and venereal disease that ultimately allowed for degrading experimentation and violation of human rights to be justified.

The USPHS experiments were largely supported by scientific perceptions that perpetuated racial inferiority. The physician’s notions of a racially subservient people promoted degradation and facilitated exposure to venereal disease. One early source for U.S scientific racial discourse can be traced to the Harvard Medical School of Tropical Medicine Professor George Cheever Shattuck. He believed that “syphilis is more frequent in Latins [especially in Guatemala City] than in Indians and that, when manifested in an Indian, it appears in mild form.”¹¹ This idea provided scientific justification for the separation of white North Americans, Europeans, and mixed Latin Americans from strictly Indian populations in relation to syphilis. Dr. Cutler shared this position in preliminary testing and concluded that, “Factors...operative in the population different from those experienced in the United States or in Northern Europe explained

¹⁰ Ibid

¹¹ George Cheever Shattuck, “Syphilis and Yaws in Guatemala” in a Medical Survey of the Republic of Guatemala, ed. Shattuck (Washington: Carnegie Institution of Washington, 1938), p. 142.

results.”¹² Here Dr. Cutler offered geographical and racial explanations for the different behaviors of venereal disease in Guatemala. In addition, the Guatemalan medical and military elite were complicit with these explanations. The groups targeted as test subjects were undesirable; they contributed very minimal to the growth or sustainability of the country. Race was a major source of exclusion in Guatemala and allowed this proposed scientific relation of race and venereal disease to become central in the Guatemalan experiments.

Central Penitentiary

A Guatemalan local newspaper, *La Reforma Penitenciaria*, printed an article in 1947 that described the Guatemalan prison system:

“The prison system in Guatemala like the infamous Bastille to the French and the horrible Romada to the Venezuelans, has not fulfilled the purpose outlined by national law, but has been a pit for vengeance, for suffering and for crime that has served dictators in satisfying their basest instincts on defenseless enemies, who in reality have been the best friends of democratic institutions and the joyful march to civilization and culture.”¹³

On the corner of 7th avenue and 21st street, just on the outskirts of Guatemala City’s main business section and east of the central train station stood a hexagonal stone fortress constructed in 1873. High above the street, four high-rise watchtowers maintained a keen eye on everything within its impenetrable six walls. In

¹² John Cutler. (1955, February 24). Final Syphilis Report. PCSBI HSPI Archives.

¹³ [translation]. Editorial. (1947, August 9) *La Reforma Penitenciaria*. Diario de Centro America.

1946, *La Penitenciaría Central* de Guatemala (Central Penitentiary) had the capacity to house over 1500 inmates. The prison was equipped with a chapel, workstations, morgues, two separate recreational patios, and most importantly, the medical ward used to treat different illnesses.¹⁴ The Central Penitentiary separated and confined Guatemala's most undesirable population, the criminals, the wrongdoers and, according to the U.S Public Health Service, its "volunteers" for their use in human experimentation.¹⁵

In fall of 1946, the USPHS arrived at the Central Penitentiary with the Minister of Justice and the warden of the penitentiary eager for Dr. Cutler to begin his work. According to USPHS researchers, this institution was ideal because the prison inmates were seen as a large isolated population that could be used for experimentation.¹⁶ Only two years prior, the USPHS conducted experiments and utilized U.S prisoners for human experimentation at Indiana's Terre Haute Federal Prison.¹⁷ Prisons offered available and segregated test subjects and as Dr. Cutler explained, "our payment for the males will be considerably less than we had originally planned" so fewer resources for compensation were necessary.¹⁸

United States PHS researchers transformed the Central Penitentiary into a laboratory that best served their needs for

¹⁴ Ibid.

¹⁵ The term undesirable is being used to define a population that serves no particular productive function in Guatemalan society.

¹⁶ John Cutler. (1955, February 24). Final Syphilis Report. PCSBI HSPI Archives.

¹⁷ The Terre Haute prison experiments were conducted in Indiana and had similar objectives as the Guatemalan experiments. Although some informed consent was provided, the experiments were halted after moral issues surrounding the exposure to venereal disease arose by the public media. Many of the same physicians of Guatemala, were involved in Terre Haute. See "Ethically Impossible" for more details.

¹⁸ Unsigned [John Cutler] to Richard Arnold. (1946, August 21). Correspondence. PCSBI HSPI Archives.

human experimentation and an environment for what was politely coined “Normal Exposure” to the disease in humans. “Normal exposure” was a method whereby test subjects are exposed to syphilis or gonorrhea through sexual intercourse with infected women. Deceit was a key component in the use of this method on the incarcerated prisoners of the Central Penitentiary. The legality of prostitution in Guatemala at this time was essential in order to exploit women who were vilified as vessels to transfer venereal diseases. Women such as Maria Luisa were brought to the penitentiary where they offered their services to various inmate “volunteers,” and were paid for by U.S. tax dollars. The dehumanization of these prostitutes, described as the “lowest in the social scale of local prostitutes and most frequently infected with syphilis...” by USPHS physicians, reflected the atrocious conditions that they were forced to work under.¹⁹ Prostitutes were often used to service many men within a short time period, denied adequate treatment for their venereal diseases, and restricted in their use of sanitary facilities. In some cases, their state of consciousness was manipulated by the use of alcohol to “assist the exposure more efficiently.”²⁰ Similar to those whom they serviced, prostitutes belonged to a marginalized population in Guatemala, but whose vulnerability was not primarily based on race. Commercial sex labor defined them as social outcasts; USPHS professional physicians exploited this population by forcing them to carry and spread life-threatening diseases while also neglecting proper treatment.

The predominately indigenous prison population in the Central Penitentiary closely reflected that of the entire country. According to one USPHS physician, “the experiments need not to be explained at all to the Indians in the Penitentiary, as they are

¹⁹ John Cutler. (1955, February 24). Final Syphilis Report. PCSBI HSPI Archives.

²⁰ Ibid

only confused by explanations and knowing what is happening.”²¹ Racism practiced by both USPHS physicians and Guatemalan officials through racialized scientific assumptions facilitated the manipulation, exposure to disease, and disregard for informed consent. Terms such as “cultured group” were often used by the physicians to categorize the prison test subjects collectively as uneducated, religiously superstitious, and barely able to understand minimal Spanish. Theories and attitudes about racial inferiority justified withholding information from the prisoners based on the color of their skin and lack of language, and therefore unworthy of respectful and humane treatment. This cultured prison population underwent procedures primarily reserved for animal test subjects and suffered greatly under the direction of U.S physicians. A total of 219 “volunteers” were involved in the penitentiary experiments but only 92 of them received some form of treatment.²² The Guatemalan experiments led to the deaths of many untreated “volunteers.”

The inmates of the Central Penitentiary constituted a population in Guatemala that was socially invisible. Whether in defiance of civil law or simply as a Guatemalan newspaper describes them as “defenseless enemies” of past dictators, their actions led them to the penitentiary. The invisibility concealed them from the rest of the population and the City, but more importantly, from international scrutiny. According to Dr. Cutlers’ VDRL correspondence, “It is imperative that the least possible be known and said about this project for a few words to the wrong person here, or even at home, might wreck it or parts of it.”²³ Following public criticism of human experimentation in the U.S and the United Nations Declaration of Human Rights, it was

²¹ John Murdock to John Cutler, Forwarded by William J. McAnally, Jr. (1948, June 30). Correspondence. PCSBI HSPI Archives.

²² Gutmann, Amy. “‘Ethically Impossible’: STD Research in Guatemala from 1946-48.” *Presidential Commission for the Study of Bioethical Issues*. Washington, D.C. (2011, September).

²³ John Cutler to John Mahoney, forwarded by William J. McAnally, Jr. (1948, August 26). Correspondence. PCSBI HSPI Archives.

crucial that the USPHS keep details of the experiments from reaching the U.S. public. Discretion was assured within Guatemala; the USPHS physicians and researchers were aware of the Ministry of Justice's neglect of any form of universal ethical codes for experimentation. The prisoner's vulnerability was further exploited due to their essential dependence on the State.²⁴ Although the use of Central Penitentiary "volunteers" involved in scientific experimentation required given consent, in the disguised pursuit for scientific knowledge, both the United States and the Guatemalan ruling officials knowingly exploited their social conditions.

National Psychiatric Hospital

Hidden in Guatemala City, there was another group of individuals confined not only by the walls of an institution, but also handicapped by mental illnesses. In 1947, the USPHS targeted patients from *Asilo de Alienados* (National Psychiatric Hospital) of Guatemala to be "volunteers" for the Guatemalan experiment on venereal disease. Dr. Cutler transitioned the experiment after experiencing some resistance from the "Indians" at the penitentiary. He reported that the opposition came from "superstitious" notions about white U.S physicians drawing blood for testing; many prisoners believed they were being weakened by tubes of blood taken from their bodies.²⁵ Although the prisoners were not informed of the experiments, this opposition illustrated limited but significant attempts to resist.²⁶ In addition, the move consolidated resources as the use of prostitutes was not allowed within the hospital and thus more cost effective. It further gave U.S physicians incentive to implement alternative forms of artificial

²⁴ State Dependence, refers to the idea that institutionalized people are under the care of the State and rely for necessities such as shelter, food, and health to survive.

²⁵ John Cutler. (1955, February 24). Final Syphilis Report. PCSBI HSPI Archives

²⁶ Ibid

and inhumane methods for exposure. Realizing that prisoners possibly posed a large problem to the success of the experiment by becoming resistant to constant examination, USPHS physicians turned their attention on a less disobedient group who, given their medical conditions, were more susceptible to degrading human testing.

On a February afternoon 1948, Berta was taken from her room and brought to the medical wing of the *Asilo de Alienados*. Approximately 22 years of age, no one knew how long she had been a patient or the illness that brought her there. One of the doctors took hold of her left arm and artificially inoculated here with an injection of syphilis.²⁷ It was common for many of the patients to receive medicine so Berta was not alarmed. One month after this visit by the American doctors, Berta suffered as the skin in her arms and legs began to waste away and she developed large red bumps throughout her body. She endured excruciating pain for two more months until the doctors gave her some treatment. Then in August, after realizing Berta's condition had only worsened and death was inevitable, Dr. Cutler re-injected her with syphilis and ordered swabs of gonorrheal pus from a male subject to be placed in her two eyes, urethra, and rectum. A few days later on August 27th, Berta was found dead, her eyes filled with puss from the gonorrhea, and bleeding from her urethra.²⁸

Berta, like many of the other institutionalized mental patients, suffered greatly under the experimentation of the USPHS. These patients were medically, and at least according to Nuremberg, legally unable to provide consent or understand the sorts of experiments doctors were conducting on them. The psychiatric hospital directors used patients as a commodity in exchange for U.S medical appliances to improve the hospital. For

²⁷ Artificial inoculation is a procedure where a person is exposed to syphilis or gonorrhea through injections or swabbing and it shown to be vastly more effective than "normal exposure" methods.

²⁸ John Cutler. (1952, October 29). Experimental Studies in Gonorrhea. Report. PCSB1 HSP1 Archives.

example, documentation shows that Dr. Cutler provided projectors, refrigerators, and basic utensils to the hospital that it seemed to lack.²⁹ Since the psychiatric hospital benefitted from the appliances, it assisted in solidifying and permitting the experiments to continue, despite the mistreatment of patients. Ostracized by their medical conditions, this population, too, was invisible within Guatemala City. Although they had not committed any crimes, their mental disability shaped them as outcasts.

The USPHS openly conducted experiments on the population in the National Psychiatric Hospital with facility and personnel support from Guatemalan authorities. The project did however experience some criticism from VDRL supervisors in the U.S. Although no conscious effort to halt experimentation arose, the need for caution and secrecy was stressed. A letter from USPHS Dr. Richard C. Arnold, a senior surgeon and supervisor in New York, stated, “ [I am] a bit leery of the experiment with the insane people, as they cannot give consent and do not know what is going on.” Dr. Arnold also expressed concern about criticism because if “some goody organization got wind of the work, they would raise a lot of smoke.”³⁰ For the USPHS officials in the main concern was maintaining discretion and keeping details from leaking out. The USPHS supervisors admitted to the inability of and disregard for obtaining consent from test subject, explicitly violating their human rights.

From the perspective of a white U.S physician in 1948, Indian people with their dark skin color similar to African Americans were unequal to their white counterparts. In the U.S, segregation and Jim Crow laws were prevalent and strictly enforced throughout most southern states while states in the north practiced their own brand of de facto racism. While Guatemala is located in Central America, and not the American south, these

²⁹ John Cutler to Fred L. Soper, Director, Pan American Sanitary Bureau. (1948, November 15). Correspondence. PCSBI HSPI Archives,

³⁰ Richard Arnold to John Cutler. (1947, April 19). PCSBI HSPI Archives.

notions of race and inferiority carried over both political and geographic lines. As Dr. Cutler observed, many of the patients "...had the classic, pure Indian features indicating little or no mixture [with other races]." ³¹ Noting the lack of "mixture" in the patients supported ideas that race and venereal disease were related. Within the psychiatric hospital, racism and racial notions of inferiority combined to facilitate the misuse and manipulation of Guatemalan human beings as test subject. Since many patients were pure Indian, little regard or consideration was given to their humanity and made them ideal test subjects.

Revolutionary Army

Outside the experimentation laboratory and realm of USPHS physicians, the spirit of revolution was still present in Guatemala. In 1944, two years prior to the arrival of Dr. Cutler and the rest of the U.S researchers, the Guatemalan government had entered a period of transition and mobilization of its armed forces. The powerful General Jorge Ubico's dictatorship, which lasted from 1930-44, was overthrown by a group of liberal military officers, students, and professionals. His ouster took place in October and brought the rise of young officers such as Jacobo Arbenz and Francisco Javier Arana, Guatemala's next two presidents. ³² Political turmoil consumed Guatemala through 1956. The defense and social stability of the country depended greatly on the control and strength of the *Ejercito Nacional de Guatemala* (National Army of Guatemala). The military coup had illustrated its power over the country as well as its power over the armed forces and thus emphasis was given to promoting and maintaining the strongest military possible. Guatemalan military and medical officials viewed Dr. Cutler and the USPHS experiments as an opportunity to enhance and strengthen the Guatemalan military with American modern medicine.

³¹ Ibid

³² Schlesinger, Stephen C. *Bitter fruit :the untold story of the American coup in Guatemala*. Garden City, N.Y. : Doubleday, 1982.

In 1947, a Guatemalan soldier entered the military hospital under orders and with the impression that he was due for a routine medical check. This soldier stood at 5'4 inches with dark skin and sharp indigenous features. He wore a uniform that lacked any trace of medals, recognition, or rank. The uniform only had the stitching of his name, which he could not even read. One of the Guatemalan doctors, accompanied by a tall white physician, instructed the soldier to remove his pants. The doctors took hold of his penis and pulled the foreskin back "... between the left thumb and forefinger so that the urethra distal to a point 2-4 mm."³³ With the tip of the penis exposed, a toothpick "swab was inserted about ½ inch into the urethra, and carefully rubbed over the mucous membrane." The sharp painful sting of the procedure was followed by a sudden burning sensation. Unaware of what had actually occurred during this "examination," the soldier was denied permission to leave. The two physicians, one a member of the U.S Public Health Service, inoculated the soldier with the bacteria *Neisseria gonorrhoeae*, which causes gonorrhea.³⁴ Finally, the soldier was released with only a packet of cigarettes for his participation. He would soon develop sores which, untreated, would potentially lead to his death. He was never asked to participate in this experiment nor properly informed of the repercussions.

The National Army of Guatemala is disproportionately composed of rural indigenous populations. According to historian Richard Adams, the distinction between officers and enlisted men follows a thoroughgoing caste system.³⁵ Race and culture were important determining factors within Guatemala and in the composition of the National Army. The officers principally

³³ John Cutler. (1952, October 29). Experimental Studies in Gonorrhea. Report. PCSBI HSPI Archives.

³⁴ Artificial Inoculation is defined as the method of introducing an organism into the body such as bacteria using swabs and toothpicks which are moistened with pus from acute cases of gonorrhea.

³⁵ Adams, Richard N. "The Development of the Guatemalan Military." Studies In Comparative International Development 4, no. 5 (May 1969): 91pg 95

belonged to Ladino or racially mixed groups of literate, politically engaged and influential men who had been educated at the *Escuela Politecnica de Guatemala*.³⁶ On the other hand, the bulk of the enlisted men were indigenous, uneducated, and culturally excluded from the officer ranks based on factors including language. One report states "...of the total of individuals who enter the Service (Permanent Force and Military Reserves), 62.50 percent are illiterate and 57.13 percent belong to the Indian race, and of these, 13.71 percent speak no Spanish when entering and only 30.63 percent have Spanish as their maternal tongue."³⁷ The large number of rural Indian men conscripted by the National Army faced enormous barriers that socially contained, restricted, and defined them as a vulnerable population in Guatemala.

When the USPHS arrived at the Military Hospital to initiate the venereal disease experiments, racial discrimination based on indigenous features, lack of education, and even their unfamiliarity with the national language all served as factors that targeted a specific group of soldiers. The conscripted soldiers were also victims of internal racism prevalent in the Guatemalan military. These enlisted "volunteers" from rural areas of the country were overrepresented in the Guatemalan experiments on venereal disease. These soldiers composed another vulnerable group in Guatemala. Already limited by their cultural and racial characteristics, they were soldiers who were bound by the chain of command and were required to follow orders. In attempts to build a strong nation through the military, the Guatemalan government volunteered its own soldiers for potentially fatal experiments and demonstrated overt racial attitudes that neglected any respect for decent human treatment.

The unnamed Guatemalan "volunteer" soldier was one of 518 men exposed to either syphilis or gonorrhea during the USPHS Guatemalan experiments in the Military Hospital. The turnover

³⁶ Ibid: *La Escuela Politecnica* is described in this article; it is the military training institutions for Guatemalan Military services.

³⁷ *El Servicio de Analfabetizacion del Ejercito*, 1961

rate for enlisted men was approximately 50 percent every two years.³⁸ Due to such a low rate of both retention and literacy, the promotion to higher rank was quite small. These factors gave the USPHS researchers incentive to use enlisted men as disposable human test subjects. The “cooperative agreements” and bartering that government officials arranged with Dr. Cutler provided him with unrestricted access to its most undesirable soldiers. Similar to the prisoners and mental patients, soldiers were constrained by their conditions within a Guatemalan institution. All who experienced the experimentation and degradation belonged to the lowest level of military rank.

Conclusion

The presence of United States Public Health Service physicians and researchers lasted until 1948, when Dr. Cutler made his final arrangements to leave Guatemala City. The U.S research grant to compensate USPHS physicians only funded the experiment through December 1948, and no additional funding was sought because “a new grant has some drawback in that it will require a progress report dealing with the work which has been accomplished. This we might not care to do at the present time.”³⁹ Applying for further funding required providing an explanation of the entire experiment which, with constant effort, was kept in the shadows of U.S public attention. Although Dr. Cutler and his research team had departed from the city, final documentation showed events set in motion by this experiment lasted through 1953, with follow-ups paid with USPHS funds and conducted by Guatemalan physicians who required less payment than U.S physicians.

³⁸ See “The Development of the Guatemalan Military” pg95

³⁹ John Mahoney to John Cutler, forwarded by (Fred L. Soper) Director, Pan-American Sanitary Bureau. (1948, September 3). Correspondence. PCSBI HSPI Archives

Dr. Cutler relocated to Alabama and became a central figure in an ongoing experiment later revealed as the Tuskegee Syphilis Experiments. Tuskegee, like Guatemala, was a forty-year study of “untreated syphilis in the male Negro.” USPHS doctors misled syphilitic African American men into believe they were receiving free health care for their “bad blood.” In fact, physicians monitored the progress of Syphilis and deliberately withheld treatment during the span of the experiment (1932-1972). Race was pivotal in Tuskegee and, similar to Guatemala, the scientific belief that syphilis was more rampant among African Americans provided justification for the experiment to continue long after penicillin proved to be a cure.⁴⁰ The clear connections between the Guatemalan experiments and the Tuskegee study serve as an example of the reoccurring patterns of institutionalized violation of human rights by the United States.

In Guatemala City in 1946, the United States Public Health Service was able to find a secure place and large vulnerable group of people to use as human test subjects for venereal disease. The Guatemalans that became a part of dehumanizing experiments were branded as outcasts, criminals, prostitutes, insane, uneducated and less than human. Frequently, they were Indians. In addition, these labels alienated people from society, confined them to public Guatemalan institutions, including prisons, psychiatric hospitals, and the lowest strata of the military. During this time racial segregation was prevalent throughout the southern U.S as it was in many aspects of Guatemalan society. This was reflected in the science concerning venereal disease. Ideas that syphilis and gonorrhea developed differently in African Americans and Indians justified the deception, misleading information, and lack of proper treatment. The combined racist perceptions and social conditions of Guatemalan undesirables facilitated the use of humans for exposure to venereal diseases.

⁴⁰ Susan M. Reverby, *Examining Tuskegee: The Infamous Syphilis Study and its Legacy*. Chapel Hill: University of North Carolina Press, 2009), pp. 187-203.

Racial attitudes were clearly apparent in the letters concerning secrecy between the USPHS physicians and their superiors. Concerns and excessively cautious steps were taken to keep this experiment from coming to light in Guatemala and more importantly in the U.S. In the face of the examples of Nazi physicians and their abuses of Jewish populations in WWII, the international effort to establish a set of universal ethical human rights was strongly supported. Had details of the Guatemalan experiments publically arisen, it would contradict all efforts to prevent atrocities mirroring those the Nazis perpetrated. In spite of this, the U.S. continuously violated many of the ethical rights granted by the Nuremberg Tribunal. Given that the experiments occurred in a foreign and underdeveloped country, the potential for scientific advancements they might produce, and the use of subjects deemed as less than human resulted in the U.S. government's full support of the program.

The use of human beings as test subjects did not begin in 1946 with the Guatemalan experiments on venereal disease; Nazi Germany provided an example disregard for human life in the name of science. Nevertheless, analyzing the Guatemalan experiments sheds light on issues of social justice and perceptions of race, social, and class status as they play vital roles in the treatment of vulnerable groups. Approaching the social history of these experiments through the dual lenses of medicine and public health offers a critical perspective on U.S. attitudes towards Guatemala and the Latin American region.

This paper focused primarily on the accounts of the USPHS physicians and doctors in the experiment. In further research, examining the domestic role of the Guatemalan government, medical officials, and their own ideas of citizenship, race, and class status will offer a more complete and nuanced account of what transpired. The venereal disease experiments in Guatemala are just one piece of a larger overarching relationship between the United States and Guatemala that can be explored in more detail. In

addition, it will contribute to the history of Guatemala by allowing us to apply this event in order to complement our understanding of turning points such as the CIA coup in 1956 that toppled the Guatemalan president Jacobo Arbenz only a few years following the experiments.

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Placas, Cultura, y Carnalismo: Inking the Soul on the Social Body

Amy A. Martinez

Mentor: Dr. Victor Rios
Department of Sociology

Abstract

Previous scholarship has examined the art of tattooing with a “self-defeating” resistance and “self-damnation” lens, but few studies have investigated how Latino “gang associated” youth create and manage tattoo aesthetics. This study examines why Latino “gang associated” youth, chose to mark their bodies with something so permanent as tattoos in an era of hyper and hostile policing apparatuses. This two-year ethnographic study, which produced a counter-archive of photographs and interviews with “gang associated” youth, followed fifteen Latino males from a working-class neighborhood (Eastside) of Santa Barbara, California, one of the most affluent and stratified cities in the state. This study demonstrates a complex narrative fraught with cross-cultural misconceptions – including but not limited to racialized and gendered stereotypes – wherein these young Latinos attempt to preserve and document a particular history/community – physically and socially – upon the personal and social body which thereby counters popular meanings of their tattoos and tattooing.

Introduction

"People don't like gang members. What if we don't like them either? But they don't give us opportunities to change"

—Baby D.

Setting/Location

Santa Barbara, a coastal California city located ninety-five miles northwest of Los Angeles, is bound on the south by the Pacific Ocean, the north by the Los Padres National Forest, and on the west by the city of Goleta, a small city with a sizable student population due largely to the physical presence of the University of California, Santa Barbara in that city. To the east of Santa Barbara lies Montecito, an affluent community of million-dollar estates and residences of celebrities such as Oprah Winfrey and Steve Martin.

Its location along a picturesque strip of California coastline has established Santa Barbara as a prime tourist location. Here, tourists stroll down State Street, the city's principal thoroughfare that bisects the city, and frequent any of its high-end boutiques, shops and restaurants. Like its more affluent neighbor Montecito, multi-million dollar estates pock the hillsides of Santa Barbara taking advantage of sweeping views of the nearby Pacific Ocean. And like Montecito, Santa Barbara is comprised mostly of high-income (median Santa Barbara annual income is \$80,000) white residents.

Amidst Santa Barbara's overwhelmingly white and affluent population is a "hidden" population of Latina/os, a population that though comprises 38% of the total population is "present" only during Santa Barbara's "Fiestas," which I will expand on later in this paper. Some Latinos live dispersed throughout Santa Barbara, but the working-class Latina/os in Santa Barbara live in areas that are spatially centralized and concentrated neighborhoods. Not coincidentally, Santa Barbara's major police station is also in this part of town. Those aforementioned Latina/o neighborhoods, which

are working-class sections of a largely upper-class city, are the central focus of this paper.

Santa Barbara's physical location, ubiquitous Spanish colonial architecture and tourist-friendly economy has resulted in a highly contentious social geography where issues of race, class and gender are woven into a complex narrative of the "tough-on-crime," "zero-tolerance" and/or "crime-free" city. While the hyper-policing of this community and its community spaces play key roles in the overall social geography of the "Eastside," this paper is more concerned with the collateral consequences of the racialized body of young Latino who are inked with tattoos that are negatively perceived by the police and treated accordingly. The youth in this community constantly find themselves publicly racialized as the "other," the criminal, and the body to be feared.

What helped me further conceptualize and understand how local police reinforce racial tensions was an experience with Rebel, a young man I was shadowing. We went to Santa Barbara's annual fair; two white cops followed us the minute we arrived. The encounter resulted in six cops verbally harassing and surrounding Rebel. Out of frustration, he kept shouting to me: "See the way they treat us Amy?! Ask them what the *fuck* I did." I was able to witness how these young men are racially profiled and subjected to subordination by cops because of their street tribe aesthetics. However, experiences such as these have been normalized as a part of the daily-lived routines among the young men.

Youth Population

The criminal justice system has now become a major social force helping shape social stratification, socialization, and social control (Rios 2011; Wacquant 2009). There have been key historical changes in the United States that have facilitated punitive, tough on juvenile crime legislation. In 1988, the state of California passed the Street Terrorism Enforcement and Prevention Act. This legislation had the stated intent "to seek the eradication of criminal

activity by street gangs by focusing upon patterns of criminal gang activity and upon the organized nature of street gangs.” This was the first gang enhancement law for juveniles that had the philosophy of “try them as adults” in California.

In 1994, John Dilulio coined the Super Predator Thesis in which he, along with William Bennett, claimed that the new baby boomers growing up in the 1990’s to 2010, would be a generation from the inner city that would one day commit a “blood bath of violence” (Jennifer Tilton, *Dangerous or Endangered?*, 2010). However, youth crime/“deviance” had actually dramatically decreased in the 1980’s, although youth populations were skyrocketing in the early 1990s.

This thesis was a strategic form of propaganda that would pave the way for the Violent Crime Control and Law Enforcement Act of 1994 and the Juvenile Predator Act of 1966 that the U.S Congress would enact. This piece of legislation would give millions of dollars to states that “toughened” their juvenile justice policies. With the culmination of these pieces of tough on crime legislation, finally in 2000, California proposed and passed Proposition 21 which would increase the criminal penalties for a multitude of crimes committed by youth and incorporate many youth offenders into the adult criminal justice system.

David Garland (2001) describes these punitive measures of social control as a cultural shift, which was driven largely by fear of crime that focused attention on constructing an ideal criminal figure. This cultural shift has facilitated society’s willingness to restrict civil liberties in the name of “protecting” social order from offender-caused “violence.” This is where in the United States, motions to advocate wars against things such as drugs and crime increased. However, doing so neglects or ignores the underlying social problems that exacerbate crime and other social problems, and concentrates only the punishment of individual “offenders.” Jonathon Simon (2007) argues that this punitive form of governing, based on crime and the culture of fear, primarily affects youth of color from urban, working-class communities.

Within the past 5 years, young Chicanos, particularly on the East Side of Santa Barbara, have been the primary focus of popular media outlets such as the *Santa Barbara Independent*, news channels, newspapers and magazines, as well as the police department. In most of the stories, these young people have been consistently depicted as pathological, selfish, and criminal.

On March 14, 2007, at 1:40 p.m., in the downtown part of the city, an encounter took place where a young man, Ricardo Juarez, stabbed a West Side rival “gang” member,¹ resulting in his death. Three years later at the Santa Barbara Superior Courthouse, a jury found the now 17-year-old guilty of voluntary manslaughter, sentencing him to seventeen years in prison.² The 12-person jury also convicted Juarez of committing the offense for the benefit of a criminal street gang and assault with a deadly weapon in the attack. Due to California Proposition 21, which passed in 2000, the age at which offenders could be tried as adults was lowered from sixteen to fourteen, and if the accused was considered a “gang member an additional ten years could be added to their sentence” (CA Penal Code, Sect 186.22). Juarez³ was the youngest in the nation to receive such a sentence. Based on this case and Prop 21, the law has opened doors for this type of sentencing in Santa Barbara.

¹ In the city of Santa Barbara, during my time spent on the field, I noticed a pattern among the stories of the youth and first hand witnessing authority figures (primarily police), approaching youth and making assumptions that they are street criminals and gang bangers. Police narrate these youth before they even engage with the youth and then go on to criminalize them before there is any proof that these youth are engaged in any acts of deviance.

² Many psychological studies show that juvenile brains do not fully develop until the age of twenty-three (Cauffman; Steinberg, 2000).

³ The young men in this study are from the same neighborhood as Ricardo Juarez. By analyzing their stories and my observations, I find how race, class, gender, and gang identity/aesthetics play a role in determining the life outcomes of young people.

The following September 2007, four Eastside youth from Santa Barbara found themselves in conflict with a Westside youth, which resulted in the Westsider being stabbed multiple times. Jigga⁴ who was brought into the case at the age of nineteen, was looking at a 25-to-life sentence, while is nineteen year old co-defendant was looking at 60 years including previous charges. Although the victim survived, on April 25, 2011, Jigga, who was 21 at the time, enrolled in community college and had begun to turn his life around, was sentenced to fifteen years in prison – five for the stabbing (Jigga had pleaded no contest), with an additional ten years because he was considered a gang member due to his tattoos (as seen in **Figure 1**). Clearly, Ricardo Juarez’ case and policies like Prop 21 established a precedent for how future “gang” members in cities like Santa Barbara who engage in these type of acts will be sentenced.

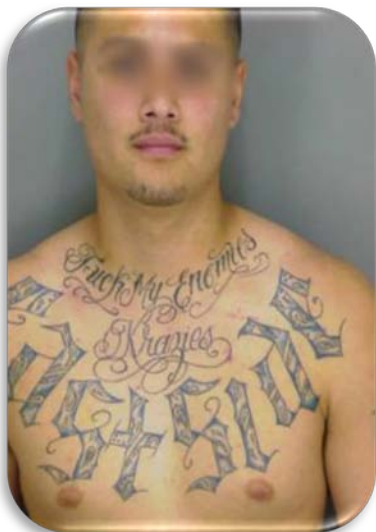


Figure 1: Youth in Study, Mugshot

(Photo provided by Edhat Santa Barbara).

Following the 2007 stabbing, in 2010, Operation Gator Roll hit the “Eastside gang” unexpectedly. In the early morning of October 15, more than 400 law enforcement officers cracked down on seventy-one homes. Nearly sixty youth

⁴ For privacy and protection, I have changed some of the name of community members and police officers. Youth were given pseudonyms they felt appropriate.

were “rounded up” that day and brought to Earl Warren Show grounds, where the Santa Barbara taskforce had set up its command headquarters. Police cars, buses, SUVs, and all manner of law enforcement occupied the parking lot as groups of young men and women were led into the auditorium, which some officers called the “Dome of Doom.” A total of twenty eight Eastside “gang members” were indicted by a federal Grand Jury in L.A, nineteen of whom were indicted under the RICO (Racketeer Influenced and Corrupt Organizations) Act, originally used to target the Mafia. The racketeering charges were the first to be brought against residents of the Central Coast. In 2005, Assistant U.S. Attorney Mark Aveis said this about the Gator Roll bust in Santa Barbara, “In my experience, [gangsters] only care about their own survival.”

Scrappy, a fifteen year old from the Eastside shares his experience:

They came to my house. It was like 5, 6 in the morning and they like... I don't know I just remember, all kinds of bangs and screams... I couldn't understand what they were saying so I just remember jumping out of my bed and I went...I thought it was somebody from the robber gang you know and they got everybody on the ground and even my mom...[it] was the feds, I was tripping out they were in ski mask[s] suited and hooded. After, it was my mom who got on the ground, I started getting mad, and my nephew came out, the six year old, and they pointed a gun at his head, and I was like what the fuck and I jumped up and I was talking shit to the cops and they just threw me out.

As Garland and Simon would argue, a culture of fear has heavily distorted the American mainstream, constantly highlighting youth of color in the media committing some heinous crime, resulting in public outrage and fear, in turn leading politicians to

propose draconian legislation that people in our society easily vote for. With this constant reminder, particularly on the Eastside of Santa Barbara, it is not surprising that Chicano youth are constantly depicted as a threat to the well being of the Santa Barbara community. As Santa Barbara's Chief Police Cam Sanchez stated, "We sent a message to the City of Santa Barbara, we will spare nothing to come and get you." The problem of going out to "get" youth is that many of the underlying issues as to why youth may partake in crimes are regularly ignored. This results in police task force and judicial courts constantly coming down with an iron fist, having a zero-tolerance for any criminal gang activity, and overlooking how these youngsters get set up to fail; it is a sick cycle. I have witnessed how easy it has become to dehumanize this population and then to funnel them to juvenile halls, boys camps, jails, and prisons, labeling them as incorrigible. In fact, many of the punitive policies created to "correct" youth in this community have taken away money and resources from programs and strategies that could reduce crime. It is not a coincidence that youth of color in Santa Barbara are continuously targeted. Currently, local business elites and powerful political force as well the police department are strongly advocating for the implementation of a gang injunction.⁵

Literature Review

Various scholars have developed theories about gang performance, identity, and membership; however, there is little emphasis on what it actually means to the population itself, including what it means to walk in society with ink on your body during this era of hyper-incarceration. Hence, the relationship of tattoos and police hostility is worth investigating. In spite of a hostile policing apparatus, "gang associated" youth are continuing

⁵ A gang injunction is a court-issued restraining order prohibiting gang members from participating in certain activities. It is based on the legal theory that gang activity constitutes a public nuisance that prevents non-gang members from enjoying peace in their communities. The first gang injunction was started in Los Angeles and the city of Oakland has also been fighting against the implementation of this injunction that LA proved not to work.

to mark their bodies with something as permanent as tattoos. Marc Blanchard (1994) describes four functions that tattoos have historically served: 1) as a rite of passage, 2) protection, 3) validation of a group membership, and/or for 4) decorative purposes (289). Although these functions are valid, tattoos have also served as a marker of criminality/deviance among bodies of color in Western and westernized cultures (Mifflin, 1997; Chinchilla 1997; Taylor, 1997).

Sigmund Freud (1931) made a point to recognize that "there can be no doubt that art did not begin as art for art's sake. It worked originally in the service of impulses" (97). Maurice Merleau-Ponty (1962) highlights how the "body is to be compared, not to a physical object, but rather to a work of art... it is a focal point of living meanings..." (p. 150-151). By linking the body to a work of art, Merleau-Ponty argues that our understanding of the body should not be confined solely to the realm of biology and the physical. The body can serve as a powerful aesthetic platform to communicate personal and cultural meanings. Arguably so, the human body then is clearly the oldest and most persistent medium through which we can express these "aesthetic impulses" ⁶ as well as what Pierre Clastres (1989) understood the body to serve - a carnal canvas to preserve human memories.

Daniel Solorzano et al (2001), using critical race theory and Latina/Latino critical race theory as a framework, apply their concept of resistance to focus on its transformative potential and its internal and external dimension among Chicano/a high school students. They ascribe self-defeating resistance to students who may have some critique of their oppressive social conditions but are not motivated by an interest in social justice, and engage in behavior that is not transformational and in fact helps to re-create the oppressive conditions from which it originated. I hope to apply this theoretical framework to "gang associated" youth. This article

⁶ See Freud's *Totem and taboo: resemblances between the psychic lives of savages and neurotics*, (1931).

begs the question of why some gang youth, such as my subjects, consciously engage in “self-effacing” branding, i.e. tattoos, despite their awareness of potential carceral punishment.

Susan Phillips (2001) argues that permanent body markings, i.e. tattoos, reinforce and challenge existing social divisions. By looking at the life of a Chicano tattoo artist, Phillips came to the conclusion that his tattoos are self-damning. Phillips views “tattoo[s] as both abomination and art, where the body becomes the existential ground for the juxtaposition of suffering and beauty and where self-expression becomes synonymous with self-damnation” (358). Although she acknowledges that tattoos can be tools of empowerment, individuality, and livelihood, they also represent oppression and exclusion from mainstream society. Phillips, like Solórzano et al could argue that Chicano youth, who continue to tattoo their bodies, are engaging in “self-defeating” or “self-damning” resistance. Both, however, neglect the potential of youth engaging in active forms of resilience. If we could shift the lens to a resilience theoretical framework, we could better understand why youth continue to mark their bodies that are already marked as “pintados”⁷ by mainstream America’s racist stereotypes. How can these youth further damn themselves if the odds are already against them?

Victor Rios and Patrick Lopez-Aguado (2012) offer an understanding and recognition of these performances and “situated survival strategies”⁸ of gang identity as navigational tools of resistance. Rios and Lopez-Aguado identify how young Chicano males use cholo style as a dominant response to the racial stigmatization, class subordination, and criminalization they face within their environments. As Rios and Lopez-Aguado describe,, cholo style is “a practical approach to poverty conditions...most articles of clothing become popular cholo fashions because they are readily available for poor urban youth...” (9). Like the zoot suiters in the 1940’s, the young men are conscious of their invisibility and

⁷ See Ben Olguin’s *La Pinta*, 2010.

⁸ See Nikki Jone’s *Between Good and Ghetto*, 2009.

use cholo style to reclaim identity and self worth. When intersections of class, race, and identity come together, looking like a cholo only enhances their criminalization. Rios and Lopez-Aguado examine the function that shaved heads, baggy clothes, and visible tattoos play in the lives of Chicano male youth: “Through cholo style, gang associated Chicano youth perform a resistance that defies race and class-based marginalization, in the process developing a perilous sense of masculinity” (4).

Diego Vigil (2002), by reframing these young men’s coping tools in hostile environments, speaks more directly to their humanity. Vigil identifies how socioeconomic factors, familial, police, and community institutions play a role in the ways in which already marginalized youth of colors’ aesthetic choices are affected. Since their access to quality mainstream public education is limited, for some, the streets become their new teachers and parents and they experience what Vigil defines as street socialization (2002).

According to Vigil, socioeconomic factors – the fact that most, if not all of the young people come from working class households, means that opportunities are hard to come by and even if they attempted to pull themselves up by their bootstraps, they often remain in the same place they started, being further pulled in to their “ecology.” Since they are trapped in their street’s web, the streets socialize them. Youth begin to embody their own subaltern communities that police officials criminalize and try to control. The pull and push factors from society’s mainstream expectations that these young people go through creates this “psychological death” or what Vigil calls “locura.” To cope with this psychological struggle, youth put up “street fronts,” further solidifying their gang identity and marginality.

However, Vigil does not analyze gang aesthetics in-depth. When faced with vulnerability to violence, youth have to do what they have to do to survive. Robert Garot (2010) defines “street fronts,” as youth using “gang” identity as a tool for performance to

try to survive in moments when they find themselves in need of this identity. Youths' "street fronts" are then an enactment, a performative overlay of street politics. These street politics are what scholar Anderson refers to as part of the code of the streets (2000). The code of the streets is unwritten laws that dictate the everyday norms of those engaged in street level activities (p. 32-33). Instead of conceptualizing youth as "gang members" and relegating them to "gangs" as a static group, Garot pushes his audience to see how the performance of gangs is strategic and context-sensitive. Such an approach provides an alternative to conceptualizing identity (i.e. street life oriented identity) as a fixed personal characteristic, but rather as a sensual response to struggles and challenges youth must confront given their environments. These sources build upon one another because ultimately as these scholars argue, gang aesthetics provides a tool to survival for the young men.

Methodology

"So the fieldworker must choose, shape, prune, discard this and collect finer detail on that, much as a novelist works . . . But unlike the novelist . . . the fieldworker is wholly and helplessly dependent on what happens . . . One must be continually prepared for anything, everything—and perhaps most devastating—for nothing."

Shadowing Street Life Oriented Latino Men

In order to understand how street life identity is negotiated, I observed and interviewed young Latino males on the Eastside of Santa Barbara, where having a shaved head, being brown skinned, inked, and wearing baggy clothes has serious consequences. Youth who were deeply immersed into this street tribe culture and identity best illustrate the focus of my research questions: How do youth perceive the policing/labeling they encounter in their everyday lives? What strategies do these young men use to cope with negative treatment they encounter? How do Latino “gang associated” youth perceive themselves to be viewed by authority figures, in particular, their cultural practices related to gang aesthetics? And why, in spite of a hostile policing apparatus, do Latino “gang associated” youth continue to ink their bodies in an era of hyper incarceration?

I was able to gain entrée to fifteen Latino men who were between the ages of fifteen and twenty-five when I began my research. I interviewed them, met some of their mothers, and visited and wrote letters to those who were in jail. From 2009 to 2011, I also shadowed these young men as they went about their daily routines, such as “being posted” at the creek, hanging out at parks, “kickin’ it” at their “homies’ pad,” and participating in a community program. To discover processes of street life we need an immersion in the rhythms, customs, and practices of the membership of a group (Hamm, 2001). It is not enough to be an armchair sociologist. I used ethno-methodology, critical urban ethnography,⁹ and symbolic interactionism¹⁰ in order to develop an

⁹ Critical ethnography applies a critical theory based approach to ethnography. It focuses on the implicit values expressed within ethnographic studies and, therefore, on the unacknowledged biases that may result from implicit values. Critical ethnography also incorporates reflexivity, pushing researchers to

understanding of how street life oriented Latino male youth come to understand their social world. I questioned the validity of what the stratified city of Santa Barbara had already created as true for the young men I studied. These three methods offered me a crucial framework to comprehend the lives of the young men and how to communicate what I observed. I had originally met about forty young men; however as time went by, because most were on parole or on probation, got “caught up” and were arrested, or sent to serve time in juvenile halls, jail, or prison, I ended up only being able to follow fifteen of them.

Ultimately, spending an extensive amount of time out in the field, I was able to observe a pattern, a cycle of incarceration among the youth. As aforementioned, this meant that I would also be exposed to visiting them in jails, writing to them, and also meeting some of the mothers. I observed much more than I had ever anticipated and what I had seen in the field moved me in unimaginable ways. The most efficient and profound way in which I could do justice to what I had seen, heard, and felt was through performance ethnography. When one truly immerses oneself with a group, it is difficult to remain objective, especially when an issue hits so close to home related in the following section.

Recruitment

After my younger brother joined a street “gang” at the age of thirteen and adopted a street life identity he ended up getting “caught up” and sentenced to two and a half years in juvenile hall, with six years of probation. I never thought that I would see him shackled from waist to feet, looking into the eyes of an old white male who had the power to dictate where his time would be spent

constantly acknowledge their own positionality in regards to which they are studying. In addition to speaking on behalf of subjects, critical ethnographers will also attempt to recognize and articulate their own limitations, histories, and institutional standpoints bear on their work. There is no attempt to be purely detached and scientifically objective in reporting and analysis (Carspecken, 1995; Madison, 2005; Walford, 2007).

¹⁰ Symbolic interaction is the study of meanings of interactions (Blumer, 1969).

after committing what society had regarded as a criminal act and what my family and I had seen as self-defense.

Upon my admittance to undergraduate studies at the University of California, Santa Barbara, in search of answers to understand my own family's experience, I met a professor who recruited me to be part of his own research. While the purpose of his study is to gain an understanding of how small town institutions treat Latino gang-associated youth and how these youngsters respond to cultural conflict, my research aimed to get a deeper understanding of the lived experiences of how street life identity played out in the lives of these young men. I was introduced to one of the main participants in this study and from there I was able to meet more young people like him using a technique known as snowball sampling. It took me a year to build trust among these young men and be able to hang around them and hear and observe the ways in which their street life identity increased their criminalization and policing.

My study does not emphasize the “deviant” behavior of the young men I studied, but attempts a more in-depth understanding of how young people use street life identity to get through the social/educational exclusion and criminalization they face from police officials and their community. I hope that readers can suspend any negative perception or biases of street life oriented, street tribe identified youth in order to understand and empathize with what these youth go through, and help change the way our society approaches youth who identify as such. Reflecting on my own positionality, being a Chicana, perhaps I should have studied Latina females who are street life oriented and or use street identity as a tool of resilience against a hostile environment; however I believe that the way in which I positioned myself to get information, I found a way to bridge distances, to gain trust these young men's trust enough for them to share their stories with me – despite the fact I was not a male. They have been able to help me gain a more in-depth understanding of how they are emotionally

affected by negative police encounters and labeling, in ways that a male researcher might not have uncovered. I played with gender, playing down my femininity in order to be taken as one of them; of course I had to constantly be reflexive about this. Speaking from my experience, I observed that no matter how much the youth had confided in me, it would never be possible to be taken in as “one of them.”

Findings

“We are all “written” all over, or should I say, carved and tattooed with the sharp needles of experience.”

-Gloria Anzaldua

Just as tattoos protect inmates inside prison, tattoos for young Chicanos can protect them on the “outs” which has become somewhat of a bigger prison in where they are being constantly watched. Rios (2006) calls this phenomenon the youth control complex, a system that manages, controls, and incarcerates poor youth of color who are deemed deviant and incompetent to participate as full citizens. But I would go further, positing that it is also a cultural web of control. Baby D, one of my key research participants stated, “I’ve actually been court ordered one time to take off my tattoo. I didn’t do it – luckily they forgot about it but it’s like trying to take away who you are it’s like they’re not letting you be yourself. A tattoo can tell a persons’ whole life story.” It is crucial to understand where the tattoos come from before figures such as police officers can use a Latino street life oriented youth’s aesthetics or style to assume they are gang members and then treat them accordingly.¹¹

¹¹ In one instance while out in the field, one of the young men I had been studying, Jigga, had been facing twenty-five to life in prison for being in the wrong place at the wrong time when a rival Westsider from Santa Barbara was stabbed twenty-eight times. In his sentencing day, the district attorney showed a picture of Jigga’s tattoos to “prove” he was a “gang” member. Jigga who was twenty-one at the time was a student at the city college of Santa Barbara and had strayed away from the street life. However, his aesthetics were used against him.

According to the California Code of regulations for Adult Prisons, “inmates shall not intentionally destroy, damage, or deface, state property or another person’s property” (California Code of Regulation for Adult Institutions, Title 15, Article 1, Behavior 3011). Law considers all inmates state property and strictly forbids tattooing in prisons. Similar to state prison policy on state property where inmates can get additional time added on to their sentences for “Destroying State Property,” police in Santa Barbara criminalize “gang” related tattoos among Latino street life oriented youth and in searches, force youth to take their shirts off to check if their bodies are adorned with any “gang related” tattoos. These tattoos are frequently photographed and later used in the Santa Barbara courts against youth, with assumptions that the tattoos validate the claim that these youth belong to a criminal street gang. I observed police controlling street life oriented youth’s street aesthetics and cultural style by humiliating them when making them remove their shirts in police searches, when making a negative example out of them, or when they are in court, in the process stripping them of their cultural dignity.

As Phillip (former “gang” member, now gang interventionist and tattoo artist) helped me understand, just because youth have tattoos with area codes or the name of their city does not mean that youth are making a statement like “I am a [Eastsider] and I want to kill everyone else;” they are simply “repping” where they grew up. However, in cities like Santa Barbara, youth can easily be added to the Santa Barbara Gang List because of their “gang related” tattoos

Although pleading no contest, Jigga was sentenced fifteen years; five for the alleged crime and ten years because of the gang enhancement made possible by Prop 21.

and as Phillip concluded, "...as soon as you get any gang tattoos you're through –it stays with you through the rest of your life it doesn't matter what you do good." A "gang related" tattoo can add an additional ten-years to a life sentence because of a gang enhancement.

Since he is aware of the possible repercussions of being added to the Santa Barbara Gang Database, as a tattoo artist, he does not tattoo specific street tribe names. Certain symbols or images are favored among street tribe youth but not by police officers. As another older street tribe member, "Timbon," now a professional tattoo artist, stated, "...committing yourself to the hood is a permanent symbol to your hood, family," and unlike Phillip who will not tattoo specific street tribe names, Timbon believes that it shows a humbling acknowledgment of what kind of life conditions these youth come from and grow up in.

Baby D stated:

"My right upper arm you know it's what I am, where I been, what I've done you know. It means a lot to me I don't know if it means a lot to a lot of people but I've gone a lot through it because of that [the tattoos] it's like a tattoo scar added to the real scars next to it."¹²

Based on interviews like this, I was able to understand that Baby D's tattoos were a narrative of his life permanently documented on his body. I quickly observed how much weight Baby D and other youths' tattoos carry. For example, when Baby D was going to Santa Barbara Community College, he came across some Westside rivals. Baby D did not have to state he was from the Eastside because the black 'E' and 'S' inked on both of his legs already signified what *barrio*¹³ he represented. Baby D's rivals ended up stabbing him nine times and left him bleeding out.

¹² Figure 2 Baby D, "East Side" was a photograph I took.

¹³ Neighborhood

Although he was physically alone, the tattoo symbolizes Baby D's belonging to a street tribe, signifying to his rivals that he is not completely alone.

Although in this particular situation, Baby D's rivals read these inked markings on his body with stigma and criminalization brown bodies are vulnerable to by the police state because of the ink on their bodies. Police and the police state lack an intercultural sophistication in properly reading ink on brown flesh. Since they are not able to read with any level of sophistication such as street life oriented youth can, there is no distinction in the ink on these brown bodies, which in turn becomes blurred together criminal alongside their "cholo" aesthetics by the police state and larger dominant society. Somehow tattoos have been a cultural marker of criminality among Latino street life oriented youth. Although, these tattoos are not a marker or sign of hostility against society, it is a marker of presence in a society that has ostracized this subculture. Phillip testified:

"You'd have a really hard time understanding who I am as a man, unless you know where I've come from and where I'm going. I thank God for allowing me to travel this road as treacherous as it has often been, because it made me...However, some people are so stuck on our tattoos that they miss the heart within...their loss."

Tattoos have not only become a provocation for conflict among rival groups, they are also a pretext for arbitrary arrests or used against accused gang members. Olguin understands this cultural web of control as:

"an indispensable point of reference in examining how the "adorned" body of the collective and individual "Hispanic male suspect" is read and also written



on by a variety of narrators-police officers, prosecutors, and judges, as well as prison administrators, guards, and even prisoners themselves. These interventions help transform the body into a network of signifiers that at once affirm the "suspected" and/or "convicted criminal's" personal identity while simultaneously confirming his abject status in society...[an] ongoing battle for authorial control of the "convict(ed) body" (161).

Figure 2 Baby D, "East Side"

However, what most people miss is that "Tatuajes (tattoos) represent a victory- a testament to the survival of the human spirit" (Olguin, 1997, p. 169). Latino street life oriented youth are "pintos" out in the "free" world, walking marked bodies because of their "cholo style," race/class, and on top of it, their tattoos (166). Regardless, tattoos for young Chicano street life oriented youth can be a permanent form of their counter hegemonic agency; tattoos serving as a personal resource to survival. By conducting extensive interviews with the street tribe youth from Santa Barbara, I understood that customizing their bodies is a form of cultural pride, carnalismo, dignity, remembrance, and acknowledgment of where they started and where they are going. As Rios and Lopez-Aguado argue, "In this struggle, Chicano males reclaim their bodies by inscribing their own meanings, performance and resistance onto themselves" (417). Some may argue that youth do not comprehend what it means to brand their bodies with ink; however with the extensive interviews I conducted, youth clearly and unambiguously stated that they would not remove them because they represent part of their life stories. Their tatuajes are not simply a decoration; they are a structure, discipline, affirmation, and love for their hood, family, and peers.

Discussion

“Tattoos tell stories of crime and passion, punishment, and regret. They express an outlaw, antiauthoritarian point of view and communicate a romantic solidarity among society’s outcasts.”

– Douglas Kent Hall

Dick Hebdige (1979) explores how criminality is relevant to subcultures; I find it intriguing how the stylistic choices of the youth in each of these time frames have been constructed as criminal. For Hebdige, subcultures represent a challenge to hegemony not through direct means, but rather indirectly through style. For Hebdige:

Style in subculture is, then, pregnant with significance. Its transformations go ‘against nature’, interrupting the process of ‘normalization’. As such, they are gestures, movements towards a speech which offends the ‘silent majority’, which challenges the principle of unity and cohesion, which contradicts the myth of consensus. Our task becomes [...] to discern the hidden messages inscribed in code on the glossy surfaces of style, to trace them out as ‘maps of meaning’, which obscurely re-present the very contradictions they are designed to resolve or conceal (18).

Alyshia Clawson (1995) understands the body as a place where the mandates of society and norms of culture can be inscribed. Michel Foucault (1980) argued that the body was a surface in which the hegemonic inscription of culture could be marked. Foucault, however, also acknowledged that where there is exercise of power, resistance is present, “hence, the body responds to the acts of domination which seek to leave indelible marks on its surface” (Clawson, 37). Clawson asks: “what happens then, when one writes on one’s own body in defiance of what others would have written, in reclaiming the surface of the body as a site of

positive personal and collective identity against the hegemonic discourse of the state and the dominant culture?"

Based on extensive interviews with the fifteen youth I spoke to and photographed, tattoos are a mental image translated to the body; taking the deepest, inner memories of happiness and pain to the carnal canvas. Joseph Kupfer (1983) understood that personal and social expressions cannot be seen as something separate from who we are as physical beings, but rather as a kind of aesthetic "ritual of the body" (113). Although I disagree with it being a "ritual," tattooing is a process of making visible the "inner self on the outer skin" (Wilton, 1991, p. 86), or, in other words, making the body analogous to a geographic space in which human narrative can be mapped. The body then becomes a geographic space that provides a sense of self to the tattooed body. Christopher Steiner understood this geographical body as "a map with marks of social and political terrain... prov[iding] a chart of the cultural anatomy which structures relations of status, hierarchy and power" (443). I hope to provide a nuanced new lens on the current forms of policing the Latino "gangster" body by providing four examples of what tattoos symbolize for youth: *carnalismo*, culture, identity, and remembrance.

Diego Vigil (1988) argues that the tattoo is a marker of loyalty to the barrios, the tattoo then becoming "an indelible imprint, a barrio imprimatur, locking a person in for what the group perceives life. Youth wear their tattoos with pride and gain a certain amount of status and adulation from onlookers" (p.114-15). It symbolizes a form of *carnalismo* (brotherhood). Figure 3 is a photograph I took of "Muñeco", a twenty-year old street life oriented youth from the Eastside, which reflects Vigil's notion of *carnalismo*. Two years prior to beginning my research, one of the young men who was nicknamed "Drowsy" had committed suicide, resulting in many of the young men etching "R.I.P Drowsy" on their forearms in solidarity, marking some type of brotherhood among one another. Although the form varies among the young men, all those who chose to commemorate their "homie" in such a

permanent visually way, did so on their forearms, making it clearly visible to any onlooker.



Figure 3 Muñeco, "Smiley"

Another example of carnalismo, shown in Figure 3¹⁴, is a smiley face with the letters “TRS” (Traviesos). When Muñeco was locked up in jail, his “cellie,” whose nickname was “Smiley,” was from the same neighborhood as Muñeco and the same age, but had had drastically different life trajectories. Muñeco was going to be released in a year but Smiley was looking at life in prison. They agreed to tattoo a smiley on each other’s neck to always remember one another. As Muñeco said, “I don’t want to accept it but I’ll never see him again.” The tattoo helped as reminder of another brother lost to the system, but Muñeco could at least carry his brother with him on his body forever in remembrance of who Smiley was despite being removed from his community.

Kim Hewitt (1997) analyses the different ways in which people use their bodies for self-expression that considers the

¹⁴ Figure 3 Muñeco, “Smiley” is a photograph I took.

significance of body modification and how different forms of body art and alteration serve individual and cultural needs. Those who engage in this type of body altering practices celebrate their physical presence in society via their “adornment” and self-transformation that Hewitt refers to as “an act of reclamation” (79). By making the choice to inscribe indelible marks that symbolize carnalismo, culture, remembrance, and identity onto their own bodies, the act of tattooing for these youth speaks to this unbreakable spirit of resilience and creative impulses that are manifested on their carnal canvas that Hewitt spoke about. It is a process of self-discovery as well as decolonizing of the body. For every time the needle touches the body’s flesh, a new story, a new documentation of their life experiences bleeds through.

Madame Chinchilla (1997) best comprehends the significance of tattoos as:

An exotic veil, embrac[ing] the mystique of the underworld. In being tattooed we connect ourselves to the ancient world, accompanied by these images breathing within our skins. Like a bizarre reference library, we are Keepers of the Images. We carry an archive of images and symbols ...representing life, death and all that throbs with a vibrant force (sect. 3).

I would not go as far as to say that the tattoo is an “exotic” veil. However, there is something powerful about how ink bleeds into the human flesh --the way in which ink transforms the way we look at ourselves and how others perceive us. Having ink on their body forevermore recognizes youth in my study, as Chinchilla would refer to as “art with a pulse.” However, that is not the way these young Latino males are perceived as by police.

Being a racialized body is nothing new. Laura Perez (2002) demonstrates how Western culture has consistently racialized bodies of color, consciously viewing paintings of the body, tattooing, and scarification “as markers of the culturally and

historically primitive” (49). Perez contends that tattooing and other forms of body decoration “continues to function not only to interrupt normative, middle-class discourses, as they have throughout their modern history usage in the United States and Europe, but also disrupt Eurocentric discourses of aesthetic, moral, and cultural superiority” (49). I argue that these culturally hybrid choices of tattooing the body reflect youth’s active form of resistance against erasure of Latino culture. As Perez (2002) also points out, the widespread fashion of tattoos among the wealthy, white, and or celebrity body is acceptable, but this is not true for bodies that are already devalued, registering different meanings for those who read the bodies that pertain to people of color and inked bodies. It is within these multifaceted parameters that Latino “gang-associated” youth are doubly marked and easily perceived as criminal. I find it interesting how in creating and negotiating their identity, police constantly targets the young men in my study because their tattoo aesthetics do not conform to mainstream Eurocentric canon’s of what is normative and or socially/culturally acceptable. The truth of the matter is that these tattoos serve a purpose; carnalismo, culture, identity, and remembrance are woven into a complex narrative preserving and helping birth “professional gangsters.” I use the term “professional gangsters” in the sense that Latino youth have to be *trucha* (on their toes) about how they customize their bodies, without complying to appease people’s fears of their aesthetics.

Lil Scrappy explains what his sugar skull tattoo symbolizes for him:

Well I got it because when you see it you automatically think of death and I feel like I carry death closer to me than most ppl [people] but she's also beautiful I live a beautiful and happy life even with all the risks involved also it looks kool! Lol [laugh out loud].

This helped me understand how tattoos have a deeper meaning to these youth than what most people, especially police or authority figures, could ever imagine. This youngster understands the implications of the choices he makes in terms of being in the street life and inking his body. The tattoo does not always have to have a “deep” meaning, as Scrappy indicates in his statement. An individual’s choice to tattoo certain images can be simply because he appreciates tattoos as art. However, it also does speak to the living conditions he has to navigate on a daily basis, the tattoo reflecting a part of his life experiences in the street life.

Conclusion

“The philosophers have only interpreted the world, in various ways; the point is to change it.”

-Karl Marx

Despite the ubiquity of the racialization and criminalization of young Latino males, what has been neglected in the literature is the racialized construction and class of young Latino “gang associated” youth, and how it connects youth to a prison pipeline. I observed firsthand how youth’s *tatuajes* are not simply a decoration; they are a structure, discipline, affirmation, and love for their hood, family, and peers. The reason why youth, despite hostile policing apparatus’ continue to mark their bodies is because it is a form of cultural pride, dignity, remembrance, and acknowledgment of what walks of life they have treaded on and what direction they wish to go.

The young men that I have bonded with do not represent all young people who use street life identity but their experiences can hopefully help to dismantle any notions that to be a member of a street “gang” is to be predatory or that older “gang” members pressure young people to be jumped in order to flaunt street tribe identity. Rather, older members serve as mentors to help those in the same life trajectory negotiate street tribe identity – I call this cross cohort socialization (Herding, 2010). Cross cohort socialization is the process in which an older “gang” member recognizes and affirms the struggle of a young up and coming “gang” member and helps them negotiate and navigate their street life identity.

From what I heard and observed through their stories, tattoos are used as a validation of gang membership and criminality, but also symbolize an official marker of a rite of passage, marking a painful predestined life trajectory because tattoos are used as a validation of gang membership, criminality. I argue that without (re)claiming your body, there cannot be conscious existence. There is something courageous and beautiful about looking at the depths of the body’s soul to extract one’s own notions of self-identity, culture, brotherhood, and memories of life experiences and inking them on the flesh.

Appendix

Sample Questions:

How do you feel about the cops? Why?

Have you ever had a positive interaction with the police?

What are some negative encounters with the police?

How do you feel being labeled a gang member?

If people had to label you something, what would you like it to be?

What are some positive contributions that you have done for your community?

Do you consider yourself a gang member, if so why?

How old were you when you got your tattoo?
Who did your tattoo?
What does it mean to you?
Do you regret any of them?
Are any of them “gang” related?
How would you feel if someone forced you to take away your tattoos
and/or “gang,” related tattoos?
Why ink Santa Bruta?
How are tattoos important to you?
Are you getting more?
How do you feel people/police look at you with your tattoos?
What negative attention do tattoos get you?
Is there any any positive attention?

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Mathematics Performance of 9th-Graders on the 2009 High School Longitudinal Survey by Ethnic/Racial Subgroup and Gender

Rosalia Zarate

Professor Richard Duran
Department of Education

Abstract

The United States has made many technological advances; however, when compared to the rest of the world, the United States lags behind many nations in terms of the STEM educational achievement of our students. In particular, research shows that African-Americans and Hispanics are the lowest performing students while Asian-Americans and Whites are the highest. This trend is particularly evident in mathematics. Thus, in order to improve in mathematics we need to accurately estimate the magnitude of these gaps and identify ways to better prepare our students and thereby narrow the gaps.

This paper focuses on a statistical study of the significant difference between racial/ethnic groups on math achievement. I drew data from the High School Longitudinal Study of 2009 (HSLs) and used the Analysis of Variance test (ANOVA) to analyze the data. I also used the information provided on the ANOVA table to calculate other statistical tests such as Omega-squared and Tukey's Post-Hoc Test. Through these tests I concluded that there is a significant difference among students of different races/ethnicities and that there is no significant difference between genders or in the interaction of gender and race. I was also able to show that there is also a significant difference between ethnic and racial groups. Change needs to be made in our education system. Educators and researchers should continue to explore the factors that may contribute to this gap by looking closer at the HSLs and addressing those factors through further data analysis.

Introduction

The direction that students take in STEM (Science, Technology, Engineering and Mathematics) fields varies by race/ethnic subgroups. Past research shows that a math achievement gap exists among different ethnic subgroups. This led me to analyze the data from the High School Longitudinal Study of 2009 (HSLs) done by the National Center for Education Statistics (NCES) to see how these gaps are represented in the study. I thought this would be interesting since this is a recently started longitudinal study and is a first step towards allowing researchers to observe how important variables such as parental education and involvement, teacher preparedness and motivation, and economic status can be further analyzed to determine their influence on mathematics and science achievement. Examining these variables is particularly significant since it is known from previous research that additional variables beyond race and ethnicity are associated with mathematics and science achievement (LoGerfo, Christopher, Flanagan, 2011). New understanding is possible of what influences students in their choice to move towards or away from STEM fields. What can be done in both the academic community

and the students' community to make changes to motivate more students to consider STEM fields and narrow the mathematics achievement gap? It is important to look at the relationship among different variables to see what society can do to make sure all students have equal opportunity to excel in STEM fields. Looking at this relationship and applying changes would benefit our entire nation. Past research indicates that a mathematics achievement gap exists amongst students of different ethnicities. I was motivated to see if such gap exists in the High School Longitudinal Study by exploring a few of the variables in this data regarding race/ethnicity, and math scores from an exam that students were given during the study.

Literature Review

A mathematics gap persists among different ethnic/racial groups. This is evident in the study on "Achievement Gaps Between Hispanic and White Students" done by the National Assessment of Educational Progress (NAEP) in 2009, which states that by fourth grade the mathematics gap between Hispanic and White students was already statistically significant, with Hispanic students lagging behind White students (Hemphill & Vanneman, 2011). According to "Performance of 15-year-old Students in Science and Mathematics Literacy," a study by the National Center for Education Statistics on the Highlights from PISA 2006 (Program for International Student Assessment, sponsored by the Organization for Economic Cooperation and Development), the United States ranks poorly on mathematical literacy when compared to the rest of the world (Baldi, Jin, Skemer, Green, Herget, 2007). This study shows that Hispanics and African-Americans are below the national average, which has an impact on how the U.S. is ranked in world mathematical literacy. If the achievement gap in mathematics was to narrow by means of significant increase in the mathematics scores of Hispanics and African-Americans, our rank would increase, reflecting the

potential for STEM literacy in the country. STEM literate people are equipped with the knowledge and skills to join the 21st century workforce, and are better able to work with technical equipment in order to innovate and push the development of technology. Currently, however, the availability of individuals with STEM skill is low. Fortunately, that is something that can be changed. Since Hispanics are the largest growing minority in this country, it is important for them, as well as all other minority groups, to succeed in these areas.

An important first step in closing this gap is to change our perception about mathematics. According to the article “Closing the Gender Gap,” Jenny Jones, Associate Editor of the *Civil Engineering Magazine*, states that students have a different approach to academic challenges depending on whether the student has a “fixed mind-set” or “growth mind-set.” A challenging subject such as mathematics may discourage those with a “fixed mind-set” who believe they cannot improve or change their level of intelligence (Jones, 2010). However, Jones references a study conducted by Stanford University social and developmental psychologist Carol Dweck, (whose research focuses on the foundations of motivation) and her colleagues who decided to test the theory that students “...with a fixed mind-set are more likely to lose confidence when encountering a challenge because they believe they are simply ‘not good’ at a task and will never be good at it” and that those with a “... growth mind-set...believe in the power of effort, and when confronted with a challenge their confidence actually grows because they believe they are becoming smarter as a result” (Jones, 2010). Dr. Dweck and her colleagues performed numerous experiments to examine this theory. After several studies they concluded that intelligence can be altered and can be increased depending on how the student perceives themselves (Jones, 2010). For example, if the student believes in him/herself, the student can increase his/her intelligence by believing that working hard can make him/her more intelligent and accepting that failing and making mistakes is part of the process of

becoming intelligent (Jones, 2010). Thus a student can change from having a “fixed mind-set” to a “growth mind-set” depending on how the students is taught or trained.

Students need to have a “growth mind-set” in order to succeed in mathematics because they need to be able to move away from negative attitudes and believe they can increase their intelligence. According to Judith Rooney (1997), if students have negative attitudes towards mathematics, these attitudes often continue into adulthood. In her article, “Teaching Influence on Life-long Perception of Mathematics,” she analyzes how certain factors influence a person’s negative or positive perception. She examines how family support, school environment and teachers’ enthusiasm about mathematics exert a large influence on the students’ perception of mathematics (Rooney, 1997). If these students are in a less-than ideal learning environment, do not have the resources they need to succeed, lack self-confidence, continue to fail, and are surrounded by individuals disinterested in mathematics and unable to motivate them to do their best in math, the students’ negative attitudes towards math will persist. Therefore, if Hispanics and African-Americans are to succeed in mathematics, they need to be reassured that they are capable of succeeding. An environment that promotes and supports mathematics achievement is crucial in nurturing their self-realization.

It is known that, in general, the achievement gap among different ethnic/racial groups continues to exist, and that Hispanics and African-Americans continue to have lower reading and math scores in comparison to Asian-Americans and White students. According to the Policy Information Report, “Parsing the Achievement Gap II,” the gap begins at an early stage in schooling and continues into high school, thus impacting the student’s future and, in particular job choice, earnings potential, and academic achievement after high school (Barton & Coley, 2009). Although factors such as socio-economic status are thought to have an impact on students’ academic achievement it is critical to note that

this factor alone does not determine academic success (Barton & Coley, 2009). Other factors such as class size, curriculum rigor, teacher preparation and experience, technology accessibility, school safety, parent participation and level of education, and student's health and nutrition affect a student's learning environment and potential to succeed (Barton & Coley, 2009). However, based on the NAEP study, some of the most significant reasons for having what is considered "low" academic attainment are poor English skills and the responsibility of the student for their family (Hemphill, 2011). An important fact is many of these factors can be changed and this change could help address the issues faced in the mathematics scores of Hispanics and African-Americans, as well as in reading.

Methodology

I decided to investigate these issues by examining the initial results of the High School Longitudinal Study of 2009 (LoGerfo, 2011). HSLs is a longitudinal study done nationwide through the National Center for Education and Statistics that began in the fall of 2009, with the first follow up to this study completed in the spring of 2011 (Ingels et al., 2011). The study involves data from 20,781 9th grade students who were randomly selected from 944 schools, their parents, administrators, counselor, and math and science teachers (Ingels et al., 2011). Researchers collected data from public, private and charter schools from the entire nation. HSLs considered all students suitable for the survey, which means that this study also included students that are English-Language Learners and students with disabilities (LoGerfo, 2011). The data was intended to represent a cross section of the U.S. population.

The goal of HSLs is to examine ethnic/racial and gender differences in math achievement in the 9th grade as students enter the high school years and to analyze and address the issues that occur as high school students transition to the work force or into postsecondary education (Ingels et al., 2011). The ninth-graders that participated in this study were asked questions designed to

reveal their experiences, expectations, future plans, and attitudes (LoGerfo, 2011). Giving the survey to parents, counselors, and teachers provided further insight into what may be affecting the students' decisions about the courses they decide to take, and their future plans. School administrators, teachers, and counselors were asked questions about the school environment, resource accessibility, their expectations for their students, how they felt about how the students were being challenged, and the school's success (LoGerfo, 2011). They were also asked about demographics and their professional experience and history. Parents were asked to answer questions about their expectations and aspirations for their child as well as questions that focused on their role in their child's life with respect to what they have done to prepare their child for the future, particularly for college (LoGerfo, 2011).

By gathering all of this data, researchers will be able to explore the connections between the student's home, academic success, interests, and other factors around the school that may be affecting student choices and achievement. The results will also give researchers and policymakers the opportunity to look more closely at minority and at-risk students and how certain factors relate to and impact the educational levels they attain. Researchers and policy makers will also be able to look at the resources that are made available to students and how such resources affect the students in the long run, for instance in the job force (Ingels et al., 2011). In addition, since this survey primarily concentrates on 9th grade students, and because it is a longitudinal study, it will allow researchers to more easily pinpoint potential high school dropouts and possibly use the data to uncover trends or similarities among these students and use this knowledge to see where changes can be made in our education system for the betterment of our students (Ingels et al., 2011).

There is a specific focus on mathematics and science (but is not exclusive to these areas), which centers on problem solving and algebra skills and how well such courses prepare students for

post-secondary education (LoGerfo, 2011). Through the different assessments of the various groups of people, the HSLs data will give researchers, policymakers and educators the opportunity to more closely assess the important issues students face in STEM fields. For example, researchers can gain insight into students' motivation, achievement, determination to continue taking STEM courses and/or interest in pursuing a career in a STEM field (Ingels et al., 2011). HSLs brings together all of the factors that contribute to students' decisions, from their parents to their teachers to the resources in their school.

The overall study discusses three major issues: math education, science education, and the changing environment in high school and postsecondary education. This paper will be focused on mathematics and education in particular. As most are aware, there is a push for increasing, motivating and retaining students in STEM fields; however, there has not been a significant amount of research conducted on secondary education and the factors that may impact a student's choice to select a major in STEM.

The HSLs survey aimed to gather data to examine how 9th grade students are guided into their initial mathematics and science courses and the type of access they have to resources to help them succeed in these courses (LeGarfo, 2011). These factors were found to affect their future course selection, which in turn affects career choice (LeGarfo, 2011). A student's academic process, from the resources that are available to them, to their course selection and motivation play a role in a student's life when it comes to deciding whether or not to pursue a major in STEM. By analyzing the students' transcripts and the counselors' questionnaires, researchers can examine the courses that students take and the relation that exists between certain course routes and a student's choice in pursuing a STEM field. Also, the HSLs survey utilizes surveys from counselors and parents to determine their level of involvement with the students' coursework. By analyzing how

parents and/or counselors contribute to the students' decisions, researchers may be able to develop a greater understanding and awareness of what factors impact student enrollment in their initial mathematics courses. Researchers can also examine how certain external factors such as parents, counselors and teachers, contribute to as well as their school environment and course enrollment influence a student's high school and future coursework and major selection (LeGarfo, 2011). The study would also give researchers the ability to examine the STEM pipeline.

Description of Math Assessment

The mathematics assessment in the HSLS survey is administered electronically through a computer resulting in fewer mistakes when scoring the assessment. Also, since the data is processed through the Internet, it is more accessible, easier to use and easier for researchers to analyze. Computerization also helps to ensure that all questions are answered because the structure/architecture of the survey does not allow the student to skip questions. It also becomes easier to track students over time and safely store the data collected (LeGarfo, 2011).

In order to complete the assessment the students had to take a two-stage design test. The assessment was presented in stages, with the first stage being a 15-item router test. Next depending on how the student performed in Stage 1, the student was either "...routed to a low, moderate, or high Stage 2 test, each consisting of 25 items" (LeGarfo, 2011). Thus, although

"...the item pool consisted of 72 items, students were only aware that they were taking a 40-item test. For linking purposes, 12 items were common to both the high and moderate Stage 2 tests and 5 items were common to both the low and moderate Stage 2 tests" (LeGarfo, 2011).

The assessment consisted of questions regarding algebraic expressions, multiplicative and proportional thinking, algebraic equivalents, systems of equations and linear functions which involved slopes of lines and line intercepts (Ingels et al., 2011).

Methods

I drew data from the public files of NCES (National Center for Education and Statistics), specifically HSLS for the survey, and used the Analysis of Variance test to analyze the research questions. I did a two-way ANOVA on SPSS (Analysis of Variance) in order to analyze the data using two independent variables and one dependent variable. The first independent variable was race/ethnic groups for which I selected African-American, Asian, Hispanic and White non-Hispanic subgroups. I selected the second independent variable, gender (female/male), as the fixed effect meaning that the variable is non-random. The dependent variable was students' Math scores. My null hypotheses, which are defined as hypotheses where there is no significant difference between particular populations, were that there was no difference in average math scores among ethnic/racial subgroups, no difference in average math scores among females/males, and no interaction effects among the two independent variables. The alternative hypotheses, which are defined as the hypotheses that state that the null hypothesis is false, were that there would be a significant difference in mean math scores for those three model effects. I was interested in finding out if there is a difference or a trend in student's math scores depending on their ethnicity/race and gender.

A two-way ANOVA is an extension of the one-way ANOVA. With a two-way ANOVA I am able to compare the mean differences that exist among the groups, which have been divided into two independent categorical variables (race/ethnicity and gender) and a continuous, dependent variable which is the math

score (Montgomery, 2009). The two-way ANOVA can make the testing more efficient by taking more information into account (Montgomery, 2009). I performed this test by using 824 as my sample size in order to have equal sample sizes for all subgroups. Therefore, 824 individuals were randomly selected to represent each ethnicity/race and gender subgroups.

Results

Table 1 shows the results of running the two-way ANOVA test on SPSS (“Tests of between Subjects Effects”). First, I checked if there is a significant interaction in which the independent variables are considered dependent on one another. I also looked at the combination between a student’s race/ethnicity and gender; there was a significance level for the interaction between gender and race is 0.727 which is also above the 0.05 significance level. Therefore, the variables gender and race are independent. Next, I examined the effects of ethnic/racial subgroups on mathematics achievement. As shown in **Table 1**, one can see that the calculated statistical significance probability values for the race/ ethnicity factor is 0.000 which is less than the 0.05 threshold which leads us to reject the null hypothesis. Therefore it can be concluded that the race/ethnicity does affect the student’s outcomes and test scores. However, gender is not significant since it has a significance value of 0.665 which is greater than the threshold. Neither gender nor the combination of gender and race/ethnicity affect the student’s math test score. These results, however, do not make claims about the population, but about our sample that was randomly selected for our subgroups.

Table 1 *Tests of Between-Subjects Effects*
Dependent Variable: Math Score Mathematics standardized theta score

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	130812.685 ^a	7	18687.526	196.924	.000
Intercept	17257981.153	1	17257981.153	181859.540	.000
Gender	17.821	1	17.821	.188	.665
Race	130670.751	3	43556.917	458.990	.000
Gender * Race	124.113	3	41.371	.436	.727
Error	624803.891	6584	94.897		

Total	18013597.729	6592			
Corrected	755616.576	6591			
Total					

a. R Squared = .173 (Adjusted R Squared = .172)

I also calculated Omega-squared, which is shown on **Table 2**, which represents the measure of the degree of association between the fixed effect and dependent variable (Becker, 1999). Such a measure of effect size helps us understand the magnitude of an effect on a dependent variable; in our case, particularly, between our fixed effects, gender and race, and dependent variable, the math score. Omega squared is an estimate of the degree of association in the population given. Thus Gender, and Gender*Race do not have an association with the math score given that $\omega^2 = 0$ but Race has a 0.03 degree of association, from a scale of 0 to 1.

Table 2 Omega Squared

Effect	<u>SS_effect</u>	<u>df_effect</u>	<u>MS_error</u>	SS_total (Correlated)	<u>SS_effect-(df_effect)(MS_error)</u> ----- <u>MS_error+SS_total</u>	ω^2
Gender	17.821	1	94.897	755616.576	-77.076/755711.473	0
Race	130670.751	3	94.897	755616.576	130386.06/755 711.473	0.0 3
Gender*Race	124.113	3	94.897	755616.576	-160.578/755 711.473	0

Discussion

As can be seen in the results, which can be better understood by examining means in **Table 3**, the mean math scores of Asian-Americans and White-Americans are greater than those of African-Americans and Hispanics. There is a significant mathematics achievement gap between Asian-American, White, African-American, and Hispanic. Interestingly, there was no noticeable gap between male/female within each race/ethnicity group. Each group of male/female averaged about the same score within their own race/ethnic group. Therefore, if there is no significant gender gap among race/ethnicities, the question then arises does this gender gap increase after 9th grade to a significant degree? If there is not a significant difference at the 9th grade level, then why are there still fewer females in STEM fields in general? Even if there are a smaller number of Hispanic and African-Americans than Whites and Asian-Americans in STEM, there should not be more Hispanic Men and/or White men than Hispanic women or White women assuming that gender does not play a role in Math achievement gap as shown in my statistical analysis. The bar chart in **Figure 1** provides a better visual of what is stated in **Table 3**. One can see just how close the average math scores were between females and males within their own race. Females and males appear to have similar abilities within their race/ethnicity. This leads me to question why and at what point do women decide not to pursue careers in STEM when they are obviously capable of functioning well in math.

Table 3 *Table of mean and standard deviation math scores by race/ethnicity and gender*

	African-American/ Black, non-Hispanic	Asian, non-Hispanic	Hispanic, no race specified or Hispanic, race specified	White, non-Hispanic
Female	Mean: 46.67 S.D.: 8.97	57.92 10.41	48.28 9.28	52 9.16
Male	46.14 9.46	58.14 10.86	48.15 9.70	52.02 9.94
Total	46.40 9.22	58.04 10.63	48.21 9.49	52.01 9.56

Student's Race/Ethnicity vs Math Test Score

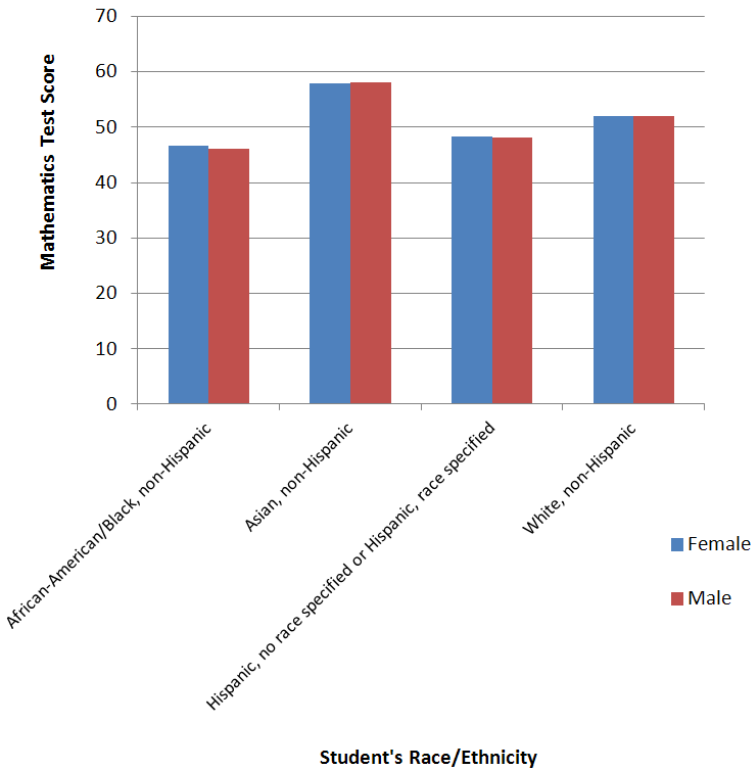


Figure 1 *Bar Chart of the student's race/ethnicity and average test scores*

With respect to the difference in averages math scores among race/ethnicities, an important question is how does this difference develop and does it present at an even earlier stage. Through the NAEP study I was able to see that a mathematics achievement gap existed since the fourth grade. So the question arises of whether this gap developed since the fourth grade or at an earlier stage? Overall, one can see there is an achievement gap,

specifically in mathematics. Now more than ever we, as a community, need to focus on trying to narrow this gap, given our growth and dependency on technology. Our community needs all people to have equal access, motivation, and opportunity to go into and succeed in a STEM field. The HSLs survey was completed in 2009, showing this continues to be a problem today, a time when many of us assume this gap to have decreased. The United States has made great technological advances, but is failing to prepare students to take on such jobs in the future; change is necessary.

In addition, on **Table 5**, I also show another statistical testing method called *Tukey’s Post-Hoc Test* that supports the fact that there is a mathematical achievement gap between all ethnicities. The *Tukey’s Post-Hoc Test* is intended to make pairwise comparisons, meaning that we are able to compare different entities in pairs to determine which entity is the best choice. Through this statistical method I was able to compare the pairs of means to see if there are significant differences between the pairs of means in the study. In other words, I was able to determine how far apart any two means have to be so that they are considered significantly different.

Table 5 *Tukey’s Post-Hoc Test*

	African-American/Black, non-Hispanic	Asian, non-Hispanic	Hispanic, no race specified or Hispanic, race specified	White, non-Hispanic
Total	$\bar{\bar{X}}_1=46.40$	$\bar{\bar{X}}_2=58.04$	$\bar{\bar{X}}_3=48.21$	$\bar{\bar{X}}_4=52.01$

$$T_{\alpha}=q_{\alpha}(p,f)\sqrt{(MS_E/n)}$$

$$T_{\alpha}=q_{0.05}(4,6584)\sqrt{(MS_E/n)}$$

$$T_{\alpha}=3.63\sqrt{(94.897/824)}=1.23188$$

To solve this formula, I let $\alpha=0.05$ (the significance level), p = number of treatment means and q = the studentized range statistic. The variable q was calculated using a “Percentage Points of the Studentized Range Statistic Table,” from Design and Analysis of Experiments (Montgomery, 2009). The variable n represents the sample size; thus in this case, $n=824$ and by **Figure 1** I know that the degrees of freedom associated with the Mean Squared Error (MS_E) is $f = 6584$ and the $MS_E = 94.897$.

Therefore, for any pairs of treatment means that are different in absolute value by more than 1.23188, it would mean that the resultant difference between a pair of populations means was significantly different from zero. I used the means shown in **Table 3**, above. The differences in means were as follows:

$$1-2 = 46.40 - 58.04 = -11.64^*$$

$$1-3 = 46.40 - 48.21 = -1.81^*$$

$$1-4 = 46.40 - 52.01 = -5.61^*$$

$$2-3 = 58.04 - 48.21 = 9.83^*$$

$$2-4 = 58.04 - 52.01 = 6.03^*$$

$$3-4 = 48.21 - 52.01 = -3.8^*$$

Note that in the Post-Hoc Test I am only looking at the absolute difference; therefore the negative signs can be ignored.

The starred values represent the difference between pairs of means that are significantly different from zero. Thus it can be seen that each pair of means is in fact significantly different and is therefore an issue that we need to pay attention to when analyzing the mathematical gap between each ethnicity/race. Whether between White and Hispanic or Asian and White, each gap is

statistically significant. The calculations indicate that Asian and White Americans (which are represented by μ_2 and μ_4) have a difference in means of 6.03, which is the third largest difference. This shows that even our top scoring students, White and Asian-American, have a significant difference in means; they are not performing at the same level and thus White Americans can also improve their scores to reach that of Asian-Americans.

The largest gap is between African-American and Asian-American students (μ_1 and μ_2 respectively) with a difference in means of 11.64. The second largest difference in means is 9.83, which is between Asian-American and Hispanic students (μ_2 and μ_3 respectively). There is a difference in means between each subgroup but the greatest is between Asians, our higher performing students, and African-American and Hispanic students, our two lower performing subgroups.

Future Work

In the future, I would like to continue to look at other variables in this High School Longitudinal Study, such as similarities or differences amongst students with respect to the type of motivation they get from their parents/teachers/counselors and the factors that influence the choices they make through their educational path. Related to students' motivation would be variations amongst parents in regards to the relationship they have with their child, their involvement in their academics and how they encourage their child. Ideally, I would also examine responses of counselors and teachers in order to have an overall view of the factors that may be contributing to the gap in mathematics scores among race/ethnicities or if there are any patterns in their responses that contribute to students lack of preparation, motivation, and/or interest in this field. Also valuable would be an examination of the type of schools the students surveyed are attending, what resources are available to them, and if there are any similarities or differences between those schools where students attained a low score in mathematics and those that

achieved a higher score. As the study continues to track these students, I would also like to investigate the factors which influenced the students to select their high school courses, and how, in turn, those choices influenced them to pursue a particular college degree and future career. There may be similar responses from students that decided to pursue a STEM field or from those that did not. The High School Longitudinal Study can ultimately help me get closer to uncovering some of the factors that contribute to students' motivation and interest in STEM fields. By looking into recent research and examining the responses, researchers have the opportunity to analyze the data and reach conclusions that can help all students have the opportunity to be successful in mathematics or any STEM field, which will only benefit our nation.

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Using mRNA Display to Select for Inhibitors of BMP Signaling

Mayra Pérez

Mentors:
Mentors: Dr. H. Tom Soh and Jackelyn Alva
Departments of Mechanical Engineering & Materials

Abstract

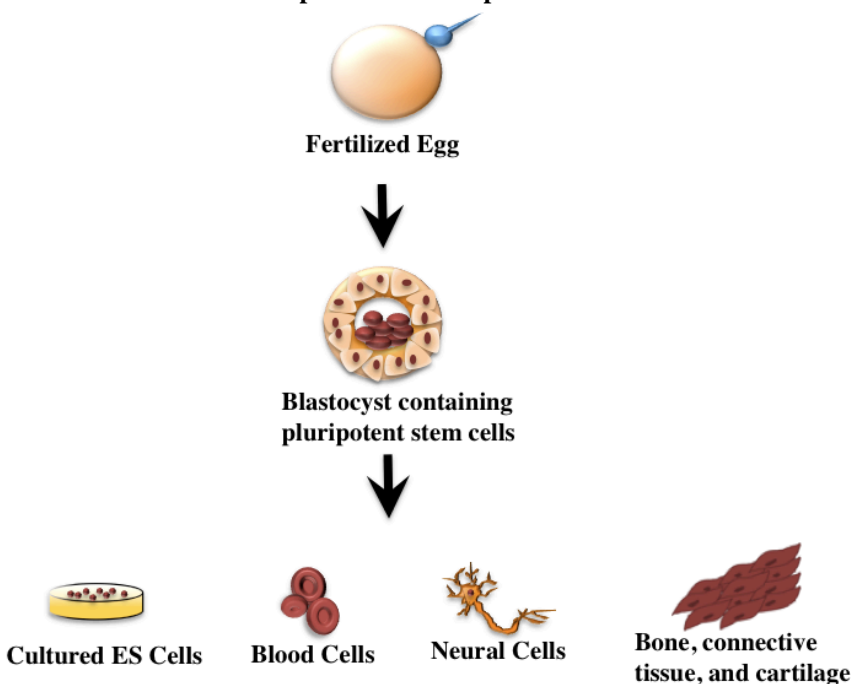
Human embryonic stem cells (hESC) are derived from the early embryo and can differentiate into the three embryonic germ layers, making them potential cell sources for regenerative medicine. Prior to the use of hESCs in patients, it is essential to understand fully the signaling pathways that maintain pluripotency and direct differentiation pathways. The bone morphogenetic protein (BMP) family of signaling molecules controls multiple biological responses during early development. Recent work has demonstrated that depending on culture conditions, BMP signaling induces the differentiation of hESCs into trophectoderm or extraembryonic tissue, and in some cases, mesendoderm, presumptive mesoderm and endoderm. However, the molecular mechanism by which BMP signaling specifies the mesendoderm or trophectoderm remains unknown. Using a fibronectin based protein mRNA display library, our goals are to identify novel affinity reagents targeting the BMP receptor with high affinity and specificity. These reagents will be used to further explore the role of BMP signaling in hESC biology.

Introduction

Human embryonic stem cells (hESCs) are isolated from the inner cell mass of the blastocyst as seen in **Figure 1**. HESCs are pluripotent, which means that they have the potential to differentiate into any of the three germ layers (ectoderm, endoderm

and mesoderm). Since stem cells can be artificially grown and differentiated into specialized cell types and tissues, they can be used in regenerative medicine (Zhang 2005). As of today, bone marrow transplantations are the only widely recognized and accepted use of stem cells in patients. Understanding the molecular mechanisms that control hESCs growth and differentiation will facilitate the development of additional cell replacement therapies.

Figure 1. Derivation of pluripotent human embryonic stem cells. Human embryonic stem cells can differentiate into any of the three embryonic germ layers: endoderm, mesoderm and ectoderm. These germ layers then give rise to the blood cells, nervous system cells, and connective tissue, bone and cartilage. Understanding these differentiation pathways can lead to advances in cell replacement therapies.



There are numerous signaling pathways that have a role in hESC growth and differentiation. We are interested in studying the role of the bone morphogenetic protein (BMP) signaling pathway in hESC differentiation. BMPs transmit their signals through kinase receptors that control a wide variety of biological responses

during early embryonic development. BMP signaling has been shown to play a role in the differentiation of stem cells into trophectoderm and mesoderm lineages (Ren-He 2002). Activation of BMP receptors sends signals from the plasma membrane to the nucleus via SMAD signaling molecules (Yu 2011). The SMAD proteins then interact with target promoters to activate genes that are important for differentiation. Our goals are to use mRNA display as a selection tool to identify novel inhibitors to BMP signaling. These inhibitors will be used to elucidate the role of BMP in hESC growth and differentiation.

In order to generate inhibitors to the bone morphogenetic protein (BMP) receptor, we use mRNA display of human fibronectin. The 10th fibronectin type III (10Fn3) scaffold is used during the mRNA display-based in vitro selection. 10Fn3 is easily expressed in bacteria, stable at room temperature, and it is fully functional in mammalian cells, which makes it an ideal scaffold to use (Hsiang-I 2009). The Fibronectin scaffold has two variable regions, the BC and FG loops. These regions generate a diverse library consisting of 10¹³ distinct molecules. The mRNA display consists of multiple rounds of selections in order to find binders to a bone morphogenetic protein (BMP) receptor. Once binders are identified, we can test for their ability to inhibit signaling, and use them for subsequent studies (Yu 2011).

Methods

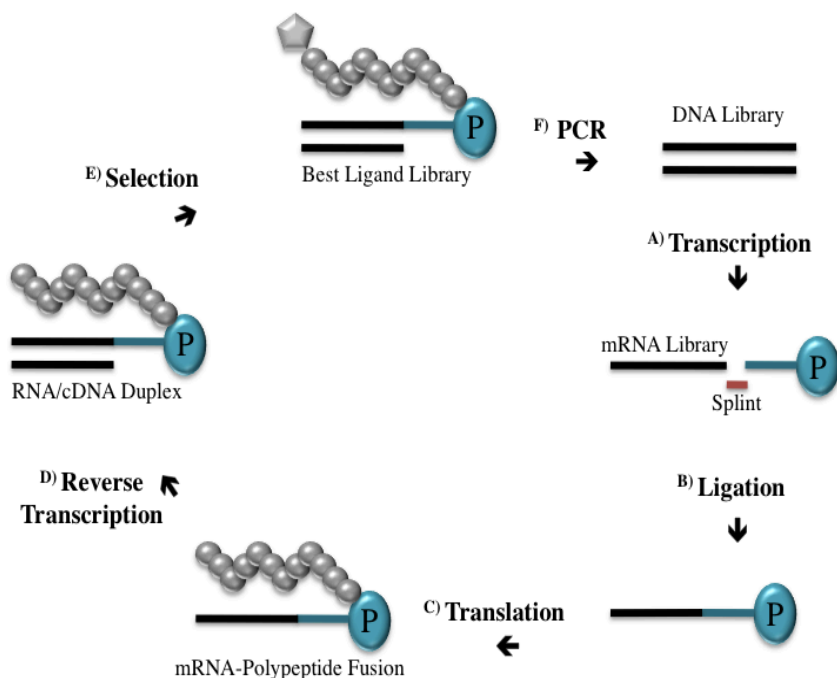
mRNA-Fibronectin-3 fusion synthesis

The mRNA library was constructed as previously published

(C. Olson 2008). For round one, we performed a large scale PCR in a volume of 1 ml to amplify 1×10^{12} different molecules using the following primers: FnOligo11 (5'- GGA GCC GCT ACC CTT ATC GTC GTC ATC CTT GTA ATC GGA TCC GGTGCG GTA GTT GAT GGA GAT CG) and FnOligo1C25K TTC TAA TAC GAC TCA CTA TAG GGA CAA TTA CTA TTT ACA ATT ACA ATG CTC GAG GTC AAG G (See schematic in **Scheme 1**). The PCR product size of 375 basepairs (bp) was verified using a 2% agarose gel. The PCR reaction was diluted with water and then the DNA was purified from the PCR mixture using a phenol/chloroform solution (pH 8). Equal amounts of phenol/chloroform were added to the diluted PCR reaction and centrifuged at 16,000 g. The top aqueous layer containing the DNA was collected and DNA precipitation was performed by adding .10x the volume of 3M sodium acetate (pH 5.2) and 2.5x the volume of 100% ETOH. After a 20-minute incubation at -80°C, the precipitate was centrifuged at 16,000g for 15 minutes. The DNA pellet was washed with 70% ethanol, vacuumed dried and dissolved in 10 mM Tris. The DNA library was transcribed into RNA using T7 RNA polymerase in a volume of 1 ml for two hours at 37°C. To dissolve the phosphates after transcription, .5M EDTA was added, followed by a phenol/chloroform extraction and ethanol precipitation. The RNA was desalted using a Princeton centri-sep prepared desalting column. The RNA was then linked to a puromycin molecule using 12 nmol of pF30P linker (5'-phospho- (A) 20-(spacer9) 3-ACC-puromycin), 11 nmol of a splint oligonucleotide (5'- TTT TTT TTT TTT GGA GCC GCT ACC) and T4 DNA ligase (New England Biolabs, Ipswich, MA) in a 1 ml reaction volume. The ligated library was gel purified using a 4.5% UREA PAGE gel and extracted by electro-elution and ethanol precipitation.

Scheme 1. mRNA display steps for Fn3 fusion library synthesis. A) After PCR amplification of the Fn3 library, transcription is performed to generate mRNA. B) After transcription, a splint oligo is used to ligate the mRNA to puromycin. C) Translation is carried out to make an mRNA-polypeptide fusion. Puromycin links the peptide

and mRNA together. D) Reverse transcription is performed to generate cDNA. E) The Fn3 fusion library is then incubated with target-conjugated beads to select for potential binders. F) These binders are then PCR amplified and the steps are repeated again to enrich the pool.



To generate the fibronectin peptides, the ligated RNA library was translated using a rabbit reticulocyte lysate (Ambion, Austin, TX) in a 1 ml reaction volume for 1 hour at 30°C. Peptide-RNA fusions were generated by the addition of 500mM KCl and 60 mM MgCl₂ for 30 minutes at room temperature. To isolate the mRNA-peptide fusions, we added 25 mg of oligo dT cellulose after translation in 10 mls of 100 mM Tris (pH 8), 1 M NaCl, and 0.1% Triton X-100 for 1 hour at room temperature. After washing, the eluted mRNA was reverse transcribed to generate cDNA in a 1

ml reaction using reverse transcriptase (Invitrogen). The cDNA served as a template for PCR after the selection was complete. In subsequent rounds of selection, reactions were scaled down as follows: 400µl PCR, 200µl transcription reactions, 200µl splint ligation, 100µl translation volume (40 pmol), fusion purification with 2 mg oligo-dT cellulose and 100µl reverse transcription. All selection rounds following round one included a flag pre-selection by purifying with M2 anti-FLAG agarose beads (Sigma-Aldrich, St. Louis, MO) in TBS plus 0.02% Tween-20. We then eluted by incubating with buffer plus 3XFLAG peptide (0.2 mg/ml).

Magnetic bead preparation for BMPR (Olson 2011)

Neutravidin-coupled epoxy beads M270 Dynabeads from Invitrogen (Carlsbad, CA) were washed according to the manufacturer's instructions. 1mg/ml of neutravidin (Pierce/Thermo Fisher Scientific, Rockford, IL) was incubated in 100 mM sodium phosphate buffer with 1 M ammonium sulfate with 10^9 Dynabeads for 48 hours at room temperature and blocked with TBS. The bone morphogenetic protein receptor (BMPR, R&D Systems) was then conjugated with sulfo-NHS-LC-biotin (Pierce) according to the manufacturer's instructions. 50 µM of BMPR and 250-µM sulfo-NHS-LC-biotin in PBS were incubated for 30 minutes at room temperature. For round 1 of selection, 5 µg of BMPR were immobilized onto 5×10^6 neutravidin-conjugated Dynabeads. For the following rounds, 1 µg of BMPR was immobilized onto 1×10^6 neutravidin-conjugated beads. Extensive washing and blocking with biotin followed each conjugation.

BMPR selection and washing

After the generation of the mRNA-peptide fusion library, selection was performed by incubating the library with BMPR conjugated Dynabeads in selection buffer (TBS, 1 mg/ml BSA, 0.1

mg/ml yeast tRNA and 0.05% tween-20) for 1 hour at room temperature. The beads were then washed using continuous flow magnetic separation (CFMS). To generate the CFMS, we fixed three 0.25" x 0.25" x 0.5" NdFeB magnets (B448, K & J Magnetics, Inc., Jamison, PA) to approximately 10 cm of PFA tubing (0.0625" outer diameter, 0.04" inner diameter). A syringe pump (SP1000, Next Advance, Averill Park, NY) was attached to the PFA tubing. This was used to withdraw the bead slurry and washing buffer mixture at a flow rate of 30 milliliters per hour. After washing, potential binders were PCR amplified as described above in a volume of 400 µl until approximately 4 µg of product was generated. We performed a total of 7 rounds of selection.

Binding assessment using ³⁵S-Met translation

To assess binding of round 1 and round 7 pools to the BMPR target, .4 µM RNA from each round was translated using the retic lysate system and the radioactive amino acid, ³⁵-S-Methionine (PerkinElmer) in a 50µl reaction volume for one hour at 30°C. The radiolabeled peptides were then Flag isolated as described above and incubated with BMPR –conjugated beads or control beads for 1 hour at room temperature. After incubation, all washes and elutions were counted using a scintillation counter.

Binding assessment using fluorescent antibody

Another way we assessed binding of the pools to the BMPR target was by Fluorescence-activated cell sorting (FACS) analysis. This type of flow cytometry works by passing the fluorescently labeled library suspended in PBS through the electronic detection piece. The FACS machine then counts the amount of fluorescence in the sample and displays the data using Accuri software. The antibody recognizes a FLAG epitope that every binder has at the C-terminus. We use this Flag tag to pull out all the full-length binders during the selection.

Results

As mentioned above, seven rounds of selection were carried out during the 10-week period. We used PCR to amplify the cDNA that was bound to the BMP receptor after each round of selection. As we continued the rounds, we saw a decrease in the number of cycles needed to properly amplify the DNA. **Table 1** shows a decrease in the number of cycles needed to amplify the cDNA as we proceeded with more rounds, which suggests that with each round of selection, there was an enrichment of Fn3 binders. **Table 1** also illustrates the cycle number dropping from 24 in round 1 to 13 in round 7. The evaluation of cycle number after each round of selection was one method we used to monitor the enrichment of binders to the BMP receptor. The decrease in cycles as we performed more rounds meant that there was already cDNA bound to our target, which suggests that it would take fewer cycles to amplify the library bound to target.

Table 1. Polymerase chain reaction (PCR) cycles in each round of selection. The number of rounds of selection performed and their respective cycles of PCR. The decreasing amount of cycles with every round is indicative of pool enrichment.

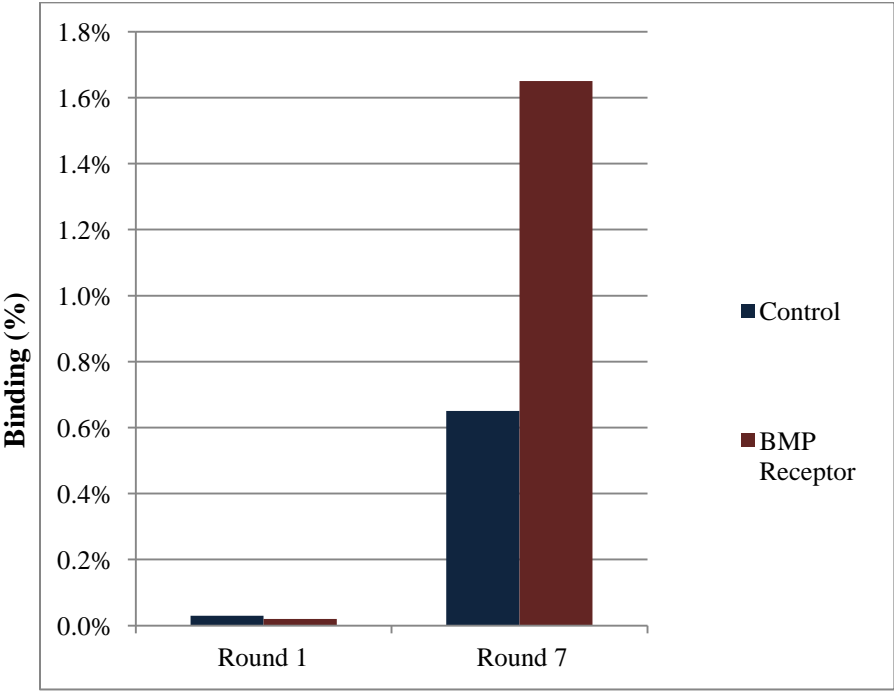
Number of PCR Cycles	
Selection Number	Number of PCR Cycles
Round 1	24
Round 3	22
Round 4	18
Round 5	14
Round 6	15
Round 7	13

To more quantitatively monitor binding enrichment, we performed a binding assay using ^{35}S -Methionine labeled pools and determined binding efficiencies by scintillation counting. **Figure 2** shows a modest target-specific enrichment after 7 rounds of selection, with a 2.6-fold increase in percent binding over non-target control beads. We also see that there is a 50-fold increase in binding of pool 7 to target compared to binding of pool 1 to target. In addition, the round 7 pool also binds to non-target control beads (about 12-fold compared to binding of round 1 to non-target control), which suggests that we should continue doing negative selections as we continue further rounds. The negative selections will allow us to eliminate nonspecific binders that are also being

amplified in the PCR.

Figure 2. ^{35}S -Met radioactive binding assay. Binding of round 1 and round 7 to BMPR-conjugated beads or control beads after 7 rounds of selection.

Binding Assessment using ^{35}S -Met Translation

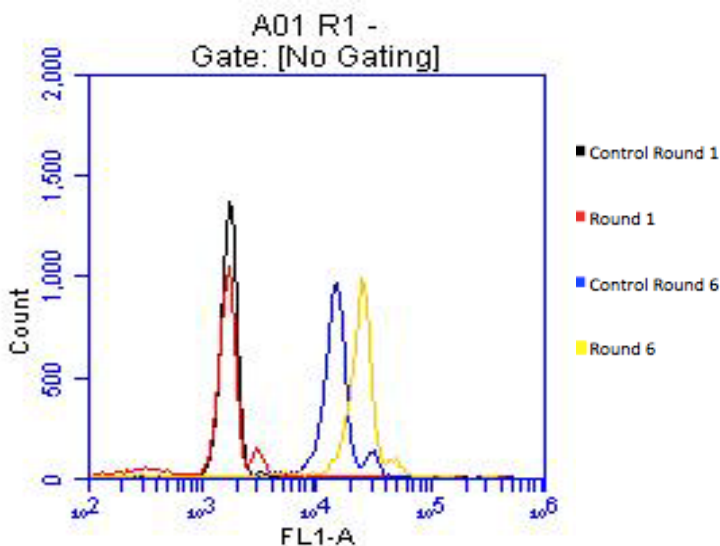


In addition to the radioactive binding assay, FACS analysis was performed to monitor the progress of the selection. We incubated pools 1 and 6 with target or control beads, and then used an anti-FLAG antibody to label the binders. In **Figure 3**, the FACS plot shows a shift to the right in the fluorescence intensity of round 6 binders compared to the non-target control. The FACS data

confirms the modest enrichment found in the round 7 pool using the ^{35}S -Methionine binding assay.

Figure 3. FACS analysis was performed to monitor the progress of selection. Pools from round 1 (black and red) and round 6 (blue and yellow) were incubated with BMPR conjugated beads and then anti-FLAG antibody was used to label the binders. An increase in fluorescence from round 1 to round 6 was observed.

FACS Analysis of Round 1 and Round 6



Increasing Fluorescence →

Conclusion/Future Research

mRNA display was efficiently used to select for binders to the BMP receptor. Further rounds will be performed to identify binders with the highest binding affinity, which will then be tested

for inhibition of BMP signaling. The pool at round 7 still contains a lot of diversity as shown in the binding to the control in **Figure 2**. The ^{35}S -Methionine radioactive binding assay as well as the fluorescent binding assay will allow us to confirm when we have the best possible binders after additional rounds. Once the best binders are identified, we will clone the pool of binders and analyze their specificity and affinity. As soon as binders with high specificity and affinity are identified, we will then test for their ability to inhibit BMP signaling. These novel tools will allow us to further explore the role of BMP in hESC growth and differentiation. Ultimately, by better understanding cell differentiation and pluripotency we can then be able to use stem cells for regenerative medicine.

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Filling in the Leaks along the Latino/a Educational Pipeline: Improving College Enrollment among Latino/a Students through Student-Initiated Outreach Program

Marlon Fernandez Castro

Dr. Richard Duran
Department of Education

Abstract

Latinos and Latinas are currently the most underrepresented ethnic groups in postsecondary education. For every 100 Latino and Latina elementary school students, only 56 will go on to graduate from high school and only 10 from college (Covarrubias, 2011). These substantial leaks along the Latino/a educational pipeline are particularly noteworthy when considering that Latinos and Latinas are the largest and fastest growing ethnic minority group in the United States. While schools and governments have implemented successful programs to help underrepresented students, college students, typically from underrepresented backgrounds themselves, have taken it upon themselves to improve these statistics through student initiated outreach programs. This study examines Latino and Latina high school students from the Los Angeles Unified School District who have participated in the College Link Outreach Program (CLOP) at the University of California, Santa Barbara. As data collection continues, a Likert scale-styled survey is distributed to the participants and an item analysis conducted to quantitatively measure changes before and after the program. Perna & Thomas' (2008) conceptual model that features 10 indicators of student success within three context –the internal (individual), family, and school –is then used to analyze the program's effect on participants' aspiration to pursue higher education (Perna & Thomas, 2008). It is hypothesized that the program will have very positive effects on participants; however,

the degree to which the program influences students' motivation to pursue higher education remains unidentified.

Historically, Latino and students have been drastically underrepresented in institutions of higher education. Latinos and Latinas are currently the lowest achieving groups. According to Alejandro Covarrubias (2011), out of one hundred Latino and Latina students who begin elementary school, only 56 will

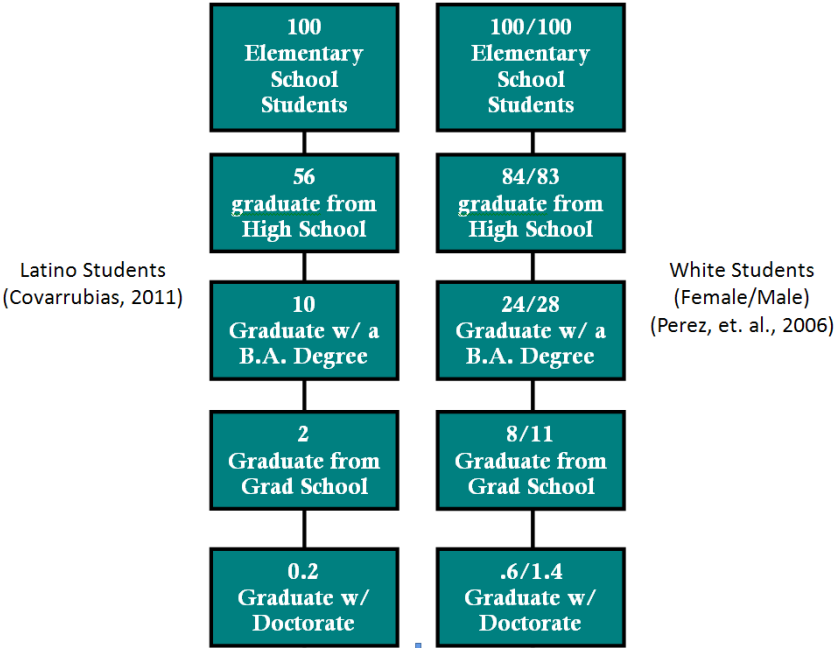
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graduate from high school. Of those 56, only 10 will go on to earn a Bachelor of Arts degree (p. 93). The statistics revealed by Covarrubias' pipeline for Latino/a students are troubling in their own right, but especially so considering that Latinos and Latinas have been the largest and fastest growing underrepresented ethnic group in the United States for over a decade (Covarrubias, 2011, p. 20). Hayward, Brandes, Kirst, and Mazzeo (1997) outline some of the barriers resulting in such low statistics, including lack of and low access to college information, understaffed and under-resourced counseling and advising, tracking systems that place a disproportionate number of Latino and Latina students in non-college bound tracks, and underprepared teachers, among others (Chapter II). To put the low academic achievement of this group into context, a comparison with the educational pipeline of white students reveals a significant gap between the two groups. Perez, Huidor, Malagon, Sanchez, & Solorzano (2006) report that out of out of 100 female and 100 male white elementary school students, 84 females and 83 males will graduate from high school, and 24 females and 28 males will go on to receive their Bachelor of Arts degree (p. 2). These statistics indicate a significant gap exist between Latina/o students and their Anglo classmates (**See Figure 1**).

In order to narrow this gap and to increase high school graduation and college enrollment rates for Latino/a students, schools, government, private institutions and individuals have created academic outreach programs to aid underrepresented students. Student initiated outreach programs are a particular type of outreach program aimed at increasing the academic achievement of underrepresented students. These programs are organized and run by college students, often from underrepresented backgrounds themselves. Since the college students involved in student initiated outreach programs are often times of the same ethnicity and from similar backgrounds as the high school students, my observation is that the college students and the high school students are able to

develop a close relationship. As a result, the high school students are more receptive to the messages and lessons of the program.

Figure 1. Educational Pipeline for Latino and White students



My research attempts to answer the question: How do student-initiated outreach programs, such as the College Link Outreach Program at the University of California, Santa Barbara (UCSB), influence indicators of student success within internal (individuals’ perspective), family, and school contexts? To answer this question, I examine Latino and Latina high school students from the Los Angeles Unified School District who have participated in UCSB’s College Link Outreach Program (CLOP). While the study is still in the preliminary stages, I plan to distribute a Likert scale survey to Latino and Latina participants before arriving on campus for the outreach activities and after they complete the program. After the surveys are completed, I plan to

conduct an item analysis to measure changes before and after the program. The survey was developed based a conceptual model that features 10 indicators of student success within three contexts: the internal (individual), family, and school to analyze the programs' effect on participants' aspiration to pursue higher education (Perna & Thomas 2008). I hypothesize that the program will have very positive effects on participants, but the degree to which it influences students' motivation to pursue higher education has yet to be identified.

Background

The College Link Outreach Program (CLOP) is an award-winning outreach program founded in 2000 at the University of Santa Barbara by Hermanos Unidos and Sigma Alpha Zeta. Hermanos Unidos is an organization open to UCSB students of all races, ethnicities, and gender. Hermanos Unidos, however, focuses on supporting Chicano/Latino males in higher education through the embodiment of its three pillars: academic excellence, community service, and social interaction. Sigma Alpha Zeta is a multicultural sorority that stands for the empowerment of women through education, sisterhood, diversity, and community service (CLOP Website). These two organizations founded CLOP with the purpose of promoting higher education to students of color. The CLOP mission statement states: "The purpose of our outreach program [CLOP] is to expose 120 high school students to the advantage that institutions of higher learning provide" (CLOP Website). To fulfill CLOP's mission, a team of two coordinators, fourteen facilitators, and eight team leaders organizes various workshops and events for the CLOP students.

Since 2009, CLOP has brought 120 high school students annually from the Los Angeles Unified School District (LAUSD) to the University of California, Santa Barbara (UCSB) to teach them about the importance of post-secondary education, how to apply to college, and to expose them to college life and to college

students from similar background. CLOP consists of a three-day, two-night stay at the UCSB where students participate in a wide array of workshops, activities, and events that range from sessions on financial aid and the college enrollment process to a dance and a barbeque for the students. Students gain important information to aid them throughout high school and into college while establishing networks with high school and college students.

My research focuses on CLOP from 2009 to 2012 because of the drastic differences between the program prior to 2009 and after. Prior to 2009, the program accepted only 60 students and operated on a budget of \$8,000 to \$9,000. Minimum grade point average was either a 2.5 or 3.0, depending on the coordinators, and gender was not considered when selecting participants. The 2008 program consisted of 59 females and 1 male. Starting with the 2009 program and continuing on since then, almost everything about the program has changed drastically. The program budget increased to \$35,000 and the number of students who participated grew to 120 students. The minimum grade point average was also eliminated so that students who were in the most need of the help would be considered for the program as well. Furthermore, gender was also added as a consideration when selecting participants so that the program would host sixty female and sixty male students.

Conflict of Interest

Before proceeding further, it is important to acknowledge that there is a possible conflict of interest in my research. I have been involved with the College Link Outreach Program for four years as a volunteer, facilitator, and coordinator. It may be assumed that I have a bias to portray the program as positively as possible. While I do hold the program in high esteem, I conducted this study as objectively as possible. Moreover, my participation with CLOP allowed me to be very familiar with the program, the student staff, and the high school participants. As a result, I am able to analyze the program much more critically.

Literature Review

The literature reviewed for this study can be classified into two categories: research analyzing high school dropout prevention and research gauging programs focusing on college enrollment support. While there are significant differences between the programs examined in each category, there is overlap. Both categories suggest components of outreach programs that best aid underrepresented students in high school and in higher education. Since the College Link Outreach Program targets students in need of both dropout prevention and college enrollment support, the characteristics most often suggested by articles in both group were synthesized to develop the indicators of student success used for the conceptual model in this study.

The first category of literature focuses on Latino students with a high risk of dropping out. While only two articles fall into this category, they are particularly useful to understanding outreach programs since it is necessary to understand at-risk students' self perceptions and the factors pushing them through the cracks in the educational pipeline. Fine's (1991) study at Comprehensive High School (CHS; name of school was changed) reveals the flawed images of high school dropouts. Too much research characterizes high school dropouts as "hopeless and helpless loser[s]" (p. 4). In fact, Fine reveals that dropouts were significantly less depressed than "stay-ins." Dropouts were more likely to recognize the role of poverty and racism in their problems, to challenge teachers over grades they felt were incorrect, and less willing to conform. On the other hand, students who stayed in school had completely opposite attitudes: they were more depressed, more likely to attribute their problems to their personality, to accept their grades when they felt they deserved a better grade, and were much more conformist (Fine, 1991, p. 5). The findings contradict the traditional images (or stereotypes) of high school dropouts. More importantly, Fine points out the importance of not only helping students at risk of dropping out, but also helping students who are not at risk.

Fernandez & Shu (1988) also recognize the need to help both “at-risk” and “not at-risk” Latino students. The researchers address the two critical issues of how “(1) to prevent those Hispanic students who have been labeled as “at-risk” from dropping out of school, and (2) to keep those Hispanic students who are “not at-risk” in our public schools” (p. 382). While the study addresses the need for college enrollment support for “not at-risk” students, the research still belongs in the dropout prevention category. While Fernandez & Shu provide recommendations to prevent at-risk students from dropping out such as programs “aimed at lack of academic skill, poor study habits, low self-esteem, and alienation from school” (p. 382), they leave strategies for college enrollment support for “not at-risk” students to future research. Nonetheless, Fernandez & Shu emphasize the need to help “not at-risk” students. From their study of the *High School and Beyond* and the *National Longitudinal Survey* data set, they found that “many [Latino students] who, in spite of the fact that they were academically more capable, came from middle-class families, had parent with relatively high indices of educational attainment...still managed to drop out at higher rates than students in the national sample” (p. 381). In response to this issue, programs that focus on college enrollment support can help students, particularly “not at-risk” students, graduate from high school and continue on to higher education.

Outreach programs aiming to provide Latino students with college enrollment support tend to focus on identifying and counteracting the barriers preventing underrepresented students from pursuing higher education. Most college enrollment support programs incorporate dropout prevention strategies in addition to strategies to improve college enrollment. For example, Hayward, Brandes, Kirst, & Mazzeo (1997) recommend that outreach programs include an “emphasis on study skills and specific academic skills” while also focusing on “early information about preparing for college” (p.14). An emphasis on study skills primarily benefits students at risk of dropping out while information about preparing for college admissions and test

preparation aids “not at-risk” students preparing for college enrollment. Much of the research in the college enrollment support category identifies characteristics or suggests strategies that could be classified as dropout prevention. However, I labeled this literature as college enrollment support since the main goal of the research and of the programs has been to increase college enrollment rather than only decrease dropout rates.

Each article reviewed here identifies key components of successful outreach programs. Though each has a different name for the components, each component serves as a recommendation for outreach programs striving to help improve academic achievement of Latino and Latina students. For example, Gandara, et al. (1998) identify eleven “Critical Components of Hispanic Educational Interventions” including building social capital, raising aspirations and instilling a vision of possible future; creating social networks; incorporating specific academic tutoring components; and active parent involvement, among others (p.53). Perna & Swail (2002) suggest “five critical components” (p.106). A comparison of only these two articles reveals four indicators of student success found in both: academic preparation, family involvement, mentoring, and social networking. All of the articles used in this review similarly identify components of successful outreach programs.

I synthesized the components of successful outreach program identified by the authors I read and developed 10 indicators of student success. These are:

1. Academic preparation (Fernandez & Shu, 1988; Hayward, et al., 1997; Perna & Thomas, 2008; Perna & Swail, 2002; Perna, 2002; Cates & Schaeffle, 2011)
2. Educational aspirations (Hayward, et al., 1997; Perna & Thomas, 2008; Perna & Swail, 2002; Perna, 2002)
3. Social networking (Hayward, et al., 1997; Gandara, et al., 1998)

4. Strategic timing (8th grade) (Hayward, et al., 1997; Perna & Swail, 2002; Perna, 2002; Cates & Schaeffle, 2011)
5. Mentoring (Hayward, et al., 1997; Gandara, et al., 1998),
6. College access (Perna & Thomas, 2008; Perna, 2002)
7. Family involvement (Gandara, et al., 1998; Perna & Swail, 2002; Perna, 2002; Cates & Schaeffle, 2011)
8. Campus tours, visits (Perna & Swail, 2002; Perna, 2002)
9. Promoting rigorous course taking (Perna & Swail, 2002; Cates & Schaeffle, 2011)
10. SAT/ACT prep (Hayward, et al., 1997; Perna, 2002; Cates & Schaeffle, 2011)

While there were many other suggested strategies in the literature, these ten indicators are the components most frequently identified as necessary for a successful outreach program. The indicators attempt to counteract the many factors pushing Latinos out of the educational pipeline. If a program is striving to help improve the educational attainment of Latino and Latina students, these ten indicators are useful for evaluating the program and its effectiveness.

Limitations

Throughout my research, I face only one limitation: there is virtually no previous research on student-initiated outreach programs. Research on outreach programs tends to analyze more traditional programs that are coordinated by a professional staff and take place over a longer period of time. Programs commonly studied include: AVID (Perna, 2002; Perna & Swail, 2008; Hayward, et al, 1997), the Puente Project (Perna & Swail, 2008; Hayward, et al., 1997) and GEAR-UP (Cates & Schaeffle, 2011). These types of programs are significantly different from CLOP, but they share the same goal of increasing college enrollment among underrepresented students. For this reason, the articles were very useful for my research despite the differences between the programs.

Methodology

Theoretical Model

In order to answer the research question, this study draws on the multilayered conceptual model for understanding student success developed by Perna & Thomas (2008). The model takes a multidisciplinary approach by drawing from previous research in economics, sociology, psychology, and education and incorporating these into ten indicators of student success. Furthermore, the model layers these ten indicators of student success into four contexts: the internal, the family, the school, and the broader social, economic, and political.

Each context considers different influences on student success and draws from different disciplines. The internal context refers to students' individual perspectives, attitudes, and motivations and is mainly based in psychological research. The family context considers the contribution of family and home life to a student's success. The family context draws from both Economics and Psychology. The school context focuses on educational institutions' role in student success. It draws mainly from Economics, Sociology and Education. Lastly, the broader social, economic, and political context considers the period of history the study covers. This context draws from Economics and Sociology to understand what social, economic, and political developments are occurring during the study and how they affect the student participants. This conceptual model allows for a more holistic analysis of changes that occurred among program participants than other possible models due to its multidisciplinary and multilayered structure. For my research, I will only use the internal, family, and school contexts. These three contexts were the most relevant to CLOP since the program does not affect the broader, economic, and political context.

Methods

The data collection plan is now in place. To gather data from participants, a Likert scale survey will be distributed before and after CLOP to Latino participants. Since the number of Latino and Latina students varies every year, the number of surveys that will be distributed has yet to be determined. While Latino and Latina students do constitute the majority of participants, there are a number of students of other ethnicities. Therefore, the number of Latino and Latina students used for this study will depend on the number of Latino/a students accepted to the program this upcoming year. Additionally, 20 participants are accepted into the program each year because they are related to a member of Hermanos Unidos or Sigma Alpha Zeta. Since the family members who participate in CLOP are not necessarily from LAUSD, they will not be considered for this study. Lastly, the survey will include questions tailored around the ten indicators of success within each of the contexts described above. The changes in the indicators before and after the program will measure whether indicators for student success improved, decreased, or remained the same due to the participation in the program. To further analyze changes in student perceptions, an Item analysis will be conducted.

Item analysis is a statistical procedure used to analyze survey items. It measures achievement and “highlights progress in education very effectively” (Törmäkangas, 2011, p. 308) when used with an interval scale such as a Likert scale. According to Törmäkangas (2011):

“The fitting values for items are calculated person-by-person and item-by-item, and unexpected answers increase misfit. This is a very accurate and objective way to calculate problems for a single item. Eventually, if the sample size is big enough, the final estimates give precise standardized t tests for each item, which is a very good basis to evaluate a test item” (p. 319).

Item analysis is also appropriate for this study given the time

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constraints. It is relatively easy to carry out and the results easy to interpret and understand. Furthermore, item analysis' precision, accuracy, and stability makes it a valuable procedure for this study.

Data Analysis

Anticipated Findings

Since the survey study is still in the preliminary stages, results from the survey are not yet available. However, I anticipate that data will show that the College Link Outreach Program is very likely to have a very positive impact on its high school participants. I hypothesize that CLOP will satisfy a majority of the indicators of student success within the three contexts. If CLOP does fulfill the majority of the indicators, then the program will have successfully influenced participants to pursue higher education. By analyzing observations of different CLOP events and activities over the last several years, I have been able to gather evidence to support how CLOP could fulfill at least a majority of the ten indicators of student success. In order to be as objective as possible, I will acknowledge the indicators of students success that CLOP satisfies, but I will also note the indicators of student success that are not fulfilled by the program. For the indicators that are not satisfied, I will either state the possible reasons preventing the program from addressing that indicator or I will suggest other strategies the program employs that are similar to the indicator. As I mentioned in the literature review, the following indicators of student success are the most commonly suggested strategies for programs aiming to increase the number of underrepresented students in higher education.

Academic preparation was the most frequently cited strategy among previous studies. (Cates & Schaeffe, 2011; Fernandez & Shu, 1988; Hayward, et al., 1997; Perna, 2002 Perna & Thomas, 2008; Perna & Swail, 2002). Perna (2002) also observes “two thirds of programs targeting low-income students, historically underrepresented minorities, and potential first-

generation college students provide instruction in mathematics and science or reading and writing” (p.72). Not only does the literature point to academic preparation as an important strategy, it is also a very widely used strategy by outreach programs.

CLOP, however, does not have the time or the funding to invest in academic preparation for its participants. Because the program is only a three-day outreach, any academic instruction would be ineffective. Furthermore, raising sufficient funds to finance any academic instruction for the participants is beyond the grasp of the program. Rather, the program places a strong emphasis on the Grade Point Average (GPA) requirements of college admissions. Often times, students do not know about the GPA requirements necessary to apply to college or even the correct way to calculate their University of California GPA –the GPA from students’ sophomore and junior year in high school. So while CLOP is unable to provide students with academic preparation, it does provide admissions preparation with an emphasis on GPA, and it teaches students about alternate ways to continue with their education (e.g. community college). Therefore, student with low GPA’s learn to avoid feeling discouraged about pursuing higher education, even if it requires time at a community college. This is one way that CLOP preserves the educational aspirations of participants, while emphasizing the importance of academic preparation.

Educational Aspirations is perhaps CLOP strongest indicator of student success. Improving the educational aspirations of underrepresented students is repeatedly mentioned by previous research as crucial to improving the academic achievement of these students (Hayward, et al., 1997; Perna, 2002; Perna & Thomas, 2008; Perna & Swail, 2002). Educational aspiration can be defined as the goals students set for their educational future and their beliefs about the academic opportunities available to them. Unfortunately, educational aspiration is often a strong reason why underrepresented students do not enroll in higher education. Stereotypes, tracking systems, and a lack of role models often limit

the education aspirations of many underrepresented students, particularly Latinos and Latinas. Fortunately, outreach programs such as CLOP do a good job in counteracting the low academic aspiration of many of their participants. The college students involved with the program challenge stereotypes that portray Latino and Latina students as underachieving. These students also serve as role models for the high school students and demonstrate that it is possible to pursue higher education despite the student's background. However, it is necessary that a student receive this help at the right time.

Strategic timing of an outreach program is strongly emphasized in the literature (Hayward, et al., 1997; Perna & Swail, 2002; Perna, 2002; Cates & Schaeffe, 2011). Most previous studies also recommend that outreach efforts begin during students' eighth grade year and continue through their high school career. CLOP, however, does not target eighth grade students and does not have the resources to follow students throughout their entire high school career. Instead, CLOP targets students when they are on the verge of preparing to apply to college. Students in their junior year of high school receive the information and motivation CLOP provides as they prepare to apply the following year. While this is late in a student's high school career, it provides juniors with information they might not have had access to in their respective schools such as FAFSA, application fee waivers, and admissions information. If the student had not done well academically, it provides them with alternative routes in higher education. Sophomore participants receive CLOP's help at a time when they can still improve their GPA, take the required A-G courses, and become more competitive in the admissions process. So while attendance at CLOP may not be during the optimum moment for academic outreach, it still occurs during a crucial time.

Family involvement was also repeatedly discussed by previous research as a necessary strategy to help Latino and Latina students increase their college enrollment (Gandara, et al., 1998;

Perna & Swail, 2002; Perna, 2002; Cates & Schaeffle, 2011). Family is an important factor in many of these students' lives and can be a barrier at times. Students often mention the difficulty of leaving their families to attend college and may even face protest from their family for leaving to attend college. This may be especially true for Latinas. It is, however, necessary to emphasize the importance Latino and Latina families place on their children's education. Unfortunately, Latino families frequently lack the information, resources, and support to help their students reach higher education. So while families strongly encourage higher education, they are often unable to help with the admission process. To counteract this, CLOP organizes informational sessions for the participants' parents to (1) explain the program to parents, (2) explain that their children have the potential to succeed in higher education, and (3) teach the parents about the college admission requirements, processes, and how they can help their students. Furthermore, participants discuss how to explain to their parents that they need to pursue higher education.

SAT/ACT test preparation is increasing being recognized as a necessary component of outreach programs (Hayward, et al., 1997; Perna, 2002; Cates & Schaeffle, 2011). CLOP is unable to provide extensive test preparation because of the lack of time and funding, but it does provide students with SAT preparation books. While this is obviously not as effective as a test preparation course, it still offers students the opportunity to prepare for the SAT.

Social networking is one of the biggest benefits of outreach programs and is crucial that outreach programs give students the opportunity to socialize and build their networks (Hayward, et al., 1997; Gandara, et al., 1998). Social networking allows students to surround themselves with peers who have the same goal: to reach higher education. The networks developed between the high school students create a support system where students can seek academic assistance, encouragement, and friendships. CLOP strongly supports social networking and allows

students to interact with each other, with the college students, and even with the professional staff throughout the program.

Promoting rigorous course taking is essential for underrepresented students striving to attend college so they are competitive for admissions (Perna & Swail, 2002; Cates & Schaeffe, 2011). Latinos and Latinas in particular need to be encouraged to take Advance Placement and Honors courses because they are disproportionately placed in lower-track courses. CLOP encourages its participants to take rigorous courses. Participants in their junior year of high school are often times unable to take rigorous courses, but sophomores are still able to enroll in rigorous courses.

Mentoring is often unavailable for underrepresented students in their schools and their communities, so outreach programs should attempt to provide their participants with mentors (Hayward, et al., 1997; Gandara, et al., 1998). CLOP, like other student initiated outreach programs, provide their participants with effective mentors. It is common for the college students and high school students to maintain contact after the program is over. The high school participants are able to receive the mentoring of the college students long after the program is over. Since the college students on the CLOP staff tend to be Latino or Latina and come from LAUSD or similar backgrounds, they are able to personalize their efforts to communicate effectively with the high school students.

College access refers to students' ability to access information about college and the admission process (Perna & Thomas, 2008; Perna, 2002). This is a very significant issue in the low-income school Latino and Latina students tend to attend. These schools, especially in LAUSD, are often understaffed and lack sufficient numbers of college counselors to provide students with adequate information, resources, and encouragement to pursue higher education. CLOP fills this void by providing

students with detailed information about the admissions process, the different schools in California and the United States, and the opportunity to consider different colleges.

Campus tours and visits are necessary in order to expose students to the college environment and to motivate students (Perna & Swail, 2002; Perna, 2002). By bringing participants to UCSB, CLOP exposes the students to a beautiful campus and gives them a taste of the college lifestyle. Since underrepresented students have not seen many college campuses, visiting different campuses serves to motivate them to pursue higher education.

Conclusion

Improving the number of Latino and Latina students in higher education is a crucial issue in the United States. Latinos and Latinas are currently a major influence in politics and in the economy and their influence in all sectors will continue to grow. However, unless Latinos and Latinas are offered the opportunities to receive a higher education, US society will feel the consequences. Outreach programs exist to provide underrepresented students with the resources necessary to enroll in higher education. Very little is known about how effectively student initiated outreach programs aid underrepresented students. This study's analysis of CLOP, a successful student initiated outreach program at the UCSB targeting Latino and Latina students from LAUSD, has the potential to uncover the benefits of student initiated outreach programs. The ten indicators of student success and the three contexts proposed by Perna & Thomas (2008) provided the conceptual model to evaluate the program. It is anticipated that CLOP will satisfy most of the indicators of student success, but the degree to which students benefit from the program has yet to be determined. The survey conducted in association with this study will begin to address the gaps in earlier research. However, much more research is needed on student initiated outreach programs in order to fill in the cracks along the Latino and Latina educational pipeline.

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Progesterone Decreases Cocaine Choice in Females

Veronica Leticia Togual

Mentor: Dr. Tod Edward Kippin
Department of Psychological and Brain Sciences and
Neuroscience Research Institute

Abstract

Cocaine addiction in humans varies between men and women and studies show that women may have higher vulnerability to addiction than men. Previous research indicates that intact female rats have a higher propensity to consume and seek cocaine relative to males and to ovariectomized females. Further, experiments in our laboratory have shown that intact females also choose cocaine over food during a concurrent reinforcement procedure. Other studies have demonstrated that exogenous hormones regulate female rats intake of cocaine and that progesterone administration is associated with decreased rates of responding to cocaine reinforcement as well as decreased cocaine-primed reinstatement of reinforcement following extinction suggesting that progesterone may suppress cocaine-seeking in addicts. The present experiment assessed the impact of progesterone treatment on cocaine choice in Sprague-Dawley female rats. Rats were trained to press one lever to receive cocaine (1.0 mg/kg, IV) and a second lever to receive food (2 x 45 mg pellets) reinforcement while receiving daily progesterone (0.5 mg/kg, SC) injections. During choice trials under concurrent reinforcement, controls selected cocaine more frequently than food whereas progesterone treated females selected food more frequently than cocaine. As hypothesized, females treated with progesterone displayed lower cocaine choice when given an alternative reinforcer relative to controls. These findings suggest that, in addition to the response rate-suppressing effects of progesterone observed during cocaine reinforcement, progesterone also reduces the selection of cocaine over an alternative natural reinforcer and supports the notion that progesterone may be beneficial in the clinical management of cocaine addiction in women.

Introduction

Addiction is a chronic, relapsing disease characterized by compulsive drug seeking behaviors impacting the neurochemicals, leading to molecular changes in the brain (Ahmed, 2012). Interestingly, sex differences in the pattern of drug addiction exist which indicate that women undergo a more severe and rapid progression through the stages of addiction (Becker & Hu, 2008). These findings suggest there may be biological differences in the response to cocaine in males and females including modulation by gonadal hormones that are critical for understanding individual addiction vulnerability (Kerstetter et al., 2012). In general, females have higher behavioral responsiveness (as measured by locomotor activity) to cocaine relative to males and these differences are enhanced by estrogen and inhibited by progesterone (Becker & Hu,

2008; Quinones-Jenab & Jenab, 2010). Moreover, females respond more to cocaine reinforcement (Kerstetter et al., 2008) and this difference is positively regulated by estrogen and negatively regulated by progesterone (Jackson et al., 2006; Larson et al., 2007).

However, it is unclear if differences in cocaine self-administration reflect differences in cocaine-induced behavioral activation. Therefore, in order to test sex differences in a rate-independent fashion, we have developed a model of cocaine versus food choice. Rat models are used in studying cocaine addiction due to their similar biology to humans, allowing observation into the underlying fundamentals of cocaine taking and choice, importantly the controlling compulsive drug take mechanism, as (Ahmed et. al., 2012) defined as taking cocaine despite another reinforcer being available.

Background

The ultimate goal of making animals addicted to drugs is to understand the neuroscience in the mechanisms of drug addiction and to produce possible treatments for the underlying cause of human addiction (Ahmed, 2011). A lasting problem in drug addiction has been to understand why a few people transition to a state of addiction while the majority seems to be uninfected by addiction (Anthony et al., 1994; Anthony, 2002; Swendsen and LeMoal, 2011; Ahmed, 2011). Previous studies have concluded that animals continue to self-administer cocaine when no other nondrug reinforcer (i.e. sweet water, food pellets, saccharins) is available (Carroll and Lac, 1993; Ahmed, 2011). These findings are consistent with previous research indicating that an alternative behavior may reduce operant responding conditions for cocaine during acquisition, maintenance, extinction, and reinstatement sessions (programmed) suggesting that resilience against cocaine addiction may exist (Carroll et al., 1989; Carroll and Lac, 1993; Liu and Grigson, 2005; Quick et al., 2011; Ahmed, 2011). The vast majority of literature indicates that it appears to be the norm in rats to be resistance to cocaine addiction; these findings have several

implications for future research in neuroscience as well as in the development of effective treatments for addiction (Cantin et al., 2010; Ahmed, 2011). Ahmed's arguments serve as a consistent reminder of the limitations in comparing animal cocaine self-administration models to addiction and choices of individuals in the real world.

Research has shown that females have a higher propensity for cocaine consummation than males. Previous studies have demonstrated sex differences in cocaine-induced rewards and subjectivity effects in males and females (Quinones-Jenab et al., 2009). Sex differences among addicted individuals have indicated that women face a more severe profile of cocaine addiction relative to men (Becker, 2009; Anker & Carroll, 2010) suggesting these differences may be due to hormones interactions. Previous studies have indicated that progesterone decreases subjective and physiological effects of cocaine, but does not decrease the motivation to acquire the drug (Quinones-Jenab et al., 2009). Similar studies conducted under the initial conditions of progesterone and cocaine doses produced similar results indicating that progesterone does decrease cocaine choice over food reinforcement. These studies reinforce the notion that administration of progesterone may decrease cocaine's subjective and reward effects. If progesterone is use as a treatment for cocaine addiction, it may have significant clinical and socioeconomic implications for future studies (Jenab et al., 2009).

Sex differences studies suggests there may be some biological differences in females' responses to cocaine that are modulated by hormones that are pivotal for understanding vulnerability in addiction. In animal models, female rats have been shown to acquire cocaine self-administration at a faster rate than male rats (Lynch et al., 2001). In particular, estrogen (ovarian hormone) has been associated with sex differences in self-administration sessions. Further, this suggests that estrogen is a factor influencing drug-seeking behavior in female rats and it may

underlie sex differences in cocaine responding behavior (Lynch et al., 2001). On the contrary, progesterone has been associated with decreased cocaine-induced behaviors when another reinforcer (sucrose, food pellet, sweet water) is available.

Methods and Materials

Subjects

Female (N= 3 cohorts, weighing between 225-250g) Sprague-Dawley rats (Charles-River, Wilmington, MA, USA) are individually housed in a temperature and humidity controlled vivarium on a 12 hour light-dark cycle. Rats are maintained on a ration of 20 grams of rat chow per day (Harlan, Indianapolis, IN, USA) and ad libitum water. The animals are given a minimum of 3 days of adaption training before the start of the experiment. The housing and care of the rats follows the “Guidelines for the Care and Use of Mammals in Neuroscience and Behavioral Research” (National Research Council 2003) and has been approved by the Institutional Animal Care and Use Committee.

Surgery

Rats are anesthetized by inhalation of isoflourane gas (5% for induction; 2.5% for maintenance) as a means to implant a jugular catheter. Chronic indwelling catheters are constructed using a bent steel cannula with a screw-type connector (Plastics One, Roanoke, VA, USA), silastic tubing (10 cm, i.d. 0.64 mm, o.d. 1.19 mm; Dow Corning, Midland, MI, USA), prolite polypropylene monofilament mesh (Atrium Medical, Hudson, NH, USA), and cranioplastic cement (Fuchs and See 2001). The end of the catheter is inserted into the right jugular vein and secured to the surrounding tissue with a suture. The catheter runs subcutaneously and exits on the rat’s back, posterior to the shoulder blades.

Catheters are flushed once daily prior to self-administration sessions with antibiotic ticarcillin disodium/clavulanate potassium (Timentin; 10mg/0.1ml; Schein Pharmaceutical, Florham Park, NJ,

USA) dissolved in 0.9% physiological saline, and 0.1 ml of heparin after self-administration sessions (6.0 IU/0.1 ml prepared in 0.9% physiological saline, i.v). This is done as a prophylactic measure against microbial infection or blood clots, and to extend catheter patency. Catheter patency is verified periodically by infusing 0.04 ml in female rats of methohexital sodium (10 mg/ml i.v.; Eli Lilly and Co.; Indianapolis, IN, USA), which produces a rapid loss of muscle tone only when administer intravenously. If methohexital sodium does not produce rapid loss of muscle, the animal subject is removed from the study.

Progesterone Monitoring

Progesterone levels are determined based on injection of the active ingredient of progesterone (2 mg/kg SC) received daily 30 minutes prior to self-admission session. Over the sessions, 3 cohorts of female rats are monitored for the effects of progesterone on decreasing cocaine choice. In performing progesterone administration, half of the female rats are injected with progesterone (0.5 mg) subcutaneously 30 minutes prior to self-administration sessions. The control group of female rats receives peanut oil (0.1 oil) injected daily under the skin as a vehicle (not the active ingredient of progesterone) injection. Thirty minutes after progesterone injections, the female rats are connected to the operant chambers with the proper program (cocaine or food choice).

Operant Training Procedures

The operant chambers are equipped with two retractable levers, a stimulus light above each lever, and a food pellet dispenser between the levers (ANL-926, Med Associates). Cocaine and food self-administration training is conducted during 1-hour (food 45mg pellets, Noyes, Lancaster, NH, USA) and 3-hour (cocaine, cocaine hydrochloride; National Institute on Drug Abuse,

Research Triangle Park, NC, USA) sessions during the rats' light cycle.

The rats are trained to press one of the levers for food and the other lever for cocaine during separate sessions on alternating days. At the start of each session, the rat's catheter is connected to a liquid swivel (Instech, Plymouth Meeting, PA, USA) via polyethylene 20 tubing that is encased in a steel spring leash (Plastics One) and the swivel is suspended above the chamber and connected to an infusion pump (Model PHM-100, Med Associates). For both cocaine and food training sessions, only 1 lever is extended (i.e. only cocaine or only food is available) and the rats are trained to press the lever for reinforcement under a fixed interval: 20s (FI:20) schedule of reinforcement with a maximum of 25 reinforcers allowed; achievement of this criterion terminates the session. During food training sessions, responses on the right lever yield a delivery of 2 food pellets into the food dispenser. After food pellet delivery, there is a 20-second time out (TO) period during which responding on the lever produces no programmed consequences. During cocaine sessions, responses on the left lever result in a cocaine infusion that involves a 4-second activation of the infusion pump. Cocaine hydrochloride is dissolved in saline, filtered using a 0.45- μ m ultra-cleaning filter unit (Fisher Scientific), and delivered at a dose of 0.4 or 1.0 mg/kg per 0.10 ml infusion. These doses are selected because they are not associated with differences in cocaine self-administration acquisition or intake and represent a large portion of the dose response curve that maintains self-administration (see e.g. Caine et al., 2004; Fuchs et al., 2005). After each infusion, there is a 20-second time out (TO) period during which responses on the levers produce no programmed consequences. Food and cocaine self-administration training continues until each rat has completed 6 sessions of at least 20 reinforcers for both food and cocaine.

After training is completed, 5 continuous-response choice trials are conducted during which both levers are extended allowing the rat to select either food or cocaine reinforcement for a

maximum of 25 reinforcers. Food and cocaine reinforcement continue to be paired with the same 5-second presentation of the light stimulus above the reinforced lever and followed by a 20-second TO period during which the levers remain extended allowing continuous responding throughout the session. Trials last until the rat earns a total of 25 reinforcers or 3 hours has elapsed, at which point, the session ends automatically. After the completion of continuous-response choice trials, 5 “discrete-response choice” trials are conducted under the same conditions as the continuous-response choice trials with the exception that during the 20-second TO, the levers are retracted to prevent non-reinforced lever responses, thus minimizing potential perseverating response patterns. Finally, rats in some experiments undergo “reverse discrete-response choice” trials training during which the reinforcer-lever relationship is reversed. The lever responses on the right lever are now reinforced by cocaine and responses on the left lever are now reinforced by food. Sessions are conducted until responding stabilizes on the new lever reinforcer schedules.

Data Analysis

Analyses of variance (ANOVA) are used to analyze responses on the right or left lever, food delivery, and drug infusions during the training and choice operant sessions with progesterone status serving as the between-subjects variable. Mixed factor ANOVA are used to analyze lever responses during operant training and percentage of cocaine infusions earned during subsequent trials, with progesterone status serving as the between-subjects variables and with operant sessions serving as the repeated measures variable as appropriate. Significant interactions are deconstructed by simple main effects analysis and post-hoc Bonferroni¹ adjust alpha levels of .01 or .00625 (.05/5, .05/8)

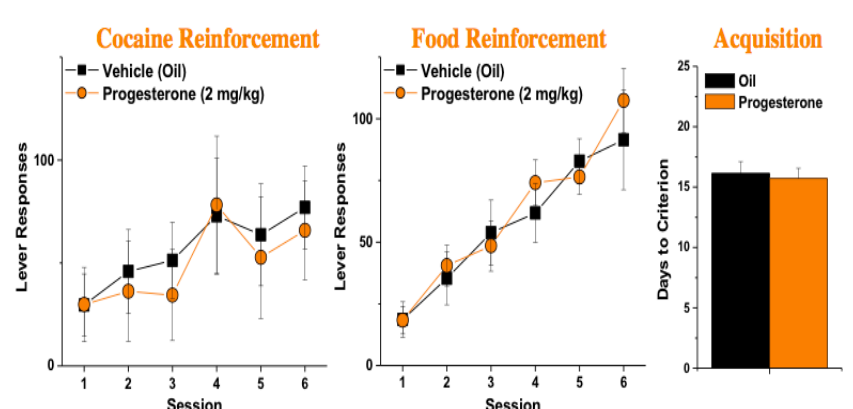
¹ Post-hoc Bonferroni is a correction analysis to account for multiple comparison of data. It is a familywise error rate that accounts for error in multiple data. The experimenter tests n dependent or independent hypotheses on a set of data, then one way of maintaining the familywise error rate (FWER) is to test each individual hypothesis at a statistical significance level of $1/n$ times what it would be if only one hypothesis were tested. Only significant levels of

implemented to further examine significant effects of session. With the exception of the Bonferroni post-hocs on the repeated measures factor, the level of statistical significance for all comparisons is 0.05.

Results

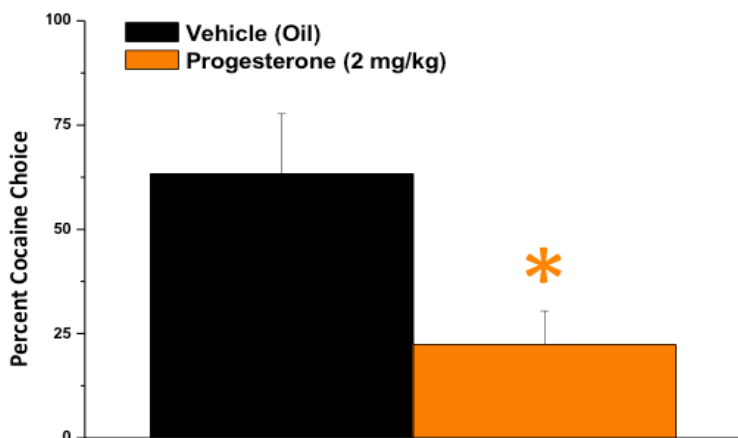
Cocaine and food reinforcement training sessions: The levels during the acquisition of cocaine self-administration were analyzed using 2 x 5 (session) ANOVA which indicate there is not a significant interaction of progesterone affecting females compared to the vehicle control group (peanut oil). Additionally, food self-administration revealed that there is not an observed interaction of progesterone affecting the acquisition of cocaine or food-reinforced operant behavior (Figure 1). Overall, progesterone and vehicle control females exhibited similar responding rates for cocaine and food reinforcement acquisition trials. For the purpose of the present study, these observations are ideal conditions to observe the interaction of progesterone in continuous-response choice trials since there is no direct interaction of progesterone observed during acquisition reinforcement training sessions.

alpha are less than 0.01 are significant in our study (Klockars, Hancock et al., 2000).



***Figure 1: Progesterone (2 mg/kg) or peanut oil is administered 30 minutes prior to cocaine or food reinforcement acquisition sessions.**

Continuous-response choice trials: The response of progesterone and vehicle control females was significantly different during continuous choice sessions. Upon analyzing the percent cocaine choice for continuous-response choice trials on a 2 x5 (session) ANOVA (Figure 2), there is a significant interaction of the hormone progesterone in choice response. Based on the percent cocaine choice for the vehicle control group (females treated with peanut oil) compare to the progesterone treated group, the response of the vehicle control group was significantly higher to cocaine over food reinforcement.



***Figure 2: Progesterone (2 mg/kg) or peanut oil is administered 30 minutes prior to continuous-response choice trials. The data demonstrates that exogenous progesterone decreases cocaine choice in intact female rats.**

Discussion

This study concluded that females treated with progesterone choose cocaine over food significantly less often than females treated with the control vehicle (peanut oil) in the continuous-response choice. Previously Kerstetter et al concluded that females respond to cocaine more over food relative to males indicating that women have a higher tendency for cocaine reinforcement at higher doses of cocaine (Kerstetter et al., 2012). Additionally, at lower dosage of cocaine, males respond to food reinforcement significantly more, while females display an equal responding rate to cocaine and food reinforcement (Kerstetter et al., 2012). Overall, females have lower responding when trained with a low cocaine dose, but higher responding when trained with a high cocaine dose. Females are more likely to forgo food reinforcement for cocaine reinforcement than are males indicating a biological propensity for higher compulsive drug ingestion

reflecting sex difference dependent on estrogen (Kerstetter et al., 2012). Furthermore, the relation between cocaine choice and ovarian hormones in females appears to be complex. The ovarian hormone treatments have been able to mitigate sex differences in other studies examining the behavioral and subjective responses to cocaine.

Although males are more likely to use and abuse drugs, women are more vulnerable to the rewards of drugs, meaning once they use a drug, they are more likely to become addicted. Despite women's increased risk, men's higher rates of drug use and abuse overall may be explained by social factors. Presently, gender differences are similar in drug intake but abuse is still higher in men indicating a small sex different ratio. This sex different ratio is dynamic over time due to social parameters changing and becoming more acceptable for women to consume drugs leading to similar rates of addiction for men and women.

Women, in general, exhibit a higher motivation for cocaine that may be attenuated in females by administration of progesterone or its metabolite, allopregnanolone in the reproductive cycle by modulating the subjective effects of cocaine (Sofuoglu et al., 1999, Evans et al., 2002, Evans and Foltin, 2006). Further, women have a faster transition from the first use of cocaine to entering treatment relative to men (Westermeyer et al., 1997). Additionally, females have reported experiencing greater cocaine craving in response to psychological and physical stressors (Back et al., 2005). One major difference between women and men that is most relevant to our study is that women display poorer nutritional status (Santolaria-Fernandez et al., 1995), which may reflect this compulsive drug intake.

Specifically, with respect to Kerstetter et al's study, we concluded that we obtained the same pattern of cocaine choice responding in the reverse discrete trials, which indicated that females are tracking the cocaine reinforcer during concurrent

reinforcement sessions. This observation suggests that females are not only responding to cocaine relatively more due to receiving a higher cocaine dose, but that females have a greater motivation to acquire cocaine reinforcement which leads them to track the reinforcer when the levers are switched during reverse discrete trials. Overall, females have a higher preference for cocaine under all conditions. Females do not necessarily change from concurrent reinforcement to discrete trials which suggest having the lever active during the programmed session time is not resulting in level habitual responding, which is labeled as compulsive drug intake in females (Kerstetter et al., 2012). Whereas in males, particularly at low dosage, there seems to be a difference of 25% to 5%, indicating a significant change in terms of males responding to cocaine during concurrent reinforcement which seems to be due to habitual or steroidal responses (Kerstetter et al., 2012). In males, the discrete choice trials may be a more appropriate model of cocaine intake. The discrete choice trials (reinforcement levers retraction) demonstrate that males intake cocaine over food pellets, while in females, the apparent cocaine preference is observed in the concurrent reinforcement model and discrete choice model. Therefore, there are statistically significant levels of cocaine intake over food without having to undergo discrete choice trials. Additionally, both female groups (progesterone treated and control vehicle) learned to acquire cocaine and food reinforcement at the same rate and took the same number of days to complete the training phase.

In our study, we viewed chronic (persist cocaine intake) progesterone exposure and long-term (over a period of time), which is subjective terminology at least pertaining to animal models observing long-term effects. Clearly, humans would experience a longer usage of the drug compared to animal models, which may indicate that our compulsive drug intake rat models may not be an appropriate model to observe the ability of suppressing cocaine dependence for months or years. Regardless, rat-animal models have allowed us to draw some inferences about human responses, one of the main reasons due to similar nervous

and endocrine system as humans. Generally, the nature of progesterone mechanism is unclear, but appears to be due to long-term regulation. It is critical to understand that our study observed an acute time period, but even though this is only preliminary data, there does appear to be an effect of progesterone.

For future studies, we may focus on the classical mechanism in which the way steroids work is through acting on steroid receptors that act as transcription factors which regulate long-term translation base protein effects. Steroids may modulate some other transmitters system, leading to a faster synthesis and shorter system. Another possible area of future research may be observing the underlying mechanism of progesterone. This study underlies the notion of steroid mechanisms that are essential to understand the mechanism of addiction.

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Contributors



Afiya Browne graduated from UCSB in 2012 with a double major in Black Studies and Sociology. Her primary research interest is street gangs, with emphasis on gender and

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race, and the application of black feminist theory to questions of gang involvement. In fall 2012, she began the doctoral program in U.C. Irvine's Department of Criminology, Law and Society. Direct correspondence to: afiyab@uci.edu.



Marlon Fernandez Castro received his Bachelor of Arts from the University of California, Santa Barbara with a double major in Sociology and Chicano Studies and a minor in Educational Studies. Marlon's research interests in educational access and equity, diversity in higher education, social issues of race and ethnicity, academic outreach and intervention, and race, inequality, and language in education derive from an extensive professional and personal

background with academic outreach programs such as the Puente Project in high school and the College Link Outreach Program at UCSB. Educational attainment has been the key out of financial and personal struggles for him as well as for the students he has worked with. Marlon will begin his Master of Arts in Postsecondary Administration and Student Affairs at the University of Southern California's Rossier School of Education and plans to continue towards a Ph.D. in Higher Education to offer resources, support, and motivation to underrepresented students. Direct correspondence to: marlon.castro34@yahoo.com



Janai Harris, graduated in 2012 with a B.A. in Sociology from UCSB. A Master's student at the University of Illinois at Urbana-Champaign, Janai is interested in working with "at-risk" adolescents, preventing them from entering the juvenile justice system through the creation of a series of academic,

social, familial, and community resources that seek to build on their strengths and potential. Janai currently tutors high school students and incarcerated individuals at Danville State Prison and is committed to providing preventative and transitional services to people who have been or are at risk of being incarcerated. She will receive her Master's in Social Work with a concentration in Children, Youth, and Family Services in December 2013. Direct correspondence to janai1922@gmail.com



Amy A. Martinez received a BA in Sociology (with an emphasis in Law & Deviance) with Honors distinction from the University of California, Santa Barbara. As an undergraduate, her research interests involved looking at the contemporary hyper-criminalization of Latino male youth, specifically those involved in “gangs.” Amy is continuing her studies in the PhD program in the Department of Ethnic Studies, with an emphasis in Film and

Media Studies, at the University of California, Berkeley. She plans to continue investigating the ways in which youth of color negotiate their street aesthetics and involvement in the street life and documenting their experiences in the carceral system. She is interested in becoming a scholar of Criminal Justice with an emphasis in Visual Media. Direct correspondence to: amy.mrtzn@gmail.com



Mayra Pérez completed a B.S. in Biological Sciences with a minor in Spanish at the University of California, Santa Barbara. Her research interests include optimizing drug delivery therapies, novel drug research, and stem cell regenerative therapy. She is also a UCLEADS affiliate scholar and is involved with outreach programs on campus aimed

to increase the number of Latinos in the STEM fields. Mayra will begin a Professional Science Master's program at San Francisco State University in Biomedical Science in the fall of 2013. Direct correspondence to: mmayraperez@gmail.com



Angel Ricardo Rodriguez earned a B.A in Philosophy, with an emphasis in Ethics and Public Policy, and a minor in History at the University of California, Santa Barbara. Influenced by his experiences as a Guatemalan political refugee, his research focuses on the social history of medicine, public health, and science in Latin America. During his studies, he traveled to and conducted archival research in Mexico and Guatemala under the supervision of his

advisor, Dr. Soto Laveaga. Additionally, he placed first in the area of Humanities and Fine Arts at the university-wide Emeriti Association Undergraduate Research Colloquium (URCA) for two consecutive years (2011, 2012). Recipient of a Eugene Cota-Robles UC Office of President Graduate Fellowship, Angel is currently pursuing a Master's of Arts (M.A) in the Latin American and Iberian Studies program at UCSB and plans to continue onto a doctorate. Direct correspondence to: Arrodriguez02@umail.ucsb.edu



Veronica Togual completed a Bachelors of Arts in Psychology with an emphasis in Neuroscience at the University of California, Santa Barbara in June 2013. Under the guidance of Dr. Kippin, Veronica conducted research concerning sex differences in drug addiction. Direct correspondence to: vtogual@aol.com



Olivia Turnross graduated from University of California at Santa Barbara in June 2013 with a B.A. in Biology from the College of Creative Studies. Her diverse and interdisciplinary undergraduate research interests have resulted in independent research studies on invertebrate thermobiology, ocean acidification impacts on larval development, algal biomechanics, and attrition of racial-ethnic minority women from Science, Technology, Engineering and

Mathematics. She will begin her doctoral work in fall 2013 under the guidance of Dr. Eric Sanford through University of California at Davis' Graduate Group in Ecology. As a graduate student her research will encompass understanding how geographic range distribution and phenotypic plasticity modulate how different species within the same community respond to climate change. Education and science communication are both a passion and priority for Olivia during her graduate studies, particularly in relation to fostering minority participation and success within research science. Direct correspondence to: oturnross@gmail.com



Rosalia Zarate graduated from the University of California, Santa Barbara in June of 2012 with a Bachelors of Science in Mathematical Sciences. As an undergraduate she worked under the direction of Professor Richard Duran in the Gevirtz Graduate School of Education. At the time Rosalia focused on advancing her knowledge of linear algebra and the statistical foundations of regression analysis with applications to educational data modeling specifically in

relation to the math achievement gap. In the fall of 2012, she began

the Ph.D. program in Developmental and Psychological Sciences at Stanford's Graduate School of Education where she continues to pursue her interest in the math achievement gap and in the motivation and retention of Latinos/as in STEM fields (Science, Technology, Engineering, and Mathematics). Direct correspondence to: rzarate12@gmail.com



Ronald E. McNair was born on October 12, 1950, in Lake City, South Carolina. Son of an auto mechanic and a high school teacher, McNair attended the local high school, graduating as class valedictorian. He went on to earn a bachelor's degree, magna cum laude, in Physics, from North Carolina A & T University in 1971 where he was named a Ford Foundation Fellow and a Presidential Scholar. McNair set a goal for himself in high school to complete his PhD within 10 years. Five years after graduating from college, he received his doctorate in Physics from M.I.T.

Nationally recognized for his work in laser physics and the recipient of numerous fellowships, honorary degrees, and commendations, Dr. McNair was also a sixth degree black belt in karate and an accomplished saxophonist. In 1978, while working at the Hughes Research Laboratory, he was selected for the NASA space program. He was the second African American to fly in space. On January 28, 1986, Dr. McNair, along with 6 other astronauts, died when the space shuttle Challenger exploded and crashed into the ocean moments after lift-off.

After his untimely death, Congress provided funding to start the Ronald E. McNair Post-Baccalaureate Achievement Program. UCSB's McNair Scholars Program is dedicated to helping promising students follow Ronald E. McNair's path of scholarship and service.

Positioned near the lagoon overlook south of the University Art Museum, Annular Eclipse VI is part of UCSB's outdoor sculpture collection. Created by George Rickey (1907-2002), one of the world's foremost kinetic sculptors, the unique stainless steel arrangement of rings slowly rotate, making the wind visible. Completed just 2 years before his death, Annular Eclipse VI is a prime example of Rickey's seamless marriage of art and engineering.

