SAN JOSE STATE UNIVERSITY

McNAIR SCHOLARS PROGRAM

RESEARCH JOURNAL

* San Jose State University and McNair

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A MESSAGE FROM THE DIRECTOR

The San Jose State University McNair Scholars Program is pleased to present the tenth SJSU McNair Scholars Research Journal. This journal represents the diverse and practical research experiences of the McNair Scholars during the 2014-2015 academic year.

I would like to congratulate the scholars for their hard work, dedication, and accomplishments during the spring course and in the summer research program. My sincere appreciation to the faculty mentors for their guidance, time, and commitment to the scholars, their research and the program. A particular word of thanks goes out to the families and extended support systems that made these outstanding presentations possible.

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The Effects of Loneliness Among College Students

Biography

Arlene Agustin is a graduating senior earning a B.A in psychology with a minor in business. Through her academic journey she has grown toward her aspirations of becoming a researcher by examining topics of her interest, such as industrial organizational psychology, education, and mental health. Arlene will pursue her Masters and Ph.D. in industrial organizational psychology.

As a returning college student, she became Treasurer of the Psi Chi International Honor Society to provide a strong sense of community within the psychology department as well guiding and enriching her peers.

The Effects of Loneliness Among College Students

Abstract

When pursuing a college education, some students are unaware of the lifestyle adjustments and harsh realities associated with the college experience. Students who have a difficult time adjusting to college may endure feelings of loneliness due to discrepancies between their expectations of college and the reality of their college life. The following literature review examines research addressing the topic of loneliness and its influence on college students' adjustment, perceptions, and health. This review explores the different types of loneliness interventions that target the college student population, such as therapy sessions conducted by means of electronic communication (E-counseling) and structured opportunities to promote a sense of belonging. A brief discussion regarding loneliness and ethnicity and an economic viewpoint on the advantages of loneliness interventions are presented in this article.

Introduction

Loneliness is a psychological concern that has been found to be an indicator of a person's wellbeing (De Jong Gierveld & Tiburg, 2006). According to Cacippo, Fowler, and Christaki (2009), on average, every individual experiences loneliness 48 days out of the year. Even though this is a universal phenomenon, previous research has found that college students are more prone than others to experience loneliness (Ponzetti, 1990). In a study of loneliness among college students, Chen & Chung (2007) found that 30 percent of subjects reported being lonely, and six percent considered loneliness a major problem. Although there is a lot of research on loneliness, there is insufficient research investigating loneliness specifically among college students.

Loneliness is experienced in all age groups, but how it is experienced and the factors associated with each group can vary (Nicolaisen & Thorsen, 2014). Several studies from different disciplines have found the transition to college can be a stressful event that is difficult to overcome. During this transition, students are becoming more independent and discovering their identities. The conflict between students' expectations and what actually happens can lead to feelings of loneliness that sometimes go

unnoticed. This article contributes to the knowledge of the effect of loneliness among college students. It will examine the negative impact of loneliness on students' adjustment to college, perceptions of lonely students, and health implications for those experiencing loneliness. The article will also briefly discuss loneliness and ethnicity and present an economic viewpoint on the advantages of loneliness interventions.

College Adjustment

In order for college students to succeed in their academic careers they must have the ability to effectively overcome barriers that inhibit their college adjustment. Gerdes and Mallinckrodt (1994) studied areas of adjustment that may lead to students dropping out of college, such as emotional, social, and academic maladjustment. The study found that students overestimated their academic and social adjustment skills and underestimated their personal and emotional adjustment skills. This suggested that students enter college with the confidence that they will be successful in making new friends and excelling in their academic career, but they overlook the importance of personal and emotional adjustment skills that can prevent the onset of loneliness. For example, Quan, Zhen, Yao, and Zhou (2014) examined the effect of loneliness and coping styles (positive and negative) on the academic adjustment of freshman college students. The relationship between loneliness and academic adjustment indicated that loneliness impaired both academic adjustment and positive coping styles (i.e., positive outlook). The findings implied that students experiencing loneliness are likely to resort to negative coping styles (e.g. avoidance) and adjust poorly to the college environment. Overall, studies conducted by Gerdes and Mallinckrodt (1994) and Quan et al. (2014) indicated that loneliness and academic disruption coincide and are possible outcomes during a student's academic journey.

Perceptions

The negative perception of loneliness creates a stigma of lonely people as unfavorable and rejected by others (Lau & Kong, 1999; Lau & Gruen, 1992). Lau and Gruen (1992) investigated college students' impressions of a hypothetical college peer who was either lonely or nonlonely. They discovered that the perception of loneliness was affected

by the sex of the observer. Female observers negatively evaluated the lonely college peer as less attractive and less preferred as a friend in comparison to the nonlonely peer. Male observers did not negatively rate the lonely college peer to the same extent the female observers did. This research also reported that both genders observed loneliness as a more undesirable characteristic in males than females. The results were consistent with Lau & Kong's (1999) findings and suggested that students who experienced loneliness were more often negatively perceived by their peers; thus, they were further excluded from the college social environment.

The concept of college students stigmatizing their peers was expanded by Rotenberg's (1998) study, which examined whether stigmatization was based on the observer's belief about the amount of control lonely peers had over becoming lonely. This research found that peers were rejected if the observers believed that peers could have controlled their loneliness by attending social events and interacting with others. Lonely peers were accepted only if they were viewed as having no control, such as having a chemical imbalance.

Both Rotenberg's (1998) and Lau and Gruen's (1992) studies concluded that lonely college students are negatively viewed by their peers. The results suggested that nonlonely college students' perceptions may have a negative influence on their lonely college peers. For instance, lonely students may deny their loneliness, which can impact whether or not they decide to seek professional help.

Health Implications

According to Goosby, Bellatorre, Walsemann, and Cheadle (2013), without the proper skills and intervention from professionals, long-time loneliness can affect an individual's health. Several studies discovered a strong association between loneliness and psychological issues like depression, suicide, and anxiety (McWhirter, 1990; Wei, Russell, & Zakalik, 2005). Therefore, it would be of great interest to further examine the relationship between health and loneliness in college students. King, Garrett, Wrench, and Lewis (2011) investigated the physical and mental health of freshman college students who relocated in order to attend college. In this study, the majority of the students who relocated were first-generation students and immigrants from another country. A predominant

decline in health was found for the relocated students as compared to their non-relocated peers. Students who relocated reported that since attending college, they experienced changes in their habits, which they believed contributed to their decline in health, including an increase in fast food consumption, less physical activity, and poorer sleep quality. All relocating students reported making new friends, but they also experienced an increase of loneliness. These findings suggest that lack of social interaction is not the only factor to cause loneliness. Findings by King et al. (2011) were consistent with Chiu, Pong Mori, & Chow's (2012) findings regarding relocated students. Chiu et al. (2012) found that international students relocating to Canada or the United States for their education reported an experience of loneliness during their stay.

Preparing students and identifying symptoms of loneliness early on before entering college would help alleviate the health adversities that some students encounter during the transition. Goosby et al. (2013) investigated the early onset of loneliness and its health implications for emerging adults. Results indicated that lonely adolescent males have a lower chance of being overweight or obese in adulthood than lonely adolescent females do. Overall, the study suggested that the pathway of loneliness during adolescence is an early indicator of adolescents' mental health as adults. This finding was supported by Cacippo, Hughes, Waite, Hawkley, & Thisted's (2006) study that identified a link between depression and loneliness. The relationship between depression and loneliness increases the impact that loneliness has on health over the course of an individual's lifetime.

Interventions

The limited number of studies examining interventions for loneliness specifically for college students found that E-counseling and creating a sense of belonging (an individual's sense of a secure connection with others) are effective techniques. E-counseling is online therapy, where the interaction between client and therapist takes place electronically, such as via webcam, email, and chat rooms. Due to its accessibility, E-counseling is seen as a favorable form of therapy for college students (Tatlilioğlu, 2013; Walton and Cohen, 2011).

Utilizing Windows Live Messenger, Tatlilioğlu (2013) examined the effectiveness of E-counseling combined with a cognitive behavioral therapy program to reduce loneliness among college students. At the end of the 12-week program, the experimental group (students who received the cognitive behavioral program) reported fewer symptoms of loneliness than the control group did (students who did not receive the cognitive behavioral program). This study demonstrated the effectiveness of the combination of cognitive restructuring and E-counseling in reducing the feeling of loneliness.

With regard to interventions to reduce loneliness, previous research has found that an emotional component is associated with loneliness, such as a sense of belonging (Walton and Cohen, 2011). Walton and Cohen (2011) took an indirect approach to examine the effectiveness of a social belonging intervention among college students. The intervention aimed to help students gain a positive understanding and perception of difficult circumstances, resulting in a decreased sense of loneliness. The study found a relationship between ethnicity and health. The African-American students in the treatment group (manipulated to create a sense of belonging among the students) experienced an increase in wellbeing and reported fewer doctor visits than their Euro-American peers did. This suggested that the social belonging intervention might have reduced loneliness and thereby created an increase in health for the minority students. Further research is needed to examine the relationship between loneliness and ethnicity. Both Tatlilioğlu's (2013) and Walton and Cohen's (2011) research provided practical interventions that produced a reduction in loneliness that can be implemented by health professionals in a college setting.

According to Eisdenberg, Golberstein, and Hunt (2009), an economic viewpoint is needed to gain the attention of government officials in funding colleges to support the mental health of their students. Eisdenberg et al. (2009) argue that funding to increase mental health in college students is cost effective because it would result in fewer students dropping out of college and thus create steady revenue. Government and private funding will allow for future research on the effects of loneliness on college students, which can be used to guide colleges on prevention and interventions to reduce the experience of loneliness among their students.

Before colleges can take action, research must identify the factors that contribute to a pattern of loneliness in the college student population.

Conclusion

Research on the impact, symptoms, and initiating factors of loneliness has described the complexity of the psychological condition but has failed to examine these factors and their impact specifically on college students. The studies in this literature review provide evidence that loneliness in college students can have a negative impact on their social interaction, health, and college adjustment. Further research on effective interventions for college students experiencing loneliness is needed to alleviate factors that may produce loneliness.

While government officials are trying to decide if funding for college students' mental health is cost effective, some institutions have already started implementing solutions. Some colleges have government funding for programs such as TRIO, an umbrella for Federal outreach programs for at-risk youth and disadvantaged schools. There are eight different programs that assist individuals who qualify on the basis of one or more of the following criteria: low-income, students with disabilities, and first-generation college students. One program under TRIO is the Ronald E. McNair Scholarship Program (McNair). The McNair program prepares first-generation college students and low-income students for doctoral studies, but it provides even more than is required, such as a sense of community (U.S Department of Education, 2015).

Currently, I am a student in the McNair program. Before my involvement in the program I was not part of a network of friends or a close community, which made adjusting to the college environment difficult during my first semester as a returning transfer student. I was unaware of resources and opportunities that were available to me, such as lab experience, conducting research, or attending conferences. Since becoming a McNair scholar, I have benefited from the program's structure, which helped create a close-knit community of college students and provided guidance for my pursuit of a doctoral degree. Through these educational and personal support systems, hurdles that would have been difficult to overcome on my own did not seem as frightening. The difference in my

education experience before and after the McNair program sparked my interest in researching loneliness among college students.

Future research on loneliness in college students and minorities is important, but I also believe that the knowledge gained by these studies needs to be acknowledged by society. Expanding the research on loneliness will provide family and friends of college students and college staff with better understanding and awareness of loneliness among college students. The more we know about this topic, the more we can help reduce or prevent loneliness among students.

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The Characterization of Muscle Spindle Afferents to Inflammation in Adult Male Mice

Biography

Anusha Allawala recently graduated with her Bachelor's in Biomedical Engineering. During her time at San Jose State University she has served as the Vice President of the Biomedical Engineering Society and participated as a scholar of the National Science Foundation Engineering Leadership to Pathways Scholarship program. Her graduate school interests are in neural engineering with a focus on brain-machine computer interfaces and neurmodulation to better treat and understand neurodegenerative diseases. She plans to pursue her graduate degree in Biomedical Engineering in the Fall of 2015, and pursue a career in research and academia in neural engineering.

1.1 Background and Introduction

Musculoskeletal disorders and obesity are becoming increasingly common, serving as a burden to the healthcare system of various countries while decreasing the quality of life experienced by the adult population[1]. Patients with these diseases often experience severe disabilities, and it has been reported that increases in life expectancy and ageing populations are expected to make osteoarthritis, a painful musculoskeletal disease, the fourth leading cause of disability by the year 2020[1]. In addition, currently one-third of the population in the US is obese and this number is expected to increase in the following years[2].

Musculoskeletal disorders like fibromyalgia, osteoarthritis and several others are characterized by inflammation. Obesity is also characterized by inflammation and has an increasing incidence of fall-related injuries and disability[3]. Improper balance and movement that result from the impaired sense of body position and movement, known as proprioception, can be attributed as one of the main causes leading to fall-related incidents and injuries[4]. Similarly, in chronic pain states and musculoskeletal disorders, impairment of muscle sensory neurons may be contributing to the incidence of disability. One of the explanations behind these disease states could be the loss or improper activation of sensory neurons innervating skeletal muscle[5]. These neurons can sense several characteristics about the muscle's environment, including muscle stretch, pain, tension, temperature, etc., and serve an important purpose in conveying this information to the central nervous system to prevent injury to skeletal muscle and regulating movement. While there is a possibility of changes in the distribution of weight and center of mass contributing to the impairment of balance in obese people[6], there has also been prior evidence indicating that there is decreased sensitivity in plantar mechanoreceptors[7] and unfortunately, the mechanism of impaired balance in obese people is still not entirely understood.

Specialized muscle sensory neurons called proprioceptors, are responsible for providing information to the central nervous system about the position of the body's limbs in space. The cell bodies and axon terminals

of muscle sensory neurons or afferents, contain receptors for inflammatory factors that can alter their firing frequency[8]. Studies have illustrated this change in firing rate for Group Ia/II muscle proprioceptors (also known as stretch receptors) with the introduction of inflammatory factors like bradykinin[9], and improper signaling from these muscle proprioceptors can lead to problems with balance or movement[10]. As previously stated, musculoskeletal disorders and obesity are prevalent diseases characterized by inflammation and the different levels of inflammation experienced in these diseases have been identified as an important contributing factor. However, the mechanism and alteration in proprioceptive function resulting from systemic inflammation is not well understood at the receptor level[11]. Several research groups are now attempting to understand the pathway that is responsible for inflammation serving as a contributing factor to the development of these diseases and leading to balance and disability problems.

Previous studies in the lab have shown that the muscle afferent population response to stretch was found to have decreased following inflammation (Multivariate ANOVA, $p < .05$). However, it is unclear if this activity is due to proprioceptors (stretch receptor afferents) that are not properly activated or responsive following inflammation or because of an alternate mechanism involving other types of sensory afferents, such as activated pain receptor afferents that exhibit irregular and lower firing activity.

Based on the results previously found in the lab and in the literature, it is hypothesized that the stretch receptors Ia/II will show an altered to inflammation in mice. Our study will explore if individual stretch receptor afferents can be functionally identified with their firing activity also quantified, in order to explore if stretch receptor afferents are responsible for the difference in firing noted after inflammation. This would suggest that inflammation in male mice changes the muscle sensory information, especially the proprioceptive information from the muscle stretch receptors, reaching the central nervous system, and support our hypothesis. This impairment in proprioceptive signaling may therefore also help explain some of the mobility disabilities experienced in disease states characterized by inflammation, such as obesity and chronic pain.

2.0 Methods and Materials

2.1 *In Vitro* Muscle-Nerve Preparation

In order to study the effects of inflammation on proprioceptors, a previously developed *in vitro* mouse muscle-nerve preparation[12] was used for electrophysiological experiments. The use of this isolated *in vitro* system allowed us to specifically test and record activity of muscle stretch receptor afferents without perturbation from other factors, such as changes in muscle perfusion, or surrounding receptor neurons.

Mice were used as the test subjects for the purpose of the experiments. Mice have been well established as animal models of disease states, including systemic inflammation. A variety of genetic technologies and options currently exist with this animal model, and they also allow for a shorter period of time for dissection of our desired skeletal muscle of interest, and provide . In addition, it has also been shown that muscle sensory afferents in mice respond in a similar manner to human stretch receptor afferents during stretch[12]. The strain of laboratory mice used was C57BL/6.

To induce inflammation, adult male mice (4-6 weeks old) were injected with a dose of Lipopolysaccharide, (7.5×10^5 EU/kg) in the lower half of their body near their hind limbs as shown in Figure 1, and the control group was injected with Saline solution (200 μL). Lipopolysaccharide (LPS) is an endotoxin and a component of gram negative bacteria which induces a robust systemic inflammation response in the mice following injection. The dose used is well below the dose necessary to cause sepsis, but the does lead to a significant decrease in body weight (-9% vs. +0.5% increase in controls), a significant increase in spleen weight, and a significant decrease in plasma white blood cell count, presumably because of invasion of white blood cells into the tissue.

After a period of 18-hours following the injection, the mice were then prepped for dissection. The animals were deeply anaesthetized using isofluorane anesthesia and immediately decapitated and skinned. The hind

limbs were placed in a high Calcium ACSF solution, that was continuously bubbled with 95 % Oxygen and 5 % Carbon Dioxide. Our desired muscle, called the Extensor
Digitorum Longus (EDL) was then dissected out from both hind limbs, with the deep peroneal nerve still attached (Figure 1b[12]) . The dissected muscle was placed in an oxygenated bath with a volume of 25 mL, containing Synthetic Interstitial Fluid, which mimics the internal physiological environment of the mice, to keep the muscle alive. The volume in the bath was replaced with fresh SIF every minute with the help of a perfusion system.

A

B

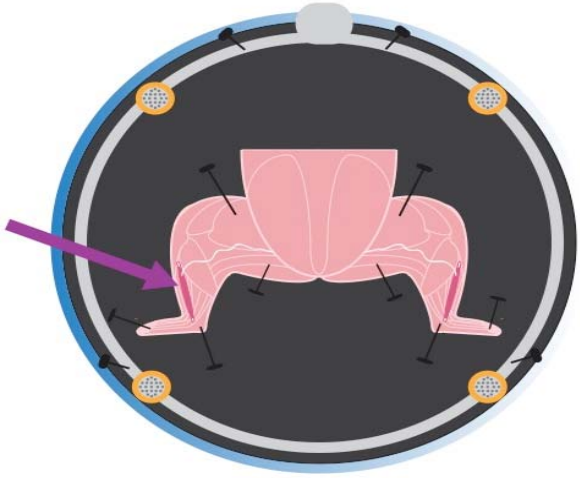


Fig.1[12] Placement of the saline and LPS injection (A); Location and dissection of the Extensor Digitorum Longus muscle in the hind-limb of the mice (B).

The tendons on both ends of the muscle were tied with 5-0 Nylon Sutures. One end was tied to a tissue post, and the other end is tied to a dual force and length controller (Aurora Scientific, 300C-LR). This controller was used to induce a series of ramp-and-hold physiological stretches in the muscle at a speed of 40%L_0/sec (L_0=optimal resting length of the muscle) for three sets of stretches at 2.5%, 5% and 7.5% L_0. The peroneal nerve attached to the muscle was suctioned up using a recording electrode, and the feed of neural activity was amplified via a differential amplifier(A-M Systems, Inc.) This output was visually displayed via a data acquisition system (PowerLab) on LabChart (AD Instruments), which also served as the primary data analysis software. This system allowed for a live feed of activity from the population of afferents housed on suctioned portion of the peroneal nerve. Figure 2[12] displays a schematic of the entire setup.

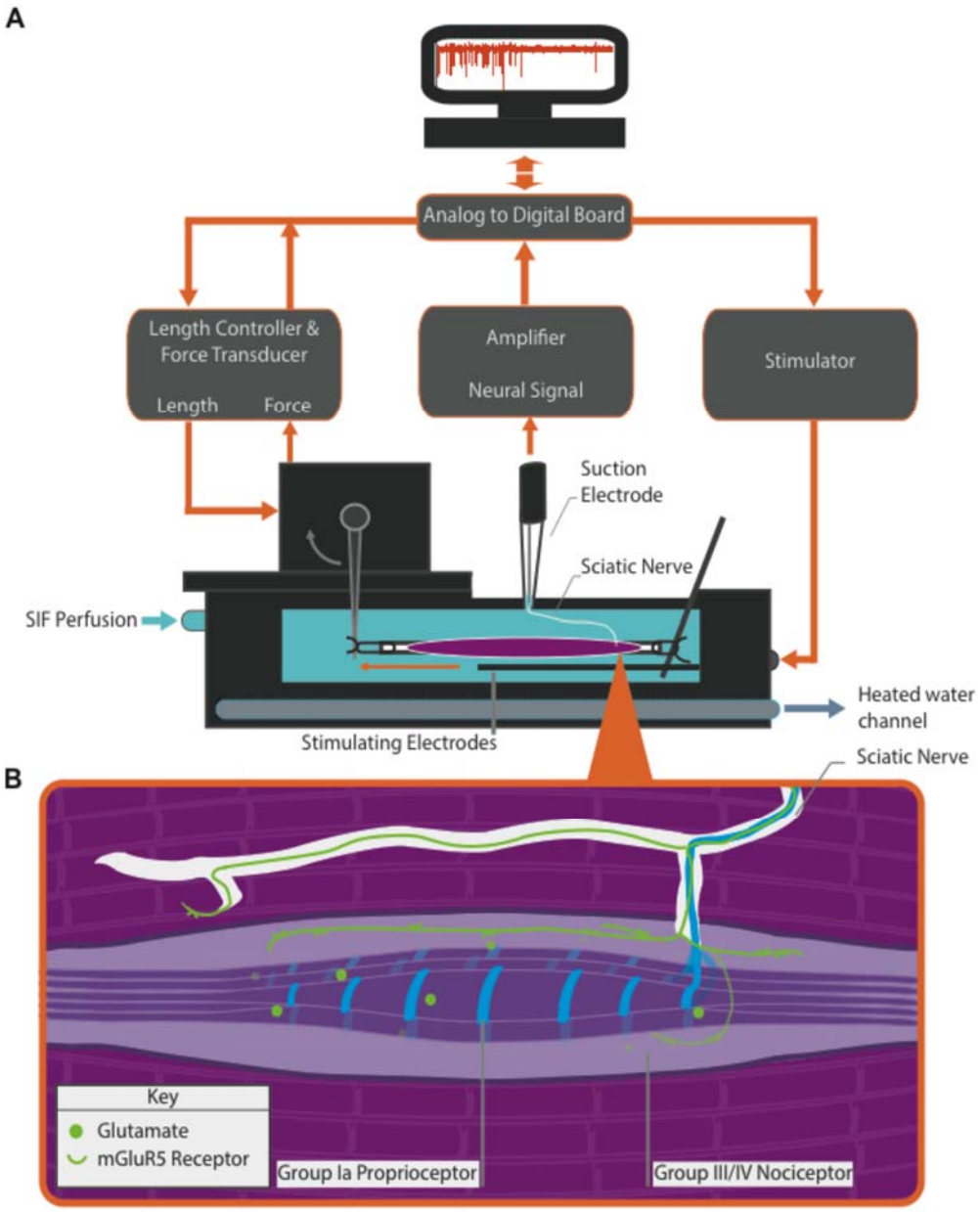


Fig.2[12] Schematic of isolated muscle-nerve preparation (A); Illustration of different afferents such as proprioceptors housed on peroneal nerve and

suctioned up recording electrode (B)

2.2 *Data Analysis*

The spikes observed through the neural recording were analyzed using LabChart. For the population response of all afferents, all units firing during baseline and stretch were identified and their cumulative activity quantified during phases in the ramp-and-hold stretch. Individual units or afferents putatively considered to be stretch receptors were separated according to the shape of the spikes (shown in Figure 3) and the instantaneous firing frequency calculated using this program for all stretch receptor units from the raw trace (Figure 4A and B)

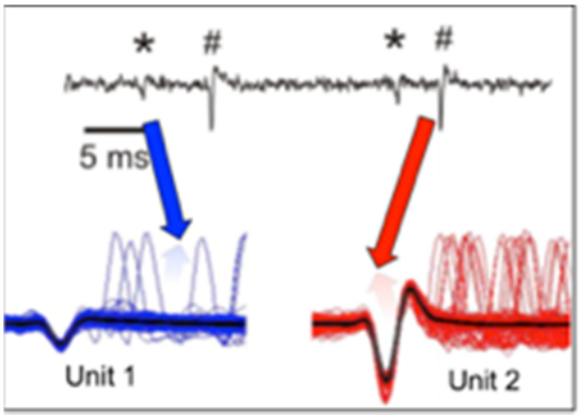


Fig. 3 Analysis of Neural Signals--The two units are identified according to their shape;

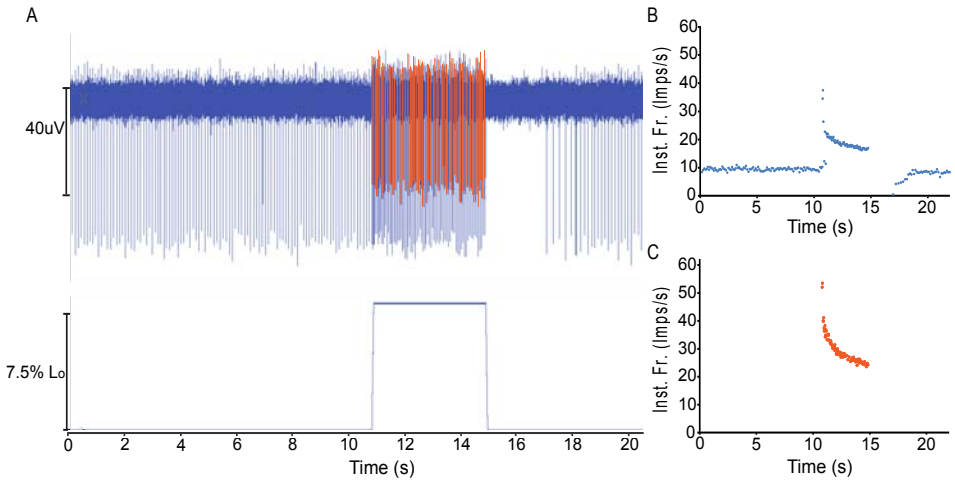


Fig 4[12] Raw Trace of Data During Stretch and Baseline (A); Computation of firing activity that is later plotted (B) for each unit. Each individual unit is allocated a different color (red and blue) during the trace and the instantaneous frequency computation.

Stretch receptors were functionally identified through the administration of a 1Hz 60 seconds test, where the muscle was stimulated once every second for 60 seconds, and a pause in firing activity of the observed receptor for all sets of contractions verified that afferent as a stretch receptor afferent. (Figure 5) Their response shape during stretch after computation of instantaneous firing frequency (refer back for Figure 4B) was found to be characteristic of stretch receptors and used as an additional measure to verify the nature of the afferent[9].

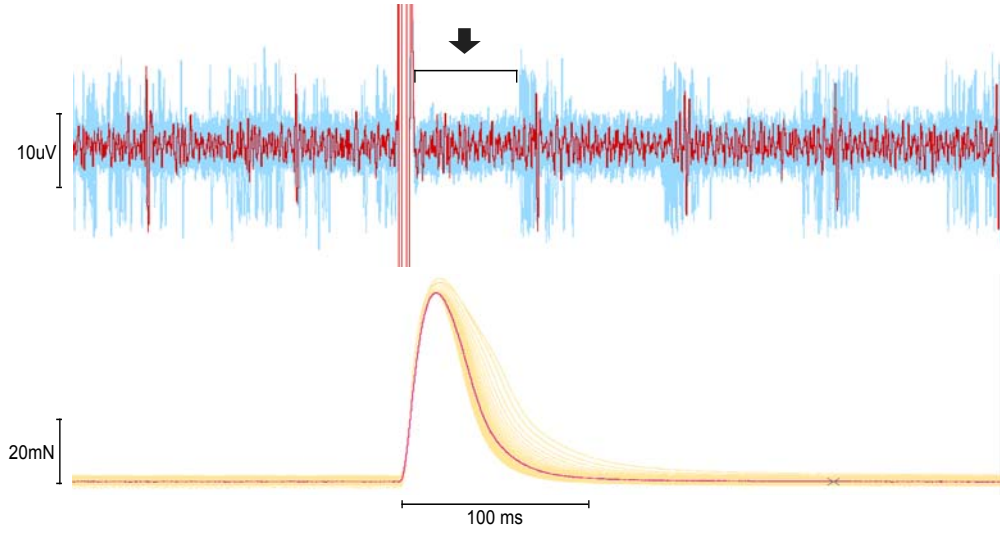


Fig 5 Contraction administered through electrical stimulation of the muscle (Bottom) to observe a pause in the firing of stretch receptor afferents (Top)

The static response to stretch was computed during the SR period, where the stretch was held from 3.25 seconds into the stretch to 3.75 seconds into the stretch. This value was normalized as a percentage of the baseline activity (when no stimulus was applied) to account for day-to-day differences in the number of afferents recorded from to accurately observe the change in firing activity after stretch was induced. The dynamic response to stretch was computed during the UP phase, where the length of the muscle was increased at a speed of 40%l0/sec, until it was held at the stretch for 2.5%, 5% or 7.5%L0. This value was also normalized as

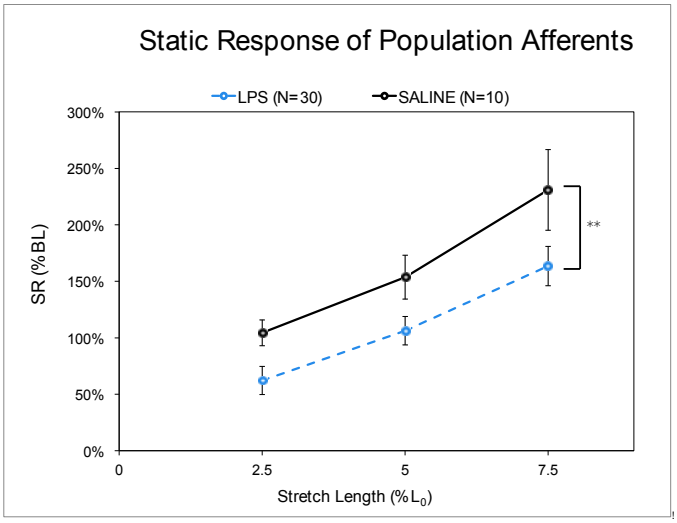
percentage of baseline activity to observe the change in firing activity as the length of the muscle was continually increased. Both measurements used displayed the nature of the response of the population afferents, and the sensitivity of these receptors to both types of stretch, static and dynamic.

For the individually identified stretch receptor afferents, the firing frequency was computed during the same static phase as for the cumulative afferents, but the dynamic change in response to stretch was computed differently. 0.25 seconds into the stretch until 0.75 seconds (referred to as IST) into the stretch the firing frequency of a stretch receptor was computed, and this value was then subtracted by SR to illustrate the falloff in activity during stretch. This measure was referred to as JST. These values were expressed as a difference of baseline activity, (SR-RD) and not as a percentage to prevent computational errors when analyzing stretch receptors with no baseline activity.

3.0 Results

It was found that the cumulative response of the muscle sensory afferents was significantly lower in the experimental group with induced inflammation, when compared to the control group during the static phase of the stretch, but no significant differences were seen during the dynamic phase of the stretch, as shown in Figure 6.

A



B

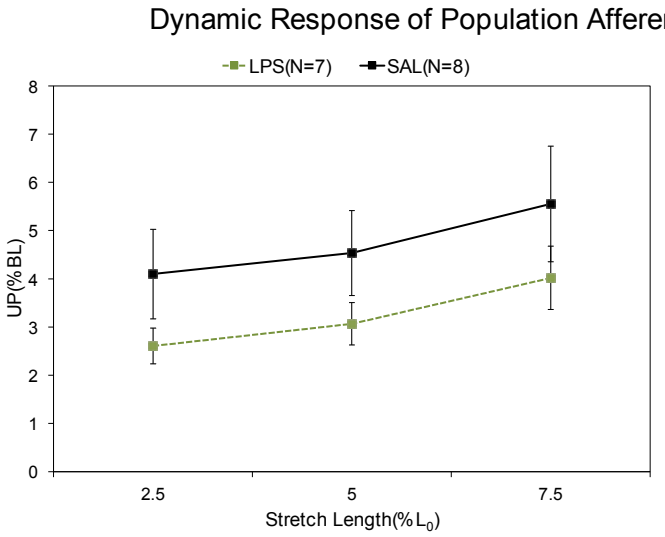
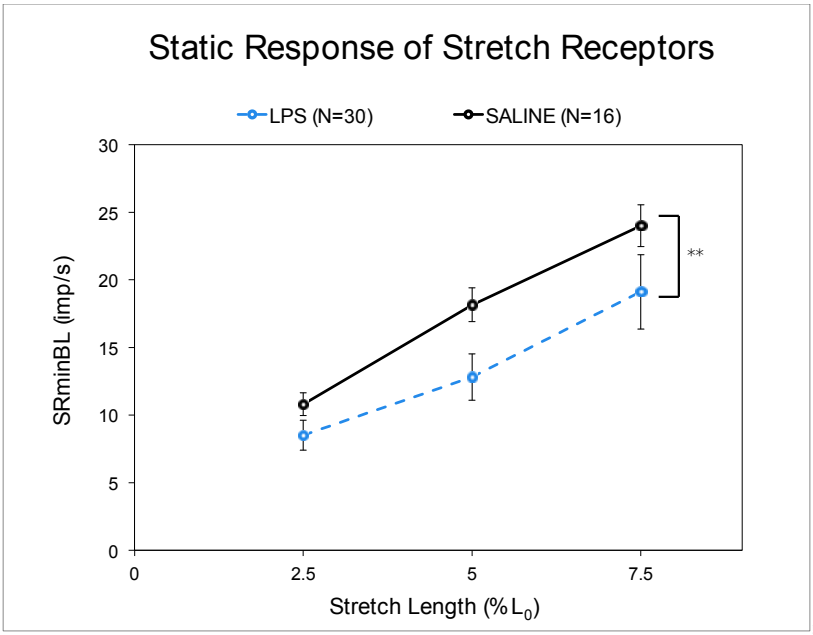


Fig.6 Static Response during the SR phase observed to be lower (** indicates $p<0.05$, multivariate ANOVA) (A); Dynamic response trending towards the lower end but not significantly different in the pretreated LPS animals (B)

Looking at the response of individual sensory afferents identified to be stretch receptors, it was found that stretch receptor activity was also significantly blunted in the males undergoing inflammation when compared to the control group during both the static and dynamic phases of the stretch, as shown in figure 7.

A



R

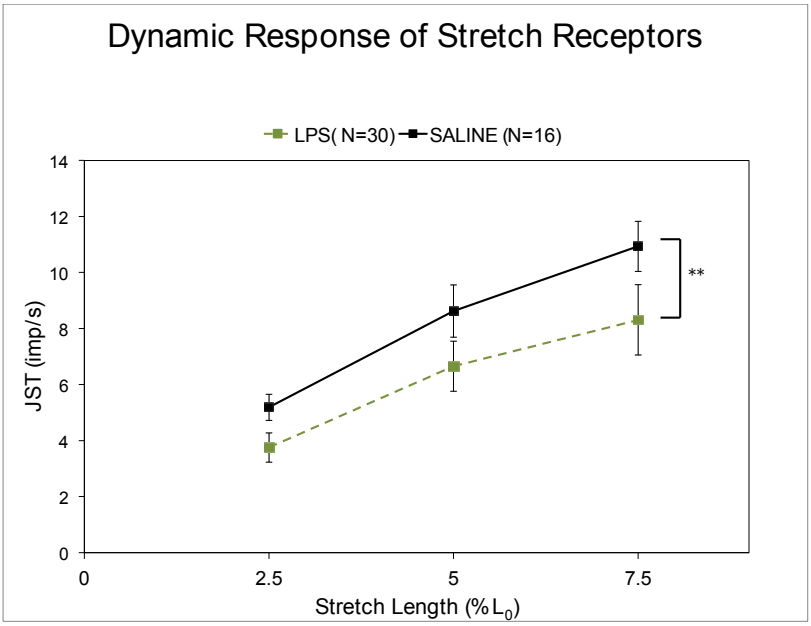


Fig.7 Static Response of stretch receptor afferents significantly blunted in LPS animals (** indicates $p<0.05$, multivariate ANOVA) (A); A similar response is seen for the dynamic response (B)

4.0 Discussion and Future Directions

It has been reported in the literature that muscle stretch receptor afferents increase their firing rate linearly in response to increasing physiological lengths[13], which was also observed in this study and seen in figures 7A, 7B, 8A and 8B for both the experimental LPS and control groups. However, despite a linear increase in firing of stretch receptor afferents and population afferents with increasing length of the muscle, there was a significant alteration and decrease in the response of these afferents in the LPS animals during stretch, as compared to the control animals. As stated earlier, it was hypothesized that stretch receptor afferents will alter their activity following inflammation, and the results of this study have supported this hypothesis.

The decrease observed in the static and dynamic sensitivity indicates

the possibility of impaired stretch receptor function and an inability of impaired stretch receptor afferents to respond to quick changes in the length of the muscle. These results confirm that a subtype of muscle sensory neurons known as stretch receptors Ia/II that are important for proprioception, are impaired following inflammation. This could potentially mean that the information sent to the central nervous system by stretch receptors and other muscle sensory neurons is incorrect in disease states characterized by inflammation. If this is the case, this could help explain the impaired proprioceptive function seen in diseases like obesity, and in musculoskeletal disorders where movement is limited.

Future studies in the lab will analyze the difference in responses between female animals injected with LPS and Saline, and the effect of inflammation on their stretch receptor function, to discover if there are any potential sex differences between the male and female response to stretch following inflammation.

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Culture Shock in Viet Nam: A Case Study on the Reification and Negotiation of the Pseudo-environment

Biography

Andrew Anguiano is a recent graduate in American Studies who has a love for cultures and travel. This passion for cultures manifests in his research interests in cultural ethnography and thinking critically about cross-cultural communications. The following paper represents research he completed after a month in Viet Nam. In his free time, Andrew also enjoys hiking, trying new foods, and attending music events.

Culture Shock in Viet Nam: A Case Study on the Reification and Negotiation of the Pseudo-environment

In the summer of 2014, six students from San Jose State University embarked on a faculty-led study abroad program (FLP) trip to Viet Nam. Heading the program was Dr. Lisa Stenmark of the university's undergraduate Humanities Department. The road to Viet Nam had been long and bumpy. It was originally scheduled for the previous winter, but burgeoning bureaucratic issues prevented the trip. With the sole exception of the author of this paper, all students who had initially expressed interest in the FLP were unavailable when it was delayed to summer. A colleague of Dr. Stenmark, whom I'll call Dr. Smith and who teaches in one of the university's graduate programs, suggested recruiting in that program, as she was in the process of developing a course there. As a result, five students enrolled, and Dr. Smith accompanied us to observe and make contacts in Viet Nam. The FLP trip to Viet Nam finally occurred.

On the ground, the students had varied reactions to Viet Nam. For some the experience of crossing streets inundated with traffic triggered intense emotional reactions. There was disagreement about the quality of the street food. Students talked about how to interpret interactions with locals. In all, this is not surprising; individuals will vary in their experiences of a new culture. Yet despite these differences, the graduate students shared a common approach of hesitation in Viet Nam and shared some dissatisfaction with the trip. In defining the approach of the students it is important to consider their similarities. They were all from the same graduate program. They all knew one another prior to the FLP and expected to take classes together afterward. These five students, all women between their mid-twenties and early thirties, in effect formed a cohesive group. For the majority of the trip they travelled, ate, socialized, and made decisions together. They chose "safer" restaurants over street food, expressed anxiety about the trip itinerary, and bemoaned insufficient amenities.

To be sure, vast cultural differences exist between Viet Nam and the United States that would evoke hesitance in many travelers. Yet in general, the approach of the five graduate students reflected their collective hesitance and experiences of culture shock. This leads to my research

question for this paper: in the case of the summer 2014 Viet Nam FLP, what abated and/or contributed to feelings of culture shock among student participants? This question is important because it begins to reveal problematic assumptions underlying the contemporary culture of study abroad and global exchange. My paper stands in contrast to the "contact hypothesis," a belief that cultural immersion *in and of itself* is a vehicle for effective cross-cultural contact and understanding (Savicki 62-3). According to this logic, mere proximity with cultural others is sufficient to combat prejudice.

I will argue here that the Viet Nam 2014 FLP provides a case study on how the contact hypothesis fails to adequately describe cross-cultural contact. In response to my research question, I assert that in the case of the Viet Nam 2014 FLP, high peer cohort and low host culture interaction along with little critical self-reflection contributed to significant culture shock among student participants. These factors contributed to culture shock because they discouraged student participants from critically engaging their cultural assumptions and prejudices and also denied a voice to the cultural other in negotiating what Walter Lippmann describes as the "pseudo-environment." Walter Lippmann argues that "under certain conditions [people] respond as powerfully to fictions as they do to realities," for they have mistaken the former for the latter (14). This is the pseudo-environment, an interaction between the individual and his "real" environment that takes many forms, such as in beliefs, symbols, and representations. Individuals will, in this way, react to the pseudo-environment because they believe it to be real, and culture shock is the anxiety and other psychological consequences that result.

Methods

In this research I utilize grounded theory as my primary methodological approach. Grounded theory promotes the emergence of theory from data through broad and exploratory research designs. My research focuses on qualitative interviews with my peers and professor from the Viet Nam FLP and situates this interview data against the broader theories and literature on transcultural contact. These interviews were hour-long one-on-one in-depth interviews framed by interview guides with room for follow-up questions based on participant responses. Pseudonyms have been assigned for the students interviewed or involved in the FLP in order

to secure their anonymity. The graduate program of the five students and additional professor also remains anonymous. I sought to interview all who participated in the Viet Nam FLP; however, only four of seven participants from the trip were interviewed: Dr. Stenmark and three students. The other professor, who I shall call Dr. Smith, and the other two students could not meet due to schedule conflicts.

In designing an interview guide I used literature on culture shock and transcultural contact as sensitizing concepts. Glenn Bowen quotes the late American sociologist Herbert Blumer's definition of sensitizing and definitive concepts as follows:

> A definitive concept refers precisely to what is common to a class of objects, by the aid of a clear definition in terms of attributes or fixed benchmarks… A sensitizing concept lacks such specification of attributes or benchmarks and consequently it does not enable the user to move directly to the instance and its relevant content. Instead, it gives the user a general sense of reference and guidance in approaching empirical instances. Whereas definitive concepts provide prescriptions of what to see, *sensitizing concepts merely suggest directions along which to look.* [emphasis added](2)

To utilize a sensitizing concept in a research design is to account for the possibilities of certain ideas without yet endorsing their relevance to the research at hand. I produced questions that were specific enough to address issues salient in the literature on transcultural contact yet broad enough to avoid fishing for preconceived answers. Examples of this type of questioning are found in two questions I constructed with consideration of Victor Savicki's article "An Analysis of the Contact Types of Study Abroad Students," in which the author identifies how interaction with members of the "home" culture—the culture individuals leave to study abroad—reinforces ethnocentrism. With regard to my interviewees' experience in Viet Nam, I asked, "What were your interactions like with your department peers?" and "How often and in what ways did you interact with people in or from the U.S.?" These questions sought to address the possibilities that

emerge from Savicki's research without conforming to his thesis. In this way, the existing research "sensitizes" me to certain possibilities.

The grounded theory approach and sensitizing concepts provide compelling starting positions for research without granting too much explanatory power to existing literature. Grounded theory and sensitizing concepts are mechanisms through which research can be contested and evaluated even as it is referenced. Limitations of both the research and researcher are important to consider, and I rely on grounded theory to best deter my own social location from framing my research findings. I participated in the FLP that is currently under study. My own experiences provide insight into the events that occurred but in other ways hinder my ability to identify how, why, and to what extent culture shock manifested. For this reason I limit the extent to which I invoke my own experiences and interpretations.

In my research design I also draw from Claude Steele's methods to identify possible disparities between the reality of participant experiences and the responses they construct in the context of academic research. In an interview one may tend, with or without conscious intent, to present herself favorably. To more accurately gauge student participants' backgrounds with diversity and multiculturalism, I first asked them to describe experiences they had with diversity prior to visiting Viet Nam, and second, to identify their five best friends. An analysis of the names given provided a way to verify the reliability of responses about experiences with diversity since the names offered a rough indication of the ethnic makeup of the participants' discourse communities. After analyzing this evidence I found that my respondents seemed to speak accurately about their experiences with cultural diversity, with some identifying their strengths in having completed academic study of diversity and others their weaknesses from growing up in sociocultural homogenous environments.

Moving onto the analysis of my data, with participant consent I audio recorded my interviews so I could replay the audio for partial transcription. I then interpreted and drew connections between interview responses in order to codify the data into several categories. I wrote memos about this data to analyze and identify trends, and finally I sorted and saturated my arguments with appropriate theory and research. These findings are organized into two separate yet interconnected parts, the first

with a focus on student prejudices toward Viet Nam and the second the denial of the cultural other.

The Peer Cohort and Reification of the Pseudo-environment

In thinking about the experiences of research participants abroad, first and foremost for consideration are how their expectations of Viet Nam and the FLP framed their experiences. In general, participants expressed feeling that their initial expectations were not met by the trip— neither their romantic preconceptions of Viet Nam nor their understanding of the class objectives—thus resulting in surprise and shock at the on-the-ground reality of the country. These expectations reflect constructions of an "authentic" Viet Nam as pre-modern and rural. Yet, as one student explained, what she thought would be a "scenic adventure" proved instead to be an inundation of noise and people. Students first entered Viet Nam through the Tan Son Nhat International Airport in Ho Chi Minh City (HCMC), a metropolis that participants perceived to be characterized by endemic overcrowding, poverty, and pollution. The sidewalks are flooded with people idling, traveling, and soliciting; and the streets congested with vehicles whose emissions exacerbate the humid air. This disparity between a pre-modern "scenic" image of Viet Nam and the metropolitan reality echoes constructions of the nation that are historically persistent. Robert Templer describes how French filmmakers in the 1980s were dumbfounded upon visiting HCMC, for nowhere were the "romantic landscapes" of which they had read and envisioned (12). Hopes of a countryside "untouched, still Asian," reveal an attachment to a supposed "authentic" Viet Nam of oriental villages and landscapes in contrast with the "ruined" and "inauthentic" urban Viet Nam of "poverty and overpopulation" (12). Despite this reality, filmmakers reproduced their romantic visions of Viet Nam in cinema, ushering in waves of tourism fueled by what Tess Do and Carrie Tarr describe as nostalgic fantasy (60). When HCMC failed to correspond to these images in students' minds, they were jolted. Even participants who had a more accurate conception of Viet Nam explained that they felt this shock of disbelief. Victoria said she "knew about the poverty" in HCMC but paralleled these expectations with "camping," thinking, "I can rough it out." In this response appears an image of Viet Nam different from that of scenic landscapes, yet no less romantic. In fact, she explicitly admits she had "romanticized the trip" and that "talking about poverty in the

classroom" could not prepare her for the reality on the ground. It is different to talk about such issues, tinged with a romantic spin of "roughing it," than to "view and truly understand poverty."

Just as expectations of a pre-modern Viet Nam were dashed, so were expectations of the course objectives. Participants enrolled in the class to fulfill requirements toward their graduate program. The class focused on culture and the environment, which are Dr. Stenmark's expertise, yet students expected more fieldwork reflective of their graduate field of study. Chloe stated feeling frustrated because she had already finished an undergraduate degree and thus felt she should not have to complete work irrelevant to her graduate program—she had "already done that." Even students such as Diann, who were more enthusiastic about the assignments, felt disappointed by a lack of recognition or investment from Dr. Stenmark. Both Dr. Stenmark and Diann admit there was a disconnect between the professor and graduate students. Dr. Stenmark argues that lack of communication and clear boundaries between her and Dr. Smith instilled and cemented this detachment. Dr. Smith was not a professor officially responsible for the trip but had gone more of her own accord. As a result, Dr. Smith "was not sure if she wanted to be the students' professor or friend," and if she wanted to "work or vacation" in Viet Nam. Students were unaware of Dr. Smith's unofficial status and, given their expectations of receiving training pertinent to their studies, they perceived her as a significant authority. In this way she was erroneously marked as the students' professor. The miscommunication inherent in the dynamic between the students and the professors in part detracted from Dr. Stenmark's credibility, as she insists that her itinerary could have aided the graduate students in thinking about and working with diverse communities. However, overall the course expectations of the graduate students as well as their assumed relations to Dr. Smith propelled them to detach from Dr. Stenmark.

Despite the displeasure of unsatisfied expectations regarding Viet Nam and the course objectives, misconceptions of cultural others may provide fertile opportunities for critical reflection. Unfortunately these opportunities were rarely realized during the FLP due in part to how students responded to their new environment. They clung together as a cohesive whole and, in addition, reacted to a pseudo-environment without

accounting for its fidelity. Students relied on one another as representations of "familiarity among the unfamiliar," as one participant phrased it, and for comfort and validation. In essence, "groupthink" seized control of the graduate students, reinforcing cultural prejudices while diminishing critical thinking about one's fundamental sociocultural assumptions. As mentioned in this paper's introduction, for the majority of the trip the graduate students made nearly all decisions together, travelled together, and socialized with one another. Deviance was tacitly discouraged since the students had to maintain positive relations. One participant mentioned that she had to share a bed with another student and take classes with her the following two semesters, so she could not afford to "piss her off." Cohesion was essential, and thus the peer cohort culture exerted overwhelming influence.

The most adverse effects of this peer cohort culture occurred whenever someone from the group expressed anxiety or reservations. As Valerie states, the dynamics of groupthink would often validate an otherwise pedestrian concern into something more monstrous and gripping. The result of such groupthink is an interdiction between the peer cohort and the environment, a pseudo-environment comprised of representations of Viet Nam constructed by the students themselves. Lippmann describes how a pseudo-environment becomes problematic when its observers do not take into account its degree of fidelity, for their reactions to the pseudo-environment occur in the "real" environment and reinforce misrepresentations in a vicious cycle (16). Student participants did not take this fidelity into account, opting instead to uncritically reify their pseudo-environment. The result was a diminished sense of adventure or enthusiasm to try new things, accompanied with a lack of engagement with one's cultural prejudices.

For example, Diann admits she came to Viet Nam with preconceptions that the street food was "delicious." Yet, for the students the perceived lack of institutional formality and hygiene associated with street-food culture preceded its otherwise positive reputation. Despite both professors standing testimony to street food's safety for consumption, the students generally considered it unsafe. As a result they mostly ate food at restaurants, locations that have institutional formality. Here the Vietnamese were more likely to offer a menu or speak English, both of which provide a sense of predictability and comfort. Granted, one student had severe

allergies that made eating in Viet Nam difficult. Yet, even when this student was not present at a pit stop during an extended drive, most of the students decided against a street vendor selling phở. Only one from the group decided to eat while the rest explored the area for "safer" options, later venerating the one who ate street food for her "bravery." What occurred here was anxiety about the contents and safety of the food, which were taken up and validated by the group. These anxieties were projected upon the vendor to constitute a pseudo-environment, to which the students responded with hesitance.

As Lippmann argues, reflection is integral in deconstructing this pseudo-environment projected from student prejudices. Toward the end of abating anxieties and cultivating awareness of those prejudices, some participants said that the thick description assignments Dr. Stenmark had them complete were helpful. Thick description is an approach in anthropology through which researchers examine cultural objects by first providing "objective" descriptions and then extrapolating symbolic meaning therefrom. This assignment models for students how to suspend their own prejudices when approaching cultural artifacts in order to better discern the meaning imbued by Vietnamese culture in such objects. After completing these assignments students would congregate together with the professor to share what had been learned about Viet Nam. "The thick descriptions focused me in on certain things [amid the overwhelming stimuli] and gave me a greater understanding of the culture," Victoria said. "I then felt like I knew why certain things were happening."

Not all students enjoyed the thick descriptions. As stated, there was some discontent about the seeming irrelevance of the classwork to their graduate field of study. Unfortunately participants also admit that, apart from the thick descriptions, they did not spend much time reflecting on their experiences in Viet Nam, which furthered the influence of the peer cohort while diminishing opportunity for critical thinking about cultural assumptions. One participant stated she wanted to journal but rarely did, while another managed to write only a chronology of daily activities rather than her impressions, thoughts, and feelings regarding her experiences. Dr. Stenmark stated that she did not observe much cultural adjustment until after the trip when students were required to reflect for their final projects. This fact emphasizes the effectiveness of separating oneself from the group

and committing time to thinking about one's experiences. In part, students blamed the class itinerary for not providing sufficient time for reflection. They felt that the day-to-day agenda was sporadic and could have benefited from time more consistently and explicitly designated for critical reflection. How Dr. Stenmark might have accomplished this is unclear. Yet one student communicated that, in light of her lack of reflection, she was unconvinced during the trip that she could have even changed how she or her peers were feeling. In this way futility characterized her thoughts about the peer cohort dynamic. The group had become so entrenched and self-validating that not much could occur to disrupt the reified pseudo-environment in Viet Nam.

Host Culture Interaction and Negotiation of the Pseudo-environment

Findings from another case study on study abroad students contend that high peer cohort interaction only contributes to culture shock when coupled with low host culture interaction (Savicki). High peer cohort with high host culture interaction tends to produce high student satisfaction with study abroad experiences. Therefore, the latter variable appears salient in defining one's experience of culture shock. However, in this case study what appeared pivotal to student satisfaction and comfort was specifically bonds with local Vietnamese who acted as cultural ambassadors. This finding is not meant to make null my argument thus far, but to complicate it by suggesting that the deleteriousness of the peer cohort dynamics examined is contingent also on a lack of connection with the cultural other. Respondents stated they were initially "thrown off" by how unemotional and unfriendly the Vietnamese people seemed. Diann recalled, "That's just the vibe I got. People were more to themselves and I just wasn't used to that from having traveled to outwardly jovial countries like New Zealand and Brazil." On the streets students admitted feeling like "customers," "tourists," and "consumers." All their conversations felt, as Chloe stated, "facilitated, except for those with the few friends we made. And the tour guides." Coupled with the language barrier, the perception of the Vietnamese as impersonal and "unwelcoming" made it difficult for the women to "get around" and "connect with people."

The importance of host culture interaction can be found in one of Chloe's responses. "I liked Tranh," she stated. "He was very good at calming me down." High host culture interaction diminishes culture shock because in this interaction cultural others have an opportunity to disrupt

representations created by tourists. Tranh was a tour guide who accompanied the class on some of our excursions and whose company the group all said they enjoyed. One student, who unfortunately was among those I was not able to interview due to scheduling conflicts, even swapped emails with Tranh when saying goodbye. We trusted and bonded with this individual, who in turn eased anxieties by acting as an ambassador to his culture. In fact the same student who described being "turned off" by the Vietnamese's "unwelcoming vibe" conceded that they were in fact "really friendly" when engaged in conversation. They just didn't seem to "smile a lot" or wear "their emotions on their sleeves," as is more commonplace in Western and Latin American countries. On the same note, Valerie felt flattered by Vietnamese students' enthusiasm for talking to American students. The FLP students participated in a café night with local Vietnamese who wanted to practice their English, and in large part these conversations consisted of communicating different cultural practices and traditions. Thus, in the act of active engagement with the other one can begin to move past prejudices, such as believing the Vietnamese are unfriendly. Returning to Tranh, these types of individuals become cultural ambassadors who, by forming trust with tourists, negotiate with these representations of Viet Nam. In the absence of this host culture interaction, the prejudices of foreigners were mutually reinforcing, suffocating, and denying a voice to the cultural other.

In essence, an unwillingness to negotiate the pseudo-environment exacerbated culture shock. In my interviews, participants reflected that there had occurred "too much complaining" among the peer cohort. Such complaints ranged from dissatisfaction with how Viet Nam did not correspond with their preconceptions, the perceived rigidity and irrelevance of the class itinerary to student knowledge development, and reservations about how the Vietnamese perceived the students. Latent in all these dissatisfactions is a desire to change what they perceived to be their unfortunate situation in the immediate environment. What participants seemed to lack was control. Such lack of control may drive one to belligerently exercise what power they seem to have, in this case resulting in a reification of the pseudo-environment. One student admits this prevented them from better enjoying and reflecting while on the trip: "What

we needed to do was just let go and not care. I don't think we were able to do that."

Reflecting on one of my own first experiences with culture shock, critical reflection and this willingness to "let go" of one's cultural perspective and authority seem to be useful in identifying and adjusting the pseudo-environment. When I first left the airport in Viet Nam I purchased a taxi to the hotel Dr. Stenmark had reserved for the portion of our trip that occurred in Ho Chi Minh City. I did not know where I was going and was completely shocked by the way the cab driver and others on the road were maneuvering traffic. The streets in Viet Nam are chaotic compared to what Americans experience. Hyper congested with traffic from large vehicles and plentiful motorbikes, vehicles drive in much greater proximity than in the United States, constantly moving in and between lanes and committing what we define as "tailgating." Fear was my immediate reaction to this scenario, for a situation like this at home would have undoubtedly meant a collision or even death. Yet, as I caught my breath in the back of the cab, I recognized that I interpreted this scenario as "bad" driving. I based a representation of the culture on my own prejudices. But this was the cab driver's country, not mine. And so I let go of my representation of Vietnamese traffic and placed trust in the driver to safely transport me to my hotel.

What might have contributed to this identification of cultural prejudices was solitude; in this scenario I was without contact with any member of my host culture and thus exempt from groupthink and other mechanisms through which my cultural perspective might have been validated. However, the opposite could very likely have occurred: the shock of Viet Nam without the safety and reassurance of my host culture could have engendered intense anxiety and fear. As stated, in these instances one may grasp their cultural perspective as a source for safety and validation. What seemed to have worked in this instance was an admission that one's cultural logic simply cannot be imposed onto a different culture. Put another way, in response to comments made by students during the FLP, Dr. Stenmark occasionally remarked that "it's their [the Vietnamese's] country." Viet Nam is not the United States and should not be judged and maneuvered as if it were. When one abstains from putting this maxim into

practice prejudices and assumptions may be entrenched as safeguards to what is perceived as a cultural or epistemological affront.

Conclusion

As Walter Lippmann reminds us, although individuals define their actions in reference to the pseudo-environment, these actions play out in the physical environment (16). Despite reflecting an imagined reality, prejudices have real repercussions. They produce anxieties and hesitance in individuals that detract from travel experiences and the effectiveness of cross-cultural communication. Misrepresentations about the cultural other are reified and these distant voices denied recognition. In this way it is useful to think about such culture shock as a reification of the pseudo-environment. Under the pressures of a new environment and misconceived expectations, culture shock describes a retreat inward toward one's own cultural framework. In the case of the Viet Nam FLP, high interaction among the peer cohort coupled with limited interaction with cultural others contributed to this move inward in the construction and reification of the pseudo-environment.

This research illuminates, in contrast to the contact hypothesis, how proximity is not sufficient in initiating and facilitating effective cross-cultural communication. As gleaned in the research, anxieties and expectations associated with this interaction could entrench individuals in their conceptions of themselves and the other. Individuals must be pushed to reflect on their representations and recognize the valuable contributions of these cultural others in constructing their worldviews. How this can be achieved is a difficult feat, and to a certain degree culture shock is and should be inevitable in any trip. Rather, what could be more fruitfully addressed is how to learn and adapt to these feelings. Thinking about authority seems central in addressing one's experience with culture shock and adjustment and student satisfaction. Dr. Stenmark lost authority as a guide, thus limiting her influence in facilitating positive discussions about Viet Nam. More authority was granted to the home culture and the peer cohort, whose approach of hesitance was mutually reinforced and validated in the near absence of intimate connection with cultural others. In the future, clearer expectations and relations between professor and students could prevent a repeat of the student dissatisfaction during the 2014 FLP to Viet Nam. Additionally, more connections with cultural others could promote a

smoother adjustment, although because some students felt alienated by how "facilitated" much of their interactions with locals felt, it would seem this is the responsibility of the individual student as much as it is that of the professor. A course itinerary and professor can do much to promote effective cross-cultural contact, but in the end, these can only nudge the group that remains hesitant and unwilling.

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Appendix

Demographic Questions

Name:

Age at time of trip:

Gender:

Ethnicity:
Religion:
Please list the names of your five best friends:

Interview Questions

Expectations and Intent

What were your experiences with travel and tourism before VN?
Could you explain in a brief 1–2 sentences what your experiences were with cultural diversity growing up?
What did you expect VN to be like before you left?
Where do you think these expectations came from?
How do you think the VN trip was intended to fit into your training as an occupational therapist?
In the last question you may have described some training/qualifications you thought the VN trip was meant to fulfill. If so, was the VN trip the first time you were exposed to this type of training? Please explain.

VN and Cultural Contact

How did you feel during the first few days in VN?
Culture shock describes feelings of discomfort that arise from unfamiliar sociocultural settings and scenarios. On the contrary, cultural adjustment describes the experience of overcoming or circumventing these feelings of discomfort and adapting to a new culture. To what extent would you say you experienced culture shock and adjustment during the VN trip?
Describe a moment of culture shock and how you reacted.
Describe a moment of cultural adjustment.
In one word how would you describe your approach or general attitude while in VN?
What were your reservations or worries while in VN?

Interaction

What were your interactions like with local Vietnamese?
What were your interactions like with your OT peers?
How do you think your interactions with your peers affected your experiences of culture shock and adjustment, or vice versa?
While you were in VN how often and in what ways did you interact with

people back in the U.S.?
What sources of information mediated or informed your interactions with local Vietnamese, and in what ways? (e.g. travel guides discouraged certain behavior, fellow tourist promoted certain attitudes, etc.)
How do you think these interactions affected your experiences of culture shock and/or adjustment, if at all?

Itinerary
How do you think OT or Thick Descriptions aided you in cultural adjustment?
How did the class itinerary and assignments affect your experience in VN? Did either aid in adjustment, and to what degree?
How did your interactions with the professors (Dr. Lisa Stenmark and Dr. Smith) affect how you felt during the trip?
How and when did you reflect on your experiences while in VN?
How did you reflect on experiences of culture shock, and what resulted from these reflections?

Closing
To what degree did your comfort level change from the moment you entered VN to the moment you left? Why do you think that is?
What would you change about the experience in regard to how you were or weren't able to adjust, and what would you keep the same?
What suggestions do you have for student participants in a future VN FLP summer experience?

Kayla Fischer

Major:
Psychology

Mentor:
Dr. Camille Johnson

Where University Students Live Affects Attitudes Towards School and Life

Biography

Kayla Fischer is a senior at San Jose State University, majoring in psychology. Currently, Kayla goes to school full time, and works two jobs. Her future research directions have grown from this first paper, and will take the direction of resilience research. She plans on pursuing a Doctoral degree in Clinical Psychology, or Counseling Psychology. She would like to thank the McNair staff, for the opportunity and continuous support, Dr. Camille Johnson, for all her patience and wisdom, as well as her family and friends.

Where University Students Live Affects Attitudes Towards School and Life

Abstract

The purpose of this study was to investigate if a significant difference in attitude measures could be seen depending on an individual's living arrangements (i.e., whether there was a difference in self-esteem in a college student living with parents compared to a student who had moved away from family). Two predictors were examined: gender (male vs. female) and residence (home with family vs. away from home). The attitudes were measured using the Sense of Belonging to School Membership Scale (Goodenow, 1993), Self-Efficacy (Chemers, Hu, & Garcia, 2001), State Self-Esteem Scale (Heatherton & Polivy, 1991), and the Multidimensional Multiattributional Causality Scale (Lefcourt, 1981). Participants (N = 56, male = 19) from the San Jose State University College of Business completed an online survey. Analysis showed trends such that among females, those living at home had better psychological adjustment. Female students living at home had higher self-esteem, self-efficacy, sense of belonging to school, and internal locus of control than those living away from home. Conversely, males demonstrated higher self-esteem, greater self-efficacy and sense of belonging when away from home. Locus of control for males demonstrated no change in either consequence.

Introduction

The environment students are in can affect their experiences at college, such as their programming (Long, 2014), academic success (Inman & Pascarella, 1998; Wang, Arboleda, Shelley, & Whalen 2003), and alcohol use (Larimer, Anderson, Baer, & Marlatt, 2000). This study examined the differences in psychological adjustment (self-esteem, self-efficacy, sense of belonging, and locus of control) related to differences in living arrangements (whether students lived at home with relatives or away from home with roommates or alone) and gender.

Self-esteem

Self-esteem is defined as "the degree of correspondence between an individual's ideal and actual concept of himself" (Cohen, 1959, p. 102). Greenberg (2008) posed that self-esteem was a basic human need, because self-esteem is related to a person's motivation, self-image, life satisfaction, and behavior (Guindon, 2010). Self-esteem is influenced by gender, sexual orientation, race, economic level, and immigrant status (Twenge & Campbell, 2002; Twenge & Crocker, 2002). In the school setting, self-esteem influences a student's academic achievement, self-efficacy, and coping (Grady, 2014). Self-esteem of students is also correlated to locus of control. It has been found that stress levels in college students, as well as self-esteem, correlates to locus of control, with an external locus of control feeling more stressed, and a negative relationship between stress and self-esteem (Abouserie, 1994).

Few studies have shown a correlation between living arrangement and self-esteem in university students, however none looked at the effects of gender on self-esteem in different living arrangements. This study questioned if male subjects experienced lower self-esteem while living at home with their parents due to gender role violation (McCarty & Kelly, 2013). McCarty and Kelly discovered that self-esteem for males can be easily shifted by a simple gender role violation. They conducted a study in which a male researcher either did or did not hold open a door for male participants. Results found that when male subjects experienced this kind of 'chivalry', their self-esteem and even their self-efficacy was lowered illustrating the relationship between masculinity and self-esteem.

For females, self-esteem is generally lower than that of a male (Jones, Chernovetz, & Hanson, 1978; Kelly & Worbell, 1977). Gender-role stereotypes dictate that females are supposed to be more passive and dependent (Broverman, 1972). Because of this, living at home should not be associated with lower self-esteem. Given this, I predict male subjects living at home will have lower self-esteem than those living away, due to a masculinity disconnect, as living at home with parents may feel weak, or more feminine. Because living at home is congruent with gender-role stereotypes, female subjects will have higher self-esteem when living at home, compared to living away.

Sense of Belonging

Human beings are social creatures, craving group interaction and socialization (Baumeister & Leary, 1995). We have several basic needs that

must be met in order to develop and prosper. Sense of belonging falls into that category, according to Maslow (1968). This desire to belong permeates most facets of life, including school. Sense of belonging has been shown to increase when students have genuine relationships with teachers at their school (Osterman, 2000; Putnam, 2000; Radcliffe & Stephens, 2008; Roderick et al. 2009), and a sense of belonging to the school influences academic success, as well as greater academic motivation (Osterman; Wentzel, 1997; Goodenow & Grady, 1993). For example, students have fewer behavioral problems when they feel more belongingness to the school (Capps, 2003). Children who perceive a sense of belonging to the school had higher levels of intrinsic motivation, as well as believed they were more competent (Osterman). Recent data even illustrates that middle schoolers sense of belonging to their school environment impacts their intentions to go to college (Steiner, 2015).

In college students, a strong sense of belonging to a student's college has also been correlated to positive self-images, like one's self-worth, or self-efficacy (Pittman & Richmond, 2008). Moreover, living arrangements affect sense of belonging, where students living in on campus housing had more of a belonging to the school than sorority and fraternity housing students, even though fraternity and sorority students had greater happiness with extracurricular activities and programming (Long, 2014). The students living on in campus housing had greater belongingness probably due to proximity to the school. Given that students living at home may spend less time on campus, I predict that they will have less of a sense of belonging than those students living away from home, and that gender will not play a significant role here.

Locus of Control

Locus of control consists of two different subscales: internal locus of control and external locus of control (Rotter, 1966). Internal locus of control is the idea that individuals believe they ultimately have control over what happens to them in their lives; external locus of control is the the belief that no matter what an individual does, luck or other people will more greatly influence the outcome of their lives. Research on this topic has illustrated that females have a greater belief external control of their life than do males (McGinnies, Norholm, Ward, & Bhanthumnavin, 1974).

Research on locus of control and student environments shows that living arrangements and locus of control are related. Tognoli (2003) explored the adjustment of students, and the role that homesickness and personality traits

may play in adjustment. He found that the farther away parents lived, the less subjects were visited, and the more likely participants were to say they experienced homesickness. The personality inventories demonstrated that students who stated they were homesick had lower self-esteem, and lower scores of internal locus of control, compared to those who were not. Researchers proposed that students living 50 miles or less from home are probably making a better adjustment because their home is close enough to transition slowly into the new college. Alternatively, those that live 100 miles or more away are abruptly thrown into a new environment, with less access to family and friends. Therefore, the location of the home and how distant it is from the student, plays a significant role in homesickness and the transition to the new environment.

Further looking at the school setting, locus of control has been tied to academic achievement. Students with an internal locus of control are the students with higher grades (Grimes, Millea, & Woodruff, 2004). Research suggests that a student's academic success is tied to their locus of control and self-efficacy (Anderson, Hattie, & Hamilton, 2005; Lent, Brown, & Gore, 1997; Pajares, 2003) and there is a body of research showing that increased levels of self-efficacy and internal locus of control orientation contributed to higher academic performance outcomes (Bandura, 1997; Lefcourt, 1982; Rotter, 1990).

Although this study did not ask participants how far away from home they lived, if they did live away from home, I predict that students living away from home will have higher external locus of control scores, and this will especially be seen with women.

Self-efficacy

Self-efficacy is the extent to which an individual believes in their capabilities to succeed in certain situations or events that affect their lives (Bandura, 1997). Self-efficacy levels and academic outcomes are positively correlated (Caprara, Vecchione, Alessandri, Gerbino, & Barbaranelli, 2010). Bandura (1997) found that gender differences existed in self-efficacy. Females perceive themselves to have less self-efficacy relative to males (Bandura, 1986). Females also have lower self-efficacy in the school setting (Rayle, Arredondo, & Kurpius, 2005). This is because gender stereotypes heavily affect females academically. One study found that female's participation in math and science related courses in high school ends quickly, which limits their career options (Owens, Smothers, Love, 2003).

Furthermore, parents can instill gender notions into their child at a young age, simply by the chores that are assigned to either sex (Grusec, Goodnow, & Cohen, 1996). Parents can also reinforce the stereotypes of academic achievement by either gender, by believing the gender stereotypes and rating their children's capabilities in line with those ideals (Herbert and Stipek, 2005). Zimmerman, Bandura, & Martinez-Pons (1992) found that parent's influence student's self-efficacy, and the goals students set for themselves. Researchers found that students' goals for themselves were linked to their parents' goals. Given that, I predict that females will have lower self-efficacy scores than males, but that both will have higher self-efficacy when living at home, due to proximity to parents having a greater influence on student's self-efficacy, than those students living away from home.

Hypothesis

Are there differences in psychological adjustment (self-esteem, self-efficacy, sense of belonging, and locus of control) associated with living arrangements (whether students live at home with relatives or away from home with roommates or alone) and gender? In accordance with the research question, four hypotheses have been formed for this study.

Hypothesis 1: Males will have lower self-esteem if they live at home than if they live away from home. Females will have greater self-esteem if they live at home than if they live away from home.

Hypothesis 2: Both males and females will feel less belongingness to the school if they live at home than if they live away from home.

Hypothesis 3: Female subjects who live away from home will have higher external locus of control scores than females who live at home do. Females will have higher external locus of control scores than males do.

Hypothesis 4: Males and females who live at home will have higher self-efficacy scores than do males and females who live away from home. The difference in self-efficacy scores between living at home

and living away from home will be greater for females than for males.

Methodology

Participants

Participants were drawn from the College of Business participant pool at San Jose State University. The average age of students in the business pool is 24.5 years, with a majority of students employed part-time (66%) and a significant minority (32%) employed full-time. Of these potential participants, 60% are male. In addition, this participant pool is ethnically and racially diverse (25% White, 49% Asian-American, 3% African-American, 23% Latino). The SJSU-COB participant pool includes people with varying real-life experience and multiple roles. Fifty-six participants were drawn from this pool (19 male, 37 female). Thirty-five participants live at home with parents (11 male, 24 female), and 21 participants live away from home (8 male, 13 female). For this study, "away from home" was simply defined as not living with parents and included living with roommates, in a dorm, or living alone.

Materials

The following surveys were administered to the subjects in English via the Qualtrics interface.

Multidimensional Multiattributional Causality Scale. The Multidimensional Multiattributional Causality Scale (Lefcourt, 1981) measured locus of control. This scale has four separate sections that measure 1) skill or ability, 2) effort or motivation, 3) context, and 4) chance or luck. Sections one and two of this scale measure internality, and sections three and four measure externality. The questions from all four sections were randomized to create variance. Participants were instructed to rate each question on a 1–5 scale (1 = strongly disagree, 5 = strongly agree). Participants answered 48 questions for this scale.

Sense of Belonging to School Membership. The Sense of Belonging to School Membership Scale (Goodenow, 1993) was administered to measure the psychological sense of school membership. This is a five-question scale, with a 5-point rating scale ranging from 1 = strongly disagree to 5 = strongly agree. Since this scale was designed for middle school adolescents, question number one in the scale was slightly

altered from its original wording "I feel proud of belonging to my middle school" (Goodenow, 1993) to "I feel proud of belonging to my university."

State Self-Esteem Scale. The State Self-Esteem Scale (Heatherton & Polivy, 1991) was administered. This scale consists of 20 items subdivided into three components of self-esteem: 1) performance self-esteem, 2) social self-esteem, and 3) appearance self-esteem. These questions were scored on a 5-point scale (1 = not at all, 2 = a little bit, 3 = somewhat, 4 = very much, 5 = extremely). To minimize the number of questions and maximize attention span and true answers, only the performance self-esteem section was administered.

Self-efficacy Scale. The Self-efficacy Scale (Chemers, Hu, & Garcia, 2001) was administered. This is an eight-item scale that uses a 7-point Likert scale to rate agreement with statements regarding confidence in academic ability and achievement.

In addition to these scales, subjects were also asked the following questions: Where do you live? 1) On-campus housing, 2) Off-campus apartment/house.

Who do you live with? 1) With one or more roommates who are not related to me, 2) With one or more roommates that I am related to, 3) At home with my parents or family.

Procedure

Participants were recruited using the SONA online participant pool system (http://cobsjsu.sona-systems.com/). Members of the participant pool receive emails when study opportunities are posted. They then log in to their personal account on SONA to see brief titles and descriptions of available studies and the associated researcher. They can choose to participate in any or all studies. The participants chose this study, clicked yes for informed consent, filled out the survey, and submitted their answers. The participants received course credit for their participation in the study. These surveys were taken online, on participants' own time, and in the place of their choosing.

Results

A series of 2 (sex: Male vs. Female) × 2 (living arrangement: Home vs. Away) ANOVAs were conducted on self-esteem, sense of belonging, locus of control, and self-efficacy. Means and standard deviations for all dependent variables are shown in Table 1.

Self-esteem

Hypothesis 1, that males living at home will have lower self-esteem than do males living away and that females would report the opposite, was supported. Gender and living arrangement influenced self-esteem, ($F(1, 52) = 1.19$, $p = .28$). Among those living at home, males (n = 11) had lower self-esteem than did females (n = 24), $F(1, 54) = .50$, $p = .48$). Among those living away from home, the opposite pattern was found. Males (n = 8) had higher self-esteem than females did (n = 13), $F(1, 54) = 1.05$, $p = .31$).

Sense Of Belonging

Hypothesis 2, that both males and females living at home will feel less belonging to school than do those living away from home, was only partially supported. Gender and living arrangements did influence sense of belonging to school membership $F(1, 52) = 2.59$, $p = .114$). In accordance with our hypothesis, females living at home (n = 24) and males living at home (n = 11), had similar scores for sense of belonging $F(1, 54) = .43$, $p = .514$). Though it was hypothesized that both genders living away from home would have higher scores than those living at home, only males followed this trend. Males (n = 8) who lived away from home had higher sense of belonging scores, while females living away (n = 13) had a lower sense of belonging $F(1, 54) = 2.52$, $p = .118$).

Locus of Control

Hypothesis 3, that females living away from home will have higher external locus of control scores than do females living at home, and that females will have higher external locus of control scores than males do, was partially supported. Females living away from home did have higher external locus of control than females living at home; however, males had higher external locus of control scores overall than females did. External locus of control differed by gender and living arrangements $F(1, 54) = 3.35$, $p = .073$). Among those living at home, females (n = 24) had lower external locus of control scores than males did (n = 11), $F(1, 54) = 1.33$, $p = .254$). Among those living away from home, the same trend was found, with

slightly higher external locus of control scores in both sexes. Females living away from home were still scoring lower on external locus of control (n = 13), versus males (n = 8), who had slightly higher external locus of control scores, $F(1, 54) = 1.33$, $p = .254$). Regarding internal locus of control data, it appears gender and living arrangements had an effect $F(1, 54) = 1.16$, $p = .286$). Among those living at home, females had higher internal locus of control scores than males did. Among those living away from home, females (n = 13) had lower internal locus of control scores than males did, $F(1, 54) = 2.86$, $p = .097$).

Self-efficacy

Hypothesis 4, that both males and females will have higher self-efficacy scores while living at home, than males and females living away from home, but females away will demonstrate lower scores of self-efficacy than males when living away, was not supported. The difference in scores between living at home and living away from home was greater for females than for males. Gender and living at home, however, does have an effect on self-efficacy $F(1, 54) = 2.31$, $p = .134$). Females at home (n = 24) had higher self-efficacy scores than females (n = 13) living away from home, $F(1, 54) = 1.66$, $p = .203$). Males living away form home had higher self efficacy scores than males living at home, $F(1, 54) = .48$, $p = .491$). This data shows the general trend that living at home affects genders differently.

Table 1
Means and Standard Deviations for Dependent Variables

	Males at Home		Males Away		Females at Home		Females Away	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Self-esteem	3.4	.694	3.6	.733	3.7	.788	3.4	.696
Sense of Belonging	3.8	.494	3.9	.566	3.9	.644	3.5	.432
External Locus of Control	3.3	.395	3.3	.523	2.9	.608	3.1	.367
Internal Locus of Control	3.4	.370	3.4	.551	3.5	.483	3.3	.274
Self-efficacy	5.1	.896	5.3	1.08	5.5	.665	5.1	.760

Discussion

Gender-role stereotypes portray males as independent, strong, assertive, and competent, while females are supposed to be more passive, dependent, weak, and subordinate (Broverman, 1972). These stereotypes can heavily affect the people's mental states. Though no findings were statistically significant, a trend was found such that where students lived was associated with differences psychological adjustment. This trend goes along with the above idea of gender stereotypes, and was particularly seen in female subjects in the present study.

The sense of belonging and school membership scale illustrated that when living at home, both genders experienced similar levels of belongingness. Among those who had moved away from home, a gender difference emerged that contradicted the hypotheses. It was hypothesized that males and females alike would feel more alienated from school when living with family. However, males indicated a greater feeling of belonging when out of the family home, while females showed the opposite. When looking at the literature, it has been found that females feel less safe and have more fear than males about criminal activities, and less perceptions of safety (Schafer, Huebner, & Bynum, 2006). Females also feel less capable than males of fighting back in a situation involving physical attack (Riger, Gordon, & Le Bailey 1978). Furthermore, females are socialized to be aware of these risks and vulnerabilities (Scott, 2003). Given this, it is possible females would be less likely to seek out school events and participate. Males do not carry the same fears of their safety in everyday situations (Schafer, Huebner, & Bynum), and therefore would have less apprehension than females about being on campus alone, and participating in activities. This idea also attaches to the gender stereotypes of females being weak and helpless (Broverman, 1972).

Considering the self-esteem scale and living arrangements, the data illustrated a trend that was close to significant. I hypothesized that males would feel lower self-esteem when living at home as compared to females, as an effect of socialization, and the data did find this trend. This is probably the case because gender roles affect mental health of males, particularly self-esteem, as males are not socially raised to exhibit feminine qualities (Gayton, Sawyer, Baird, & Ozman, 1982; O'Neil, 1981; Chafetz, 1978) with possible negative social consequences if they do. Male stereotypes are of the strong, independent male, and living at home with parents may violate that idea to them. Considering females in this study, the data found the opposite to be true, where females had less self-esteem when no longer

living at home, versus those females living at home. The stereotypes surrounding females are of dependency (Broverman, 1972), and living at home would align with the dependent stereotype. Therefore, living at home for the female would be more acceptable, and would not affect their self-esteem as greatly. Furthermore, home represents a safe place, where loved ones are there to provide protection- financially, emotionally, and physically. When considering independent living for young females, both the female and parents large concern is of vulnerability and victimization (Hendey & Pascall, 1998). This is much less seen with parents of young adult males. Stereotypes of what a typical victim, and a typical criminal look like could be the cause of this. Christie (1986) found that the typical stereotype of a victim is female, old, sick or young, and helpless to the offender; the stereotypical criminal was male, poor, psychotic, or uneducated. Furthermore, television has in recent times increased sexual violence against women significantly (Cuklanz, 2000). Watching these shows has also been shown to be linked to higher perceived risk in females (Custers & Van den Bulck, 2013). Therefore this affects perceived notions of safety, and makes parents and females more cautious. If the parents and the child are wary of her safety when independently living away, it follows that the female would have higher self-esteem while living at home, where they feel safer and comfortable, versus living away.

Concerning self-efficacy in this study, male self-efficacy was higher when living away from family than it was when living at home, while female self-efficacy was lower amongst those living away from home. It was hypothesized that both male and female self-efficacy would increase when living at home versus living away, due to parental goal setting and effect on grades (Zimmerman, Bandura, & Martinez-Pons, 1992). For females, researchers theorized that females believe in themselves less due to social stereotypes that are learned throughout life of the female gender being less capable in many settings, even though that is often times not the case. A substantial amount of research illustrates that stereotypes do affect women in an academic setting, work environment, and even at home (Betz & Hackett, 1981; Chatard, Guimond, Selimbegovic, 2007; Grusec, Goodnow, & Cohen, 1996; Rayle, Arredondo, & Kurpius, 2005; Wigfield, Battle, Keller, & Eccles, 2002). This theory answers the difference in self-efficacy scores seen in this study, where males had greater self-efficacy in all conditions. However, the data also demonstrated that females had less self-efficacy among those living away from home, than those living at home. A theory as to why might have to do with family support, protection

and guidance, that a female might receive more of while living at home. There is also less responsibility to take on while living at home with parents, which would allow for more focus on academics and achievements. Once independently living, a female may need to take on another job, pay more bills, and struggle more frequently. These extra responsibilities could cause feelings of depression and lower self-esteem and self-efficacy, as well as lower academic achievements.

Locus of control in this study demonstrated the same effect, where both sexes had higher external locus of control when living away from home. The hypothesis was only partially met, however, I predicted that females would have higher scores of external locus of control than males. This was hypothesized as past research indicates that, in general, females have higher external locus of control than males (McGinnies, Norholm, Ward, & Bhanthumnavin, 1974). For internal locus of control, women living at home have higher scores than when living away. For males, no notable difference was demonstrated. Given that living in the home may allow for less responsibility on the individual, as family is there to provide support and assistance financially or psychologically, it may be easier to have an internal locus of control. Once leaving the home, more responsibilities occur, causing more stress. Abouserie (1994) demonstrated that stress and locus of control are correlated, with an external locus of control feeling more stressed. Being an independent adult causes considerable stress, and therefore, participants living away from the home would illustrate the change shown in the data above, where externality increases, and internality decreases. The same is true in the opposite manner, where living at home would be less stressful, and subjects illustrated higher scores of internal locus of control.

This study illustrates that living at home, for these female students, is more psychologically healthy. Considering that college protocol is to have first year students living more than 30 miles away from the college to live in dorms and move away from family, this protocol may be less of an advantage to young females. It is suggested that females have greater psychological adjustment when living at home.

Limitations

This study had a few limitations. Because of the small sample size, no results were statistically significant, although a few variables were close to it. The number of male participants was especially low in this study, so the effect of sample size was greatest in the results for male participants. If this study was to be conducted again, a larger subject pool would be used, and more male subjects would need to be included. Additionally, the College of Business pool that was utilized to find subjects for this study consisted primarily of third-year and above students. Freshman students primarily make up the pool of students who have recently moved away from home, together with a small population of junior transfer students. These students would experience the most change in attitudes with a new move affecting their lives, and they should have been pooled. The small sample size, insufficient number of male subjects, and lack of freshman perspective caused a few limitations in this study.

Future Research

Conducting this research with first-generation students as an independent variable could be a path for future research. Self-esteem, sense of belonging, and self-efficacy would be particularly interesting to investigate when comparing students who are navigating the academic world with little family help or knowledge. Further investigating gender differences seen in self-efficacy when living at home could also be a potential research direction. Finally, the living arrangements of students who are "living away" could be further defined because these conditions could potentially influence their attitudes.

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Sexually Transmitted Infection Health Literacy Among Urban Emerging Adults

Biography

Athena is a first generation college student who searched for years to find her passion—which is teaching and nursing research. Athena is currently a nursing student at San Jose State University (SJSU) with a GPA of 3.894. Following the completion of her Bachelor of Science Degree in nursing, she plans to pursue a PhD as a nurse researcher. Athena is a Robert Chang scholarship recipient and a proud Ronald E. McNair Scholar. She is an avid undergraduate researcher and is the current EOP Tutoring Center Coordinator at SJSU. Athena is active in many professional and university nursing associations and is the President of the Black Masque Honor Society. Her plans following her PhD include working in a family planning clinic and conducting research regarding sexually transmitted infections among urban emerging adults. She aspires to be the bridge that connects emerging adults to healthy living and education. She would like to thank her family, as well as Dr. Madeline Adamczeski, Dr. Constance Hill, Robert Gutierrez, Maria Cruz, and Jeanine Slater for providing her with the encouragement and the tools necessary to build her own bridge to education and a healthy future.

Sexually Transmitted Infection Health Literacy Among Urban Emerging Adults

Abstract

Emerging adults, ages 18–29, have the greatest number of changes in sexual partners and the highest rates of new Human Immunodeficiency Virus (HIV) and Sexually Transmitted Infections (STI) contractions when compared to all other age groups (CDC, 2011). Unfortunately, the majority of existing STI and HIV contraction research focuses on the adolescent period of development, ages 14 to 18. Thus, current research does not address the risks facing emerging adults. This study targeted STI health literacy among emerging adults in hopes of identifying possible gaps in STI knowledge. Three groups of students were surveyed from the following adult education centers and university in San Jose, California: The Center for Training and Careers (CTC), Metro Education District–Silicon Valley Adult Education (SVAE), and San Jose State University (SJSU). A heterogeneous sample of 86 Students (63% Hispanic, 10% Asian, 7% multiethnic, 7% Black/African American, 3% White/Caucasian, 3% unknown, 2% American Indian/Native American/Native Alaskan) between the ages of 18 and 29 was recruited. Quantitative data were collected using two instruments, a knowledge scale (originally adapted from the AIDS Risk Reduction model) and a demographic survey. The demographic survey was created to include factors that may influence STI contraction and sexual risk behaviors such as education level, previous STI contraction, socioeconomic status, criminal background, ethnicity, and parental information. Results, related to the small sample size (N = 86), did not reveal statistical significance for the majority of the demographic information. Data analysis revealed that there were no distinct discrepancies in STI health literacy between genders [99% confidence interval (CI); p = 0.588] or ethnicities (CI = 99%; P = 0.498). Among the participants, there were large gaps in socioeconomic status and education, with 70% of participants living under the poverty line, and only 50% possessing a high school diploma. The sexual risk survey revealed that 50% of participants did not know if they had received the human papilloma vaccine (HPV). Additionally, participants who stated that their community was at no risk of STI contraction scored significantly lower on the knowledge assessment than their counterparts who stated that their community was at risk (CI = 95%, P = 0.027 for the total sample and CI = 99%, P = 0.004 for females). The data revealed knowledge deficits in

regard to the spread of HIV/AIDS, HIV testing, HPV, and HPV implications. The results regarding risk perception and knowledge deficits are important to the construction and design of future STI health education courses and the evaluation of current programs.

Keywords: STI, Health Literacy, Emerging Adulthood, HIV/AIDS, HPV

Introduction

Emerging adulthood is a developmental stage that involves individuals aged 18–29 years. Emerging adults experience more change at this time than in any other stage of their life (Arnett, 2014). Sexuality is an area that is often explored by emerging adults (Arnett, 2014). This topic is vital because when compared to all other age groups, emerging adults have the greatest number of sexual partners and highest rates of newly contracted sexually transmitted infections (STI), including Human Immunodeficiency Virus (HIV) (Centers for Disease Control and Prevention (CDC), 2011). Giving prominence to these concerns are the statistics coming out of San Francisco, California. Emerging adults in San Francisco report lower use of condoms and have higher STI contraction rates than the rest of the United States (CDC, 2011). Given this information, it is imperative that researchers focus on the possibly associated factors contributing to these alarming statistics. Current research has reviewed the impact of different sexual risk behaviors such as lack of STI education, sharing needles, condom use, and multiple sexual partners (Aalsma, Tong, Wiehe, & Tu, 2010; Arnett, 1998; Champion, Harlin, & Collins, 2013; Kan, Cheng, Landale, & McHale, 2010). The purpose of this study is to target STI health literacy among emerging adults in hopes of identifying gaps in knowledge. This study is important in that the results may aid in the evaluation of current and future STI health literacy programs at the community level.

Literature Review

Emerging adults in the United States have the highest rates of both newly contracted Human Immunodeficiency Virus and other Sexually Transmitted Infections (CDC, 2013; CDC, 2011). Specifically, emerging adults account for over 50% of all new infections of gonorrhea and chlamydia in the U.S. (CDC, 2014). Unfortunately, the majority of existing STI and HIV contraction research focuses on the adolescent period of development, ages 14 to 18, thus resulting in a void of research

to adequately address the risks facing emerging adults. However, current adolescent research has provided a strong foundation to guide future studies for emerging adults. For instance, current research with adolescents has shown that increased STI contraction and sexual risk behavior have been linked to low socioeconomic status, ethnicity, and low education levels (CDC, 2011; Champion, Harlin, & Collins, 2013; Kan, Cheng, Landale, & McHale, 2010). Furthermore, National data has shown that African American and Hispanic adolescents are more likely to be sexually active and have more sexual partners than their Caucasian counterparts (Kan, Cheng, Landale, & McHale, 2010). Data has also revealed that as adolescents aged and entered into emerging adulthood, African Americans and Caucasians showed a decrease in the number of sexual partners, whereas Hispanics did not (Kan, Cheng, Landale, & McHale, 2010), placing emerging adults of Hispanic origin at an increased risk of contraction.

These and other sexual risk behaviors may be closely tied to sexual education. STI health literacy has been identified as an important factor when evaluating STI contraction rates. For example, one study involving a group of Mexican American and African American females from Austin, Texas, ages 14-18, revealed that participants who displayed a lower level of STI health literacy were also more likely to have contracted an STI than were their counterparts who had a higher level of STI health literacy (Champion, Harlin, & Collins, 2013). To obtain this information, researchers evaluated STI health literacy using a knowledge scale developed from the AIDS Risk Reduction model and demographic/sexual risk behavior survey (Champion, Harlin, & Collins, 2013). This information, as well as other aspects of current research on adolescents, may be used to inform future studies on emerging adults.

Theoretical Framework

Emerging adulthood is a period of human development newly defined as the period of time between the ages of 18 to 29 years; the theory pertains to people from highly industrialized or postindustrial societies (Arnett, 2000; Arnett, 2014). The conceptual framework associated with emerging adulthood has five main components: (1) the age of identity explorations, (2) the age of instability, (3) the age of self-focus, (4) the age of feeling in-between, and (5) the age of possibilities (Arnett, 2000; Arnett and Tanner, 2006; Arnett, 2014). A combination of each of these concepts contributes to the current state of sexual health and sexual

risk present amongst emerging adults.

The age of identity explorations

Emerging adults spend a large portion of their time seeking and molding their identity. They have few solid commitments during this period, which leaves them more time to explore their preferences in areas such as work, love, and education (Arnett, 2014). Emerging adults commonly spend their late teens and early twenties exploring different intimate partnerships. "According to national surveys, over 80% of 18–23-year-olds have had sexual intercourse, and about 95% of Americans in our time have their first experience of sexual intercourse before marriage" (Arnett, 2014 p. 93). Additionally, reports from the 2006–2010 National Survey of Family Growth have shown the median age of first marriage to be 25.8 years for women and 28.3 years for men, which has increased since 1995 when women were 25% more likely to have experienced their first marriage before age 25 (Copen, Daniels, Vespa, & Mosher, 2012).

The age of instability

Emerging adulthood is a period of great transition in a person's life. Emerging adults experience cohabitation, multiple housing changes, different jobs, and relationships that are both intimate and non-intimate (Arnett, 2014).

The age of self-focus

Not to be confused with self-centered, self-focused refers to the lack of outward obligations and the emphasis on self-development. With exception of the elderly, emerging adults spend more time working independently toward self-sufficiency than any other age group (Arnett, 2014).

The age of feeling in-between

The top criteria for adulthood are the following three points: "(1) accept responsibility for one's self, (2) make independent decisions, and (3) become financially independent" (Arnett, 2014 p.15). Although defined as legal adults within the U.S., 60% of emerging adults who were asked, "Do you feel like you have reached adulthood?" answered, "in some ways yes, in some ways no" (Arnett and Tanner, 2006 p. 11). This may imply that emerging adults are developing skills and working toward what they believe it means to be an adult.

The age of possibilities

During emerging adulthood, individuals have seldom tested their dreams and goals against reality, and it is seen as the period of greatest optimism and hope (Arnett, 2014). This optimism and hope can be seen when looking at marriage —roughly 90% of emerging adults say they plan to someday marry (Regnerus, & Uecker, 2009).

Rationale

The research questions are: What are the current STI health literacy levels among emerging adults in San Jose, California? Is there a link between STI contraction and socioeconomic status, parental education level, personal education level, or ethnicity? How do emerging adults in San Jose perceive their personal risk and community risk of STI contraction? The hypothesis of this study is that the San Jose emerging adult community will have low STI health literacy levels and high self-reported STI contraction. Further predictions are that emerging adults will perceive their personal and community risk of STI contraction to be low. If confirmed, then this information can be used to target the gaps in STI knowledge and develop a program to better disseminate STI information to emerging adults.

Methodology

Participants

This study surveyed three groups of students, ages 18–29 years, from the following adult education centers in San Jose, California: The Center for Training and Careers (CTC), Metro Education District–Silicon Valley Adult Education (SVAE), and San Jose State University (SJSU). The institutions selected encompass vastly different geographical regions of the city. CTC is located in East San Jose, SVAE is located in South San Jose, and SJSU is located in Downtown, or central, San Jose. The majority of participants from CTC and SVAE came from General Educational Development (GED) classes. The group from SJSU consisted of incoming first generation freshman college students. Participation from each group varied: SVAE had 45 students (approximately 52% of the sample), CTC had 5 students (approximately 6% of the sample), and SJSU had 37 students (approximately 43% of the sample).

Materials and Design

This study obtained data regarding STI health literacy levels and demographic information using two instruments, a knowledge scale and a demographic survey. The knowledge scale originates from the Champion, Harlin, & Collins (2013) study titled "The impact of delinquency on young adult sexual risk behaviors and sexually transmitted infections." The knowledge scale was originally adapted from the AIDS Risk Reduction model, and "…was constructed to describe psychosocial and situational factors associated with sexual risk behavior and STI/HIV knowledge" (Champion, Harlin, & Collins, 2013). The demographic survey was created to include situational and psychosocial factors that may influence STI contraction and sexual risk behaviors, such as education level, previous STI contraction, socioeconomic status, criminal background, ethnicity, and parental information.

Procedure

The study was conducted in a group setting of one-hour blocks. Each block consisted of an introduction to the survey, information regarding confidentiality and participant rights, and dissemination of the survey and knowledge assessment. Participants were provided light refreshments. Following the completion of the survey and knowledge assessment, a debriefing was held to clarify any knowledge deficits observed, and participants were each given a copy of the correct answers to the knowledge assessment.

Analysis

The data collected in the surveys was transferred to SPSS data collection software to establish a database and analyze the information. The original copies of the surveys are stored in a locked file. Access to this data is limited to research mentor Dr. Constance Hill and principal investigator Athena Ford. Data was analyzed by examining the relationships between demographical information and the scores obtained from the knowledge assessments.

Results

Demographics

The sample population contained both men and women of various ethnicities, education levels, and incomes. Participants ranged in age from 18 to 29 years, with an average age of 20.6 (see Table 1). There were 57

females (approximately 66% of the sample), 28 males (approximately 31% of the sample), and one unreported gender (approximately 1% of the sample) (see Table 2). When comparing average scores between males and females, a *p* value of 0.588 was obtained, failing to reject the null hypothesis that the two groups of scores are equal (using alpha = .01). There were no significant differences in average knowledge assessment scores between genders.

Table 1. Age of Participants

Age	Frequency	% of Total Sample
18	36	41.860
19	10	11.628
20	8	9.302
21	4	4.651
22	4	4.651
23	7	8.140
24	5	5.814
25	3	3.488
26	3	3.488
27	2	2.326
28	2	2.326
29	2	2.326

Table 2. Gender and Scores of Participants
*One participant in the sample did not identify gender

Females*	**Males***
n = 57 (67.06%)	**n = 28 (32.94%)**
Average	Average
20.26	19.32
Min	Min
0	9
Max	Max
32	29
Median	Median
22	19.5
Mode	Mode
24	23

The ethnographic portion of the survey was based on the CDC's representation of known ethnicities. For the purposes of this study, ethnicities were grouped in the following manner: "Hispanic Descent" (including Mexican, Mexican American, Chicano, Puerto Rican, Cuban, Other Hispanic, Latino, or Spanish origin), "White, Caucasian" (including white and other European), "Black, African American," "Asian Descent" (including Asian Indian, Chinese, Filipino, Japanese, Korean, Vietnamese, Pacific Islander, and other Asian), "American Indian, Native American, or Alaskan Native," "Multiethnic" (including participants who identified with more than one ethnicity), "Missing" (including participants who declined to state their ethnicity). A one-way ANOVA showed a *p* value of .498 with an alpha of .01, indicating that there were no significant differences in scores between any of the ethnicities (see Table 3).

Table 3. Ethnicity of Participants and their Average Scores

Ethnicity	Frequency	% of Total Sample	KA Average Scores
All Participants	86	100	19.977
Hispanic Descent	55	63.953	19.073
Asian Descent	9	10.465	21.889
Multiethnic	7	8.140	18.857
Black, African American	7	8.140	22
White, Caucasian	3	3.488	24.667
Missing	3	3.488	19.33
American Indian, Native American, or Alaskan Native	2	2.326	22

When we do a one-way ANOVA, we get a *p* value of .498, we can conclude with 99% confidence that there are no significant differences in scores between any of the ethnicities.

The socioeconomic backgrounds and education levels varied among participants (see Figures 1 and 2). Over 70% of participants reported earning less than $10,000 per year, which is below the federal poverty line for a single person household (U.S. Department of Health and Human Services, 2013). Roughly 50% of participants had obtained a high school diploma or its equivalent. Only 30% reported that they did not complete a high school education. In addition to education and income level, the demographic survey also discussed the utilization of government assistance programs (see Table 4)[1]. According to the data, 80.5% of participants had utilized at least one of the assistance programs listed in Table 4, and 57.5% reported utilizing multiple programs.

Figure 1. Highest Education Level Achieved

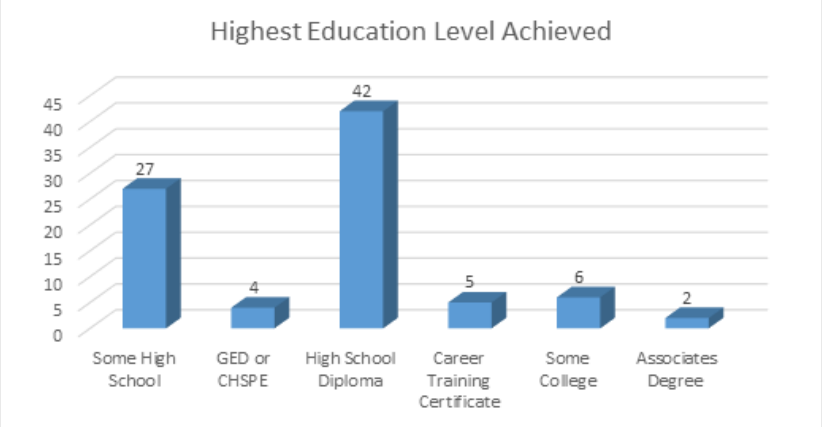

Figure 2. Yearly Income of Participants

[1] The decision to include government assistance program information was based on the study "Early socioeconomic disadvantage and young adult sexual health," by Wickrama, T., Merten, & Wickrama, K.A.S. (2012). Their results shed light on the connection between community level vulnerability and young adult sexual risk.

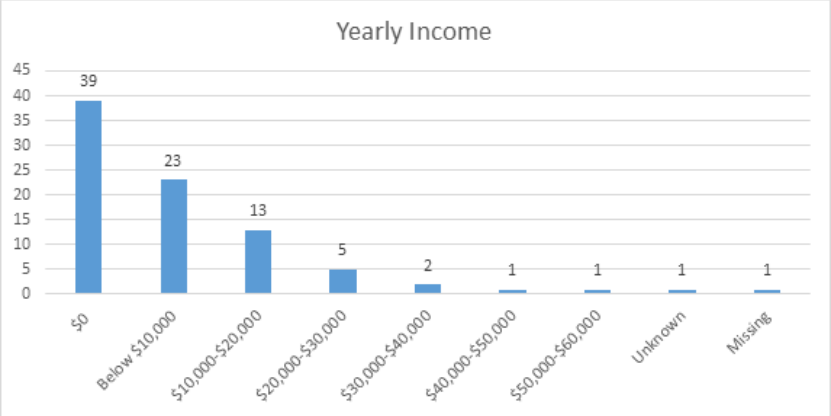

Table 4. Government Assistance Programs		
Do you, or does anyone in your family, receive assistance from any of the following programs?		
Programs	**Yes**	**% of the Sample**
Utilize at least 1 Program	7 0	80.5%
Utilize more than 1 Program	50	57.5%
Do Not Utilize any Programs	17	19.5%
CalFresh (foodstamps)	28	32.2%
CalWORKs (TANF)	10	11.5%
Head Start	4	4.6%
Healthy Families (SCHIP)	9	10.3%
Low Income Home Energy Assistance	4	4.6%
Medicaid or MediCal	52	60.0%
National School Breakfast and Lunch	13	15.0%
Special Supplemental Nutrition Program	8	9.2%

Summer Food Service	0	0%
Unemployment Insurance	5	5.7%
Weatherization Assistance program	0	0%
Renter Assistance Program	1	1.1%
Cash Aid Programs	6	6.9%
Social Security	15	17.2%

Sexual Risk Behavior

The sexual risk behavior portion of the survey covered many areas including Human Papilloma Virus (HPV) vaccination, STI contraction, number of sexual partners, and personal perception of STI contraction risk. Results revealed that 50% of both males and females reported that they "do not know" whether or not they have received the HPV vaccine (see Table 5). Those participants who reported having one or more STI's in their lifetime had a higher average score than the group as a whole (see Tables 6 and 3). For STI risk perception, we are 95% confident that participants who answered "none" on the community STI risk level perception had significantly lower average scores than those who answered minimal or above. Additionally, women who answered "none" on the community STI risk level perception were also 99% more likely to have significantly lower average scores than those who answered "minimal" or above (see Table 7).

Table 5. HPV Vaccine

Had HPV Vaccine?	Frequency	% Female	% Male
Yes	25	68	32
No	18	70.588	29.412
Do Not Know	42	66.667 (28)	33.333 (14)

Table 6. Number of STIs Contracted in Lifetime, Number of Sexual Partners in Lifetime, and Groups' Average Scores

# of STI's in Lifetime	Frequency	% of Sample	# of Sexual Partners in Lifetime	KA Score
0	74	86.047	About 2.9	19.203
1	8	9.302	About 8.6	23.875
2	3	3.488	About 18	25.333
3	1	1.163	Over 20	29

Knowledge Assessment

The data revealed deficits in current STI knowledge related to the spread of HIV/AIDS, HIV testing, HPV, and HPV implications. Over 60% of participants answered the following true/false questions incorrectly: "A natural skin condom works better against HIV than latex condoms," "Taking a test for HIV one week after having sex will tell a person if they have HIV**,**" **"**Douching protects women from getting STI/HIV," "The risk of contracting HIV is increased by being infected with another STI," "Once you get genital warts (warts on the penis or vagina), the disease (HPV) never goes away," "STIs can cause cervical cancer" (see Table 8). Over 80% of participants answered the following true/false questions incorrectly: "Easier for a woman to get an STI or HIV from a man than for him to get it from her," "All pregnant women infected with HIV will have babies born with AIDS" (see Table 8).

Table 8. Knowledge Assessment Results
(N = 86; Q18KA was unclear and was discarded from the research.)

Question #	Question	# Correct	% Correct
Q2KA	Coughing and sneezing DO NOT spread HIV	47	54.651
Q3KA	A person can get HIV by sharing a glass of water with someone who has HIV.	53	61.628
Q4KA	Pulling out the penis before a man climaxes/cums keeps a woman from getting HIV during sex	67	77.907
Q5KA	A woman can get STI/HIV if she has anal sex with a man.	59	68.605
Q6KA	Showering, or washing one's genitalia/private parts, after sex keeps a person from getting STI/HIV	65	75.581

Q7KA	All pregnant women infected with HIV will have babies born with AIDS.	16	18.605
Q8KA	People who have been infected with HIV quickly show serious signs of being infected	61	70.930
Q9KA	There is a vaccine (medicine) that can stop adults from getting HIV	50	58.140
Q10KA	People are likely to get HIV by deep kissing, putting their tongue in their partner's mouth, if their partner has HIV	43	50
Q11KA	A woman cannot get STI/HIV if she has sex during her period	69	80.233
Q12KA	There is a female condom that can help decrease a woman's chance of getting HIV	50	58.140
Q13KA	A natural skin condom works better against HIV than latex condoms.	27	31.395
Q14KA	A person will NOT get HIV if she or he is taking antibiotics (medicine)	58	67.442
Q15KA	Having sex with more than one partner can increase a person's chance of getting STI/HIV	80	93.023
Q16KA	Taking a test for HIV one week after having sex will tell a person if they have HIV	30	34.884
Q17KA	A person can get HIV by sitting in a hot tub or swimming pool with a person who has HIV	51	59.302
Q19KA	Using Vaseline© or baby oil with condoms lowers the chance of getting HIV.	55	63.953
Q20KA	Douching protects women from getting STI/HIV	35	40.698
Q21KA	The risk of contracting HIV is increased by being infected with another STI	32	37.209
Q22KA	Once you get genital warts (warts on the penis or vagina), the disease (HPV) never goes away	31	36.047
Q23KA	Changing sexual partners about once a year is safe as long as you have sex only with each other	39	45.349
Q24KA	STIs can cause cervical cancer	35	40.698
Q25KA	All STIs can be cured	47	54.651
Q26KA	Some STIs can make it impossible for women to get pregnant	41	47.674
Q27KA	Condoms don't have to cover the whole penis as long as they cover the tip and any sores.	66	76.744
Q28KA	If he pulls out before he comes, you don't need a condom to prevent STIs	70	81.395
Q29KA	A woman or man can have an STI without any symptoms at all	63	73.256
Q30KA	If your symptoms go away without treatment, you don't have to get checked	76	88.372
Q31KA	You can't get an STI from oral sex	47	54.651
Q32KA	Rectal/anal sex is safe because a woman can't get pregnant or get STIs	56	65.116

Q33KA	It doesn't matter how many partners you have sex with, you're safe as long as you use condoms	45	52.326
Q34KA	You get AIDS from sharing needles	74	86.047
Q35KA	You can always tell if someone has an STI	66	76.744
Q36KA	Easier for a woman to get an STI or HIV from a man than for him to get it from her	14	16.279

Table 7. Self-Reported Perception of Community STI Risk

Community STI Risk Level	Average Score	P value	Statistically Significant?
Both Female and Male			
None	16.83	0.027	Yes at sig. level 0.05
Minimal or Above	21.08		
Female			
None	15.13	0.004	Yes at sig. level 0.01
Minimal or Above	22.27		
Male			
None	20.71	0.437	No
Minimal or Above	18.65		

Discussion

The knowledge assessment data revealed many deficits in STI Health Literacy. Of greatest concern is the participants' risk awareness. During the Age of Identity Explorations and the Age of Instability between the ages of 18 and 29, many emerging adults explore new sexual preferences and experience the greatest number of sexual partners, which places them at increased risk of STI contraction (Arnett, 2014; CDC, 2012; Kan, et al., 2010). To the true/false statement, "Easier for a woman to get an STI or HIV from a man than for him to get it from her," roughly 84% of participants answered incorrectly. Additionally, participants who

stated that their community was at no risk of STI contraction scored significantly lower than their counterparts who stated that their community was at risk (Confidence Interval [CI] = 95%, $P = 0.027$ for the total sample and CI = 99%, $P = 0.004$ for females; see Table 6 for additional information). These results demonstrate a negative trend between risk awareness and STI knowledge levels; lower perception of risk scores coincided with lower overall knowledge scores. Taking into account the age of identity explorations, data revealed 70% of participants (average age of 20.6 years old) have engaged in premarital sex--holding true to national surveys, which state, "...over 80% of 18–23-year-olds have had sexual intercourse, and about 95% of Americans in our time have their first experience of sexual intercourse before marriage" (Arnett, 2014 p. 93). The current cultural acceptance of premarital sex in the United States may be contributing to the perception of STI risk associated with multiple sexual partners. This data illustrates the need to increase public awareness amongst emerging adults regarding the community's risk of STI contraction.

Additional segments of the data revealed a knowledge deficit regarding specific STI/HIV contraction information and HPV prevention. It would be advantageous for future STI Health Literacy programs and workshops to include segments addressing the reliability of latex vs animal skin condoms (roughly 70% of participants answered incorrectly), the lifespan and prevention of HPV (over 60% of participants answered incorrectly), the link between HPV and cervical cancer (roughly 60% of participants answered incorrectly), the methods of contraction and the factors that increase the risk of contraction of HIV (roughly 60–80% of participants answered questions incorrectly) (see Table 8 for more information). Additionally, nurses and health clinics may use this knowledge to guide targeted conversations with patients and the community.

The emerging adult population observed in this study can be difficult to reach on many levels. A large portion can be accessed through colleges and universities. However, as of Fall 2014, only 41% of Americans ages 18–24 will be enrolled in a 2-year or 4-year institution (National Center for Educational Statistics, 2014). The remaining 59% of those aged 18–24 and an undetermined number of those aged 25–29 are unaccounted for. The question is, how do we reach these people? For this study, we targeted several adult education centers that were community based (not considered a college or university) with exception of the SJSU

cohort[2]. It was difficult to obtain participants in the community-based programs because attendance fluctuates greatly for many of the schools. This lack of participation may be related to many things, including work, transportation conflicts, and/or child care needs. Originally, these community-based programs were the study's targets for possible dissemination of an STI health literacy workshop. The demographic data regarding government assistance utilization (Table 7) shows that 80.5% of participants are utilizing these programs, which correlates to the age of instability. Roughly 60.0% of participants are enrolled in Medicaid or MediCal, 32.2% are utilizing CalFresh (food stamps), and 6.9% are using Cash Aid. The applications for Medicaid/MediCal, Cash Aid, and CalFresh are combined into one application and are processed by the prospective County Welfare Department. Since the majority of the participants are utilizing one of these three programs, it may be beneficial to develop an STI health literacy workshop to be attached to these programs and/or the application process. By increasing STI health literacy among emerging adults we may decrease the contraction rates of STI's and HIV, and this may save countless dollars spent on STI/HIV treatment through Medicaid and MediCal. Additional research with a larger sample of emerging adults is necessary to identify any possible connections of STI literacy to education level, socioeconomic status, or ethnicity.

Limitations

Several limitations were noted throughout this study. Overall, the sample size was small and some participants found it difficult to comprehend parts of the vocabulary in the surveys. Additionally, question #18 on the knowledge assessment was unclear for participants and was subsequently discarded from the survey. All information obtained during the course of this study was self-reported and the participants may not have disclosed personal information due to the STI questions on the survey.

[2] We decided to incorporate the SJSU cohort because they closely mirrored the population of the community-based programs. They had not attended any institution of higher education (they were incoming freshman) nor had their parents. They were mostly low income, and they were ethnically diverse.

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Barriers to and Motivation for Parent-implemented Behavioral Interventions for Children with Autism Spectrum Disorders

Biography

Amanda Holst graduated with a BS in Nutritional Sciences and Journalism. Her research focuses on mindset and intrinsic/extrinsic and fixed/growth orientated motivation. Amanda is interested in investigating motivation in implementing home treatments with an emphasis on food and autism. She currently works as a behavioral therapist for an autism comprehensive educational services company. She is teaching applied behavioral analysis to children affected with autism to aid in increasing their academic, communication, adaptive, motor, and social skills. She is also the former editor of SHiFT Magazine, where she managed a team of 18 designers, photographers, and writers. Amanda has interned for The Health Trust, Unblind My Mind, and best-selling author, Marlene Koch, advancing wellness within the autism and diabetes community. She volunteered at Sacred Heart Community Service and Santa Clara County Fire Department, educating families and firemen on proper health nutrition. Amanda plans to earn her PhD in the field of Social Psychology and hopes to contribute to the research on motivation.

Barriers to and Motivation for Parent-implemented Behavioral Interventions for Children with Autism Spectrum Disorders

Abstract

This paper examines the barriers to motivation pertaining to parents delivering and following through with interventions at mealtimes with children who are affected by autism spectrum disorder (ASD). Several studies on treatment methods have been conducted in controlled research settings, but little is known about parents implementing these methods in a home setting. There is also little research showing the relationship between motivation and the barriers to treatment participation. This small case study examining the effectiveness of an evidence-based parent training intervention in a home setting has two aims. The first aim was to assess parent motivation during a six-week training focusing on child behavioral modification and communication. The second aim was to examine the effect of motivation on barriers to the intervention. It was hypothesized that the more instruction parents received, the higher their level of motivation would be. Motivation was assessed three times during the six week training program using the Parent Motivation Inventory Scale. Parents also completed the Barriers to Treatment Participation Scale, a general survey on mealtime, behaviors, learning styles, and strengths and weakness as a parent. The FAI (Functional Assessment Interview) and a Functional Assessment Direct Observation (FA) were also completed. Findings show that while the children's disruptive mealtime behavior decreased and food intake increased, motivation varied. These findings provide valuable insights into improving motivation for parent-implemented interventions and improving services available to ASD families.

Keywords: motivation, autism, behavioral intervention, applied behavioral analysis, barriers to intervention

Introduction

Research shows an increase in the prevalence of gastrointestinal tract (GI) problems in autistic children (Horvath, Papadimitrious, Rabsztyn, Drachenberg & Tildon 1999). This can lead to picky eating and malnutrition. Since children eat many meals at home and parents must follow through and maintain intervention programs, parents can encourage

successful meantime behaviors. Parents can be the best advocates for increased eating and compliance as well as reduced disruptive mealtime behaviors that prevent the intake of food in this population. Research shows that parents who participate in the treatment of their children show less stress, better affect, and higher ability (Brookman-Frazee 2004; Connell, Sanders & Markie-Dadds 1997; Keen, Couzens, Muspratt, & Rodger, 2010; Koegel, Bimebela, & Schreibman, 1996). In addition, there is also a high rate of success for implementing meal plans at home. According to one study (Najdowski, Wallace, Doney, & Ghezzi, 2003), mothers of children with inappropriate meal behaviors demonstrated a mean of 98% program integrity in implementing programmed consequences using functional analyses. The data reinforces the evidence that parents can be trained to implement functional analyses (components of an intervention plan) easily, and this can be seamlessly incorporated into carrying out a treatment at home. With regard to parent involvement, previous studies show that parents viewed participating in in-home therapy and learning techniques in therapy to carry over to the home setting as important factors in the success of early intervention treatment with children affected by autism (Lecavalier, Leone, & Wiltz., 2006; Ozonoff & Cathcart, 1998; Mancil, Conroy, & Nakao, 2006; Osborne & Reed, 2010; Tehee, Honan, & Hevey, 2009; Benson, Karlof, & Siperstein, 2008; McConachie & Diggle, 2006).

Yet, factors relating to families and parents are also the greatest contributors to children dropping out of child and adolescent therapy (Kazdin, & Mazurick 1994). The purpose of this study was to assess the barriers to motivation for the delivery and follow through by parents of interventions at mealtimes in a home setting. In addition, this study identifies steps to increase the success of implementation by parents.

Literature Review

Feeding problems are common among one-third of persons with developmental disabilities (Palmer, Thompson, & Linscheid, 1975). According to Sisson and Van Hasselt (1989), the four categories of feeding problems are lack of independent self-feeding skills, disruptive behavior (tantrums) during mealtime, eating too much or too little, and limited intake due to selectivity (type or texture of food). Behavioral interventions have been successful and are used to treat feeding problems in children affected by autism. One way they are used is by making access to the foods kids like dependent on eating the foods they do not like (Luiselli, Evans, & Boyce,

1985; Palmer et al., 1975; Riordan, Iwata, Finney, Wohl, & Stanley, 1984; Riordan, Iwata, Wohl, & Finney, 1980). Other studies focus on manipulating the consequences in the antecedent-behavior-consequence (ABC) method (what happened after the inappropriate behavior) by delivering consequences for problem behavior using establishing operations (EO) and reinforcers to create high levels of attention-maintained appropriate behavior. Some problem behaviors were associated with antecedents such as the food itself or escape from eating the food. Escape from food is tied to the negative reinforcement of escape behaviors. "Descriptive analyses of pediatric food refusal and acceptance" reports findings on 25 children (three with autism) ranging in age from one year and five months to eight years and two months and participating in inpatient or day-treatment programs for the treatment of severe food refusal or selectivity (Borrero, C. S. W., Woods, Borrero, J. C., Masler, and Lesser (2010). Twenty-two parents, aged between 22 and 49 years, also participated. This study extended the results of Fisher et al. (1992) by using a large number of participants to see if the consequences given after food refusal were being enforced during parent-conducted meals. Results showed that escape and attention seeking were the most common behaviors. This article is important because it describes how parents work with their children's behavior. It shows that parents do use responses such as coaxing and threatening to take away preferred items or offering to give preferred items in order to increase the chances that their child will eat (Borrero, et al., 2010). This study is also important because it reveals that escape (spoon removal/meal termination) and attention (coaxing, reprimand, comfort, concern) are the most frequently observed parental responses to food refusal, establishing a good baseline. This article shows that a functional analysis can be designed for a more naturalistic environment for feeding.

Parents' motivation plays a huge role in the success of an at-home intervention plan. It is estimated that 40–60% of youth drop out of treatment early (Kazdin, 1996; Wierzbicki & Pekarik, 1993). Identifying factors that cause delay or cessation can be helpful in increasing treatment participation in a home setting. Parents' motivation for children's treatment procedures is the most prominent predictor of whether families will attend and follow prescribed treatment interventions. In "Parent Motivation to Participate in Treatment: Assessment and Prediction of Subsequent Participation," Nock and Photos (2006) published the Parent Motivation Inventory (PMI), a scale to measure parent motivation to participate in treatment. Items in the scale assess three main parts of motivation: parents' desire for change in their

child, parents' willingness to change their own behaviors in order to influence change in their children, and parents' perceived ability to change such behaviors (Nock & Photos, 2006). Parents can be effective in using procedures appropriately. The data reinforces the evidence that caregivers can be easily trained to conduct functional analyses and incorporate them into treatment.

This study examined whether motivation increased when participants were given more training. It was hypothesized that more training, self-reflection, and feedback during the six-week intervention program would result in higher motivation. It was also hypothesized that the more the barriers to treatment parents had, the lower their motivation would be.

Methodology/Critical Approach

Participants

Participants were recruited via flyers posted at schools providing applied behavioral analysis, autism clinics, and centers in the South, North, and East Bay. Those who elected to participate were given a six-week in-home parent training course. The study was completely voluntary and participants did not receive any compensation for their participation. The participants included four women. The ages of the participants ranged from 30 to 40 years, with a mean age of 34. Ethnicities were Mexican-American (75%) and Caucasian (25%). The women were the parents of four children who have been diagnosed with autism spectrum disorder (ASD) and exhibited meal selectivity. The children had been diagnosed with autism by an outside agency or doctor using the diagnostic criteria of the DSM-IV. The children ranged in age from two to six years, with an average age of 3.5 years. One subject dropped out at the second week and elected not to fill out an exit survey.

Procedure/Methods

A multiple-baseline across participants design (Barlow & Hersen 1973) was used to evaluate initial parent motivation, barriers to treatment participation, and perceived interpersonal skills, each ranked from highest to lowest. Then, using the FAI (Functional Assessment Interview) and Functional Assessment Direct Observation (FA), parents were interviewed on problem behavior and were observed with their children before an intervention plan was created. Needs, main concerns, and strong points of the family dynamic in relation to meal selectivity were taken into account.

Parent motivation was assessed three times during the study using the Parent Motivation Inventory (PMI) at sessions 1, 3, and 6. An intervention plan was designed for two identified problem areas and two or three different foods, one being a new food to avoid confounding variables and increase differentiation of receipt of food. Using applied behavioral analysis (ABA), parents used the tools they learned to observe and assess their child's behavior. They used the intervention and collected baseline and tracking data. I followed up with an interview with the parents on the difficulties they had during the process. Parents also completed the Barriers to Treatment Participation Scale.

Setting

Sessions took place in the participants' homes. Materials used during the study included motivating toys, food prepared by the caretaker/parent, and other table-setting and meal-related items readily available.

Six-week training session

Each parent-education session lasted 45 minutes and took place once a week for six weeks. During each training session, parents were given a demonstration of the meal intervention steps, followed by a 20-minute parent instruction phase in which the parents could ask questions and model the steps. Afterward, the parent was given feedback and was invited to ask more questions or receive additional instructions.

Outline of procedures with parent and child

My training was with the parent. The parent was instructed to use reinforcers, verbal praise, and replacement behaviors to alter mealtime behavior. The parents were instructed to praise the child or offer a reinforcer after the child attempted or completed any step of their task analysis. There was no specific diet proposed. Parents were responsible for picking two new foods that they wanted their children to incorporate into their diets and two behaviors that they wanted to decrease. Parents prepared and introduced their own food to their child.

Qualifications

I have been a behavioral interventionist for one year and three months. In my position, I teach appropriate behavior to children diagnosed with autism. I helped decrease maladaptive behavior such as escape,

tantrums, and aggression as well as increase functional behavior like better communication skills and appropriate self-expression. Some programs that I have implemented include increasing the intake of non-preferred foods.

Case Study 1

This study was recommended to Subject 1 (S1) by her six-year-old son's school. S1's son was diagnosed with autism at the age of 3.1 years. She became aware of his feeding problem starting at the age of 5 or 6. She noticed her child started to eat fewer types of foods in the past year. Both parents are responsible for making meals in the home. At week 1, S1 reported that she tries to get help from teachers and the school to alleviate her son's feeding problems; however, she currently does not have any intervention in place. The child also experienced speech delay and hyperactivity when he was younger. He used to eat everything when he was a year old, but now his diet consists of cheese quesadillas, chicken sandwiches from the fast food restaurant where she works, cookies, crackers, chips, eggs, pancakes, soda, and water. She noted that she would like intervention but needed more information. She described her skills from strongest to weakest as verbal communication, problem solving, non-verbal communication, listening skills, decision-making, assertiveness, and negotiation.

Demographics

S1 is a 30-year-old Hispanic woman. Her husband is 37 and also Hispanic. SI works at a fast food restaurant 40 hours per week, and her husband works at a Mexican restaurant 50 hours per week.

Goal behaviors and new foods

Mealtime challenges included problems with new food selections, only eating preferred items at mealtime, and sometimes escaping the dinner table. Preferred items at meals included cereal, milk, and cheese quesadillas. According to S1, her son did not eat a normal dinner and did not eat with the family. The behaviors that S1 wanted to work on included attention-seeking and escape/sitting issues. The two types of foods S1 wanted to try adding to her son's diet were something salty and something sweet. S1 indicated that rice was salty and fruit was sweet. S2 also mentioned at week 1 that she wanted her son to eat more vegetables and meats. Homework assignments included adding a schedule, decreasing the number of preferred

snacks during the day, putting food on the table as a snack, and blending non-preferred foods with preferred foods.

Motivation ratings

Motivation decreased 25 points from session 1 (121 points) to session 3 (96 points), but then increased 7 points from session 3 to session 6 (103 points).

Identified challenges

S1 noted in the first session that her child has learned over time that being upset or angry gets him out of an uncomfortable situation. Phrases the son uses are "I'm mad," "it's not fair" and "this is yucky food." During the Functional Assessment Direct Observation (FA), it was observed that most behaviors occurred between 3:30 and 4:30 p.m., the time when the son came home from school and the time before dinner, respectively. S1 noted that her son would reach out for her and tell inappropriate jokes. During observation, it was noted that this was to obtain attention. The function of saying "No, I'm not hungry" and screaming seemed to be to escape the request to eat.

During the first session, S1 told her son it was time for dinner. He went into the kitchen, grabbed cereal, and sat back on the couch. S1 took the cereal away and pleaded with him to eat some rice and carrots. The child screamed and went back to the couch. S1 reported that her son would grab for cereal instead of sitting at the table to eat. She also reported that her husband would force their child to eat food, causing a gag reflex. After pleading with their son for about an hour, the parents would take him to a fast food restaurant to get dinner. S1 reported that she gave in to his demands because she worried he will starve. In week 3, the child got sick at a fast-food restaurant and was unable to eat fast food. S1 used this as an excuse for healthier eating and introduced soups.

During the six-week training, the session was cancelled once and rescheduled once.

Outcome of intervention

Throughout the six weeks, S1 tried to stick with the same mealtime schedule as much as possible. During week 3, her child was noticeably calmer and exhibited 50% fewer non-compliance and escape behaviors at mealtime. S1 noted in week 4 that he was losing weight. During weeks 4–6, he only ate fast food on occasion, and he sat at the table and ate soup

while watching a show on his iPad. S1 attributes the success of the program to sticking with the same mealtime schedule. Non-homework tasks S1 implemented included taking away soda, adding a morning shake, adding protein bars, and clearing off the table when it was time for her child to eat. In week 5, S1 added a chicken broiled sandwich to her son's lunch options and added beef soup with vegetables, fruits in a smoothie, and spaghetti star noodles consisting of tomatoes, onion, carrots and garlic. S1 learned that behaviors occur when her son is hungry. In week 6, S1 reported that her son was trying new foods (wonton noodle soup, ham, yogurt, and fruit) and that mealtime stress was lessened. SI attributed success to the education of the program, her consistency in implementing it, and the use of reinforcers when her son ate all of his vegetables and fruits. Reinforcers included X-Box and Godzilla video games for weeks 5 and 6.

Case Study 2

This study was recommended to Subject 2 (S2) by an autism agency in Oakland, California. One of S2's sons was diagnosed with autism at 15 months. S2 was aware of feeding problems in her son's first year. Currently, the family is seeking feeding help from a pediatrician, an occupational therapist, and through feeding therapy at a nearby children's hospital. The child is on a vegetarian, casein-free diet. In addition, the child is taking acid reflux medication once a day. S2 shops at organic markets at least two or three times a week and is finely mixing foods together because her son has an issue with texture. He typically eats yogurt, oatmeal, waffles, soymilk, avocado, and rice. S2 listed her interpersonal skills from highest to lowest as problem solving, verbal communication, decision -making, negotiation, listening skills, assertiveness, and non-verbal communication.

Demographics

S2 is a 33-year-old Caucasian woman who lives with her husband and twin 2-year-old boys. Her husband is 32 and is Hispanic. S2 is a stay-at-home mom, and her husband works as an engineer. A caregiver comes twice a week to help take care of the twins.

Goal behaviors and new foods

S2 chose to work on escape and tantrums. Two foods she chose to use in the intervention were noodles and grapes. As barriers to participating in treatment, she reported that treatment added another stressor to her life, the assigned work for treatment was too difficult, and treatment interfered

with spending time with her children. Homework assignments included adding a schedule, decreasing the amount of preferred snacks during the day, putting food on the table as a snack, blending non-preferred foods with preferred foods, and reducing stress at mealtimes by separating job functions and children.

Motivation ratings

Motivation decreased 11 points from session 1 (109 points) to session 3 (98 points) and decreased 5 points from session 3 to session 6 (93 points).

Identified challenges

During the first session, both S2's children were placed in their high chairs for feeding, and noodles were presented to both boys. S2's son smashed the noodles in his fingers but did not attempt to put them in his mouth. S2 struggled to model eating the noodles and tried to use contingencies (first take a bite, then get your milk). Her son began to tantrum, and S2 told her husband to give their son milk. S2's stress and frustration seemed to carry over to the stress of husband and their other son in session 2, when her son cried out for milk before the end of the meal. There was a minor argument between S2 and her husband about when to give the milk, and lunch ended early with the child in distress.

In week 3, conflicting feeding styles between S2 and her husband were more prevalent. S2 admitted that she would rather stay away at mealtimes to avoid the stress of trying to help her ASD child eat. S2 also decided that the reinforcers learned in the training were not working for her son. She felt that the high fives and verbal praise were making him hypersensitive, so she changed to a more naturalistic approach in which she let her son initiate touching or bringing food to his mouth from her plate and only rearranged items, increased verbal prompting, or used encouragement when his motivation decreased. In week 4, S2's husband was alone with child and feeding was successful using a direct approach. In week 5, S2 was alone with her son, and feeding was successful using a more naturalistic approach. S2 reported that her son got an infection and had lost weight and was not eating well. In week 6, the child's twin brother went to school for the first time. S2 noticed that her son was less agitated without his brother around. During the six-week training, S2 rescheduled once when the family went out of town.

Outcome of intervention

Throughout the six weeks, S2's stress level seemed to decrease. Her son received milk after his meal starting at session 2. S2 split up meal times, where she fed her ASD son while her husband took care of their other son. S2 attributed the success of the program to the gradual introduction to the new food and having it available at all meals. There were no escape behaviors or tantrums exhibited after the second session. S2 attributed this to allowing her son the opportunity to find his own interest in the new foods and not pushing him to put them in his mouth. Her son went from throwing grapes and noodles on the floor (sessions 1 and 2), to playing with them on his tray (sessions 3 and 4), to putting them in his mouth and partially eating noodles and grapes without skin (sessions 4–6). S2 reported that noodles and grapes were given at most meals and her son was trying new foods with new textures such as butternut squash, black bean patty with jelly on top, blueberries, died apricot, different-shaped noodles (elbow), and broccoli. S2 reported that she wanted to introduce whole fruits and vegetables instead of combining them in a shake by cutting them into desirable shapes and presenting them in a bento box to encourage consumption.

Case Study 3

Subject 3 (S3) and her family live in San Jose, CA. S3's son was diagnosed with autism at the age of 2.5 years. S3 had gestational diabetes in her second trimester. She became aware of her son's feeding problem during his first year. He has seen a biomedical doctor for diet since the age of 18 months for treatment of GI symptoms, constipation, and lowering the amount of yeast. He currently takes supplements including COQ10, multivitamins, probiotics, enzyme D3, calcium, and iron. He is on a gluten-free, casein-free, specific carbs diet. S3 reports that her son loves crunchy foods and is sensitive to cold foods. She has to limit the amount of fruit he eats to control sugar intake. S3 makes the meals in the household. At the beginning of the six weeks, she reported that her child ate meat, potatoes, fruit, and bread. He follows his own mealtime schedule and routine. S3 has foods available for her son all day long. Mealtimes lasted 10–15 minutes. S3 described her personality as easy-going, with persistence, resourcefulness, and loving as her greatest strengths. She described her weakness as a parent as a lack of discipline. She has strong intentions of helping her child at mealtimes and agreed that it is important to help him for the sake of nutrition, social acceptance, reducing stress in the household,

and increasing the foods he eats. S3 listed her interpersonal skills from strongest to weakest as listening, verbal communication, decision-making, assertiveness, problem solving, negotiation, and non-verbal communication. S3 described her coping strategy as being emotionally focused. She reported that the best methods of learning are modeling, answering questions that are relevant to child's personality, visual, auditory and kinesthetic. S3 agreed that she was capable of learning skills to competently carry out change at mealtimes.

Demographics

S3 is a stay-at-home mom and is 40 years old. Her husband is 39 years old and works in the tech field. Both parents are Hispanic.

Goal behaviors and new foods

Distractions at meal times included noise and placement of food. S3 used modeling behavior at mealtimes. Mealtime challenges included new food selections, only eating preferred items at mealtime, eating too quickly, refusing to eat, not sitting still, being distracted at times, and refusing to eat vegetables. On a scale from 1 to 10, S3 rated her stress as a 7. She noticed her child started to eat fewer types of foods in the past year. She perceived intervention as vital at all costs, and she does research on her own about ways to help her child. She participates in a support group that helps her, and she receives intervention services paid through insurance and out of pocket. S3 noted that her child has trouble paying attention, following rules, and complying with her requests. In the six-week program, S3 wanted her son to sit at the table for 15 minutes, use utensils, and be open to more foods. S3 noted that her child has aversions to food, especially vegetables, eats meals too quickly, and does not want to finish meals because he gets distracted. The two foods she wanted to add were carrots and potatoes. The two mealtime behaviors she wanted to target were escape and task avoidance. Homework assignments were implementing a schedule for food, adding more carrots to meal times, using a PECS board for hand-washing before meals, rewarding him after taking a couple of bites, and setting a timer for staying at the table.

Motivation ratings

Motivation increased 15 points from session 1 (102 points) to session 3 (117 points) and increased 4 points from session 3 to session 6 (121 points).

Identified challenges

Challenges encountered during the six weeks included S3 being inconsistent with the program, not doing the homework, illnesses, and the family moving. During week 1, non-preferred food was presented to the child. He was instructed to eat the non-preferred food and then he was rewarded with fruit slices. He protested and showed distress by hitting his head. S3 was instructed to immediately stop and let him get out of his chair. During week 2, the family added another ABA training program on adaptive skills and saw some change at meal times. S3 reported that consistency and visuals in the program aided in preventing task avoidance and escape at meals. Tantrums increased in week 4. S3 admitted that she had not been consistent with her child. S3 brought a Mexican food lunch home instead of having carrots and potatoes. In week 5, a timer was introduced to use as a countdown for food to be prepared and to wait for mom and dad to finish at the dinner table before ending a meal. S3 reported that the timer worked once but overall her son still left mealtime before dinner with the family was over. Sessions began 12/28 and lasted until 2/5. Two sessions were rescheduled when the child was sick and once when S3 was sick. The family was also in the middle of putting their house up for sale, causing irregular eating times and inconsistent implementation of the program.

Outcome of intervention

The child's intake of fruits was reduced and these were offered only as a reinforcer for eating the rest of his meal. S3 reported that her son was eating more vegetables during week 3 with his smoothies and rice. S3 reported that roasted carrots were shredded over eggs at lunchtime. Mealtime behaviors were moderately reduced. Overall S3 stated that icons, organization, and predictability had the greatest impact in the success of meal times. However, meals and snacks were not consistent, and moving made it difficult for the family to stay on a set schedule. The child was still leaving the table and showing signs of some stress at mealtimes.

Results

Motivation

The difference in motivation over time was not statistically significant, $F(2,4) = .905$, $p = .474$. S3 had the highest average motivation (113.33), which increased steadily over the six weeks. S1's motivation was next highest (106.67). Her motivation decreased from week 1 to week 3 and

then increased from week 3 to week 6. S2 had the lowest average motivation (106.67), and it decreased during the course of the study (Table 1).

Motivation increased for S3, whose child had the most interventions in place (speech, prior research, occupational therapy, adaptive skills therapy). It was unclear whether motivation was influenced by who made the meals. For example, S2 had the most help with meals (mom, dad, caretaker, feeding clinic), but her motivation decreased throughout the six weeks. S1 became recently aware of her child's feeding problems in the last year, and her child was diagnosed the earliest. Not having insurance was a factor in whether or not children received services. Receiving the ASD diagnosis early was associated with higher motivation. Possibly if there were more comprehensive services working under one medical group, parents' motivation would increase.

Barriers to treatment participation

Another aim of this study was to examine the barriers that families experience during treatment and how those barriers affect therapy. The Barriers to Treatment Participation Scale (BTPS) was used to evaluate the barriers associated with treatment participation and retention in families. The scale consisted of 44 questions (Table 3). Four subjects reported on the scale, the three subjects in this study in addition to a fourth subject who dropped out at session 2. The survey was taken before session 1 and dealt with the current intervention the subjects had in place. Subjects rated the questions on a 5-point scale (1 = never a problem, 5 = very often a problem. The subjects' scores were added together and then averaged. S2 reported the highest barriers to intervention.

Barriers vs. motivation

There was a relationship between motivation and barriers to intervention. S2 had the highest barrier score (81) and showed the greatest decrease in motivation over the six weeks of the study. S3 showed the highest motivation throughout the six-week course and had a moderate score on the barriers scale (46). S1's son had not received previous therapy; therefore, she reported no barriers. Her motivation decreased from week one to week three and then increased from week 3 to week 6. All three subjects considered intervention as vital at all costs.

Motivation and interpersonal skills

Interpersonal skills reported by the person with the highest average motivation (S3) in order from strongest to weakest were listening skills,

verbal communication, decision making, assertiveness, problem solving, negotiation, and non-verbal communication. Interpersonal skills in order from strongest to weakest reported by the person with the lowest average motivation (S2) were problem solving, verbal communication, decision making, negotiation, listening skills, assertiveness, and non-verbal communication.

Discussion

There are not many studies showing the effectiveness of parent-implemented interventions. Research shows that parents have a higher dropout rate at the beginning stages of an intervention process. The hypothesis in this study that parents who received more instruction would have a higher level of motivation was not met. These findings suggest that knowing a parent's interpersonal skills may lead to better outcomes for motivation. More research is needed on a larger scale to better sort out these factors.

Parents seem to take more risks after their children show progress. Ways to reduce dropout include parent education, emphasizing the importance of the program, and clarifying expectations, roles, and the time frame for achieving short- and long-term goals. Consistency and practice throughout the week proved the most successful in increasing food consumption and decreasing disruptive mealtime behaviors, however this may or may not affect parents' motivation to implement the program. When the environment was less stressful, the child was more inclined to eat, decreasing disruptive mealtime behaviors.

With regard to motivation and interpersonal skills, the participant with the highest average motivation (S3) ranked listening as her strongest skill, indicating that this interpersonal skill could play a part in keeping motivated. Verbal communication, decision making, and non-verbal communication skills were ranked the same for the most and least motivated subjects and therefore did not seem to play a part in motivation. S3 listed her greatest strengths as persistence and resourcefulness, and her weaknesses as a lack of discipline and emotion-focused coping strategies (directed toward changing her emotional response to a situation). This shows that while a lack of discipline may not be directly related to motivation, how people change their emotional response to a situation can be. The subject reporting the least average motivation (S2) listed her greatest strength as awareness that this is a long ride and her weakness as low patience to deal with clutter. Her main coping strategies were problem

focused (directed toward reducing or getting rid of a stressor, adaptive behavior). Her preferred method of learning was reading. Parents' learning styles, coping strategies, and interpersonal skills should be taken into consideration in a parent-implemented meal program. Further research is needed on motivation across interpersonal skills.

With regard to barriers to treatment, parents taking an active role, such as providing homework, advocating for the child's best interest, attending consultation sessions, and having a client-defined therapy approach (Schaefer & Gilbert, 2012) have been shown to reduce intervention dropout rates. Providing additional services for low-income families and those facing many barriers is important. Examples include providing home visits, short-term treatment, sliding pay scales, and interpreters.

Table 1.

Motivation Scores (Session 1, 3, & 6)

	S1	S2	S3
Session 1	121	109	102
Session 3	96	98	117
Session 6	103	93	121

Table 2.

Tests of Within-Subjects Effects

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Factor1 (Sphericity Assumed)	266.667	2	133.33	.905	.474
Factor 1 (Greenhouse-Geisser)	266.667	1.140	233.934	.905	.448

Factor 1 (Huynh-Feldt)	266.667	1.651	161.543	.905	.465
Factor 1 (Lower-bound)	266.667	1.000	266.667	.905	.442

Table 3.

Barriers to Treatment Participation Scale

Questions	S1	S2	S3	S4	Average
Question 1: My child refused to come to the sessions	0	0	1	3	1
Question 2: Transportation (getting a ride, driving, taking a bus) to the clinic for a session	0	3	1	1	1.25
Question 3: My child was in other activities (sports, music lessons) that made it hard to come to a session	0	0	1	1	.50
Question 4: Scheduling of appointment times for treatment	0	3	1	5	2.25
Question 5: Treatment lasted too long (too many weeks)	0	1	2	1	1
Question 6: Treatment was in conflict with another of my activities (classes, job, friends)	0	1	1	2	1
Question 7: Treatment did not seem necessary	0	1	1	4	1.5

Question 8: I did not like the therapist	0	1	1	1	.75
Question 9: I felt that treatment cost too much	0	2	1	1	1
Question 10: I was billed for the wrong amount	0	2	1	4	1.75
Question 11: Treatment was not what I expected	0	3	1	0	1
Question 12: Information in the session and handouts seemed confusing	0	1	1	1	.75
Question 13: My child had trouble understanding treatment	0	0	1	3	1
Question 14: During the course of treatment I experienced a lot of stress in my life	0	3	1	0	1
Question 15: I lost interest in coming to sessions	0	1	1	1	.75
Question 16: I was sick on the day when treatment was scheduled	0	1	1	0	.50
Question 17: My child was sick on the day when treatment was scheduled	0	2	1	0	.75
Question 18: Crises at home made it hard for me to get to a session	0	2	1	0	.75
Question 19: I felt I had to give too much personal information to the therapist	0	1	1	1	.75

Question 20: Treatment added another stressor to my life	0	5	2	0	1.75
Question 21: I felt treatment did not seem as important as the sessions continued	0	2	1	4	1.75
Question 22: I felt this treatment was more work than expected	0	3	1	5	2.25
Question 23: The atmosphere at the clinic makes it comfortable for appointments	0	1	1	0	.50
Question 24: I did not feel that I had enough to say about what goes on in treatment	0	1	1	3	1.25
Question 25: I feel treatment did not focus on my life and problems	0	1	1	1	.75
Question 26: The therapist did not seem confident that treatment would work for my child	0	1	1	1	.75
Question 27: The therapist did not seem confident in my ability to carry out programs	0	1	1	1	.75
Question 28: My child now has new or different problems	0	3	1	2	1.5
Question 29: My child's behavior seems to have improved, therefore, treatment no longer seems necessary	0	1	1	5	1.75
Question 30: Treatment did not seem to be working	0	2	1	1	1

Question 31: There was bad weather and this made coming to treatment a problem	0	1	1	1	.75
Question 32: I do not feel the therapist supported me or my efforts	0	3	1	1	1.25
Question 33: The assigned work for me to do as part of this treatment was much too difficult	0	4	1	1	1.5
Question 34: I did not have time for the assigned work	0	3	1	1	1.25
Question 35: My child was never home to do the assigned homework	0	0	1	4	1.25
Question 36: There was always someone sick in my home	0	2	1	1	1
Question 37: The therapist did not call often enough	0	1	1	1	.75
Question 38: Getting a baby-sitter so I could come to the sessions	0	5	1	1	1.75
Question 39: Finding a place to park at the clinic	0	3	1	1	1.25
Question 40: I had a disagreement with my husband, boyfriend, or partner about whether we should come to treatment at all	0	1	1	1	.75
Question 41: I was too tired after work to come to a session	0	2	1	1	1

Question 42: My job got in the way of coming to a session	0	0	1	1	.50
Question 43: Treatment took time away from spending time with my children	0	5	1	1	1.75
Question 44: I had trouble with other children at home which made it hard to come to treatment	0	2	1	0	.75
Total Score	0	81	46	68	

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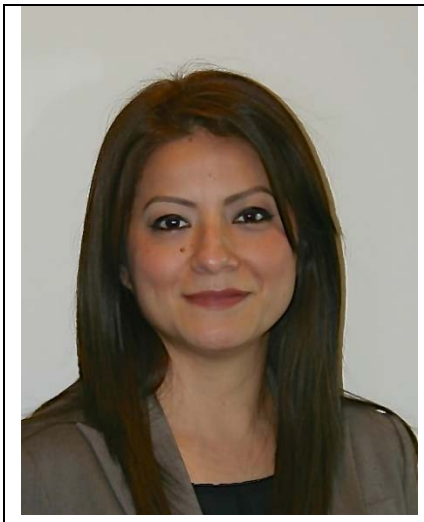

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Paper Title
High Impact Practices Associated with Higher GPAs of Psychology Transfer Students

Biography

Cirenia is a nontraditional student who, after a ten-year gap, made a critical decision to return to school. She graduated Cum Laude from De Anza College, where she earned an Associate of Arts degree. She then transferred to San Jose State University where she will be receiving a BA in Psychology with departmental honors. She hopes to attend graduate school and one day teach at a public university in California. Her research interests involve finding solutions to the current achievement gap between minority low socioeconomic and upper income students. Her passion stems from her pursuit of her own education, and she wants to be in a position to help others reach their potential.

Cirenia has more than ten years of management experience. She had held several leadership positions and worked in richly diverse communities. Currently she volunteers as a Court Appointed Child Advocate (CASA) working with foster children. Cirenia has a ten-year-old daughter, Mary Anna, who is the inspiration behind her perseverance and fortitude.

High Impact Practices Associated with Higher GPAs of Psychology Transfer Students

Abstract

Kuh (2008) and Kuh and O'Donnell (2013) reported on specific educational practices that correlate with higher levels of academic challenge, student engagement, and achievement. These "High Impact Practices" (HIPs) have been associated with improvements in retention and graduation rates, or, more broadly, with "student success." In the current study, students who had been accepted for admission in the BA or BS programs in Psychology at San Jose State University were asked to participate at the conclusion of their onsite transfer orientation. Of the approximately 250 students approached, 133 completed the questionnaire. Results indicated support for the relationship between participating in HIPs (yes/no on one or more of the ten HIPs identified by the Association of American Colleges and Universities (AAC&U) and academic success (GPA in the prior semester at the pre-transfer institution): t (109) = 2.18, p = .029. These results are surprising given the ceiling effects imposed by the transfer selection criteria and potential misunderstanding of the HIP categories. The prior semester GPA of the No HIP group was 3.06 (SD = .85); the prior semester GPA of the 1+ HIP group was 3.40 (SD = .53). We intend to follow up with consenting participants on their performance throughout their time at SJSU to collect additional data on the relationship between participation in HIPs and academic success and to determine the extent of definitional confusion. Caution should be taken in considering these (and other) HIP-related results because causal links have not been adequately demonstrated.

Introduction

Student success is the number one goal of all higher education institutions across the country. However, each individual institution's approach to achieving such an ambitious goal varies, and it may seem like a high-reaching goal according to the disconcerting 2012 retention rates reported by the Integrated Postsecondary Education Data System (IPEDS) of 59% at 2-year institution and 57% at 4-year degree-granting institution U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System, 2014). Not only is completion a concern, but also the time it takes to complete a baccalaureate degree has increased to an average of six years instead of the traditional four

years. IPEDS statistical data for the 2006 cohort of students across the country reports a completion rate of only 45.8% in four years (U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System, 2014). George D. Kuh sought to address retention rates, longer completion time, and overall student engagement in his article "High-impact educational practices: What they are, who has access to them, and why they matter" (2008). Kuh addresses the essential educational practices that have since been correlated with a positive impact on students' success, termed High Impact Practices (HIPs). With Kuh's research as the basis for student engagement, student performance, and overall student success, further research has been conducted to investigate the impact of each of ten HIPs, which include first-year seminars and experiences, common intellectual experiences, learning communities, writing-intensive workshops, collaborative assignments and projects, undergraduate research, diversity/global learning, service learning-community based learning, internships, and capstone courses and projects. Kuh proposed that if students participate in a minimum of two HIPs, one during their first year and one during their senior year, student engagement would increase, thereby increasing student GPAs and graduation rates.

A 2011 assessment of HIPs conducted by Ashley Finley, senior director of assessment and research for the Association of American Colleges & Universities (AAC&U), found that the effectiveness of and participation in each HIP indeed varied, with study abroad having the least effect and service learning having the highest effect and most participation. Undergraduate research was also low in participation. However, as a whole, students who took part in two or more HIPs had a positive outcome (Finley, 2011). Since the majority of HIPs are focused on either the freshman or senior year, Finley's (2011) statistical analysis from the National Survey of Student Engagement (NSSE) identified higher participation in first year HIPs in comparison to the senior year. Hispanic students tended to participate in more HIPs than did students of other races, although the difference was not statistically significant. This could be because underrepresented students, such as first-generation students, may not recognize or acknowledge that they need to seek out resources that can help them get up to par academically. This is true especially in community colleges, which serve as the entry point into higher education for underrepresented groups (Price & Tovar, 2014). Huber and Hutchings

(2004) agree that HIPs are not inclusive and often only few students take advantage of them.

In a subsequent study, Finley and McNair (2013) examined the effects of HIPs on underserved students. They found that first-generation, transfer, and underrepresented students all benefited from participating in HIPs. Of special interest was the overall higher level of reported learning across four groups, African American, Asian American, Hispanic, and White students. Finley and McNair (2013) found an average 11% increase of self-reported gains from students in the previously mentioned groups who participated in 1–2 HIPs, 22% for 3–4 HIPS, and 34% for 5–6 HIPS.

In collaboration with educational institutions and Excelencia in Action Network, the AAC&U is currently involved in projects and initiatives that involve establishing HIPs at institutions across the country to help students, particularly underrepresented students, achieve their academic goals. For example, at Palm Beach State College, the Supporting Outstanding Achievement and Retention (SOAR) initiative is a two-year program that will provide a learning community for minority, first-generation students. The University of Texas at Brownsville has implemented Link2Success, a program that incorporates study sessions in a collaborative learning environment with peers and tutors in courses that have high failure rates. Texas A&M-Corpus Christi has increased the number of one-on-one sessions and workshops offered by their writing center, and they have even extended their services by helping local high schools develop their own writing centers. In New York, Bronx Community College has implemented a First Year Program that includes a first-year seminar that specifically includes several HIPs. Since the start of their program in 2012, the results show a 64% one-year retention rate, 55% four-semester retention rate, and an average cumulative GPA of 2.68. By contrast, students who did not attend a first-year seminar had a 56% one-year retention rate, 49% four-semester retention rate, and a cumulative GPA of 2.42.

Furthermore, Hostos Community College in New York recently implemented a summer bridge program that helps incoming students adapt to college (Rosario, Flemister, Gampert, & Grindley, 2013). Serving a low socioeconomic community, Hostos Community College recognized the need to embrace students who might drop out as a consequence of the new expectations they face, specifically first-generation students who might lack the skills necessary to succeed. By having access to encouragement, remedial courses, and assistance acclimating to college life, students were

more likely to continue their educations. Hostos Community College also incorporated another HIP: internships. They developed two types of internship programs. In the first type, students can voluntarily choose to take part in internships, as is typical in many colleges. The second type are internships that are included as part of the normal curriculum. By integrating internships into the normal curriculum, students were able to be actively involved in their learning. A 250% increase occurred from 2005 to 2013 in internship placements. As a result, students gained the confidence needed to find a career and job placement.

O'Neill's (2010) analysis of internships as a HIP points out how they provide an excellent platform for undergraduate students to explore their future career goals. By taking part in real-world experiences, students are exposed to direct supervision from employers, peer connections, and constant feedback, which can be integrated into the students' academics and vice versa. However, O'Neill argues that individual colleges must meet certain conditions in order to produce successful high-impact internship programs. The first is that colleges must clearly define what internships are and distinguish between their learning goals and career development goals. While some faculty members might regard internships as vocational and therefore be hesitant to promote them, colleges must accept an internship as an opportunity for students to strengthen their career goals while still pursuing their degrees. By placing students in a well-structured internship program, students might not feel dissatisfied or unprepared with their degree upon job placement.

San Jose State University (SJSU) has also taken part in implementing HIPs to help students succeed. Debra David, associate dean of undergraduate studies at SJSU, described how the university partners with Evergreen Valley College to incorporate HIPs for transfer students (O'Donnell et al., 2011). Through collaboration between faculty members at both institutions, an English 1B course was designed that combined intensive writing and service learning by partnering college students with elementary students to participate in a letter exchange program. Additionally, the majority of the Evergreen Valley College English 1B classes were held at SJSU. Integrating the transferring students into the university campus empowered students to conceptualize their future attendance at the university. At the end of the semester, positive feedback was received from the students who participated in the program.

SJSU has other HIPs in place that are considered first-year seminars. Community for Engineering Learning and Living (CELL) is a residential

first-year experience for engineering students that provides the setting to create supportive cohorts where students can interact with peers and staff via “immersion, community, and hands-on learning” (San Jose State University, 2014). ASPIRE is a program that assists low socioeconomic and underrepresented students with a welcoming community that provides them with the tools necessary to successfully transition into a university setting. Success as Transfers is a course designed to assist all transfer students in becoming successful scholars at San Jose State University. Although transfer students are considered third-year students, it is an important transition to a new institution where such a program can be tremendously beneficial. Discovering Business is an introductory business course recommended for freshman business majors, which "directs students toward career paths that best reflect their personal aptitudes and interests" (San Jose State University, 2014). Personal, Academic and Career Exploration is a course aimed to assist students in finding a major and orienting to SJSU. These are only some of the many first-year experience programs and courses available with student success as the goal.

Another example of a HIP practice in place at SJSU is undergraduate research. The McNair Scholars Program provides students with the opportunity to conduct individual undergraduate research under the close mentorship of a professor. Internships can be obtained through the Career Center, which specializes in helping students find internships that link them with companies where they can apply their knowledge to the real world. Study Abroad programs are available for summer, a semester, or a full year for travel to Africa, Asia, Europe, Latin America, the Middle East, and Oceania. Alternative Spring Break sends SJSU student teams on domestic and international service trips during spring break to work with communities in their host countries. The destination for the 2015 Alternative Spring Break is Oaxaca, Mexico. The intensive cultural immersion and hands-on service exposes students to the realities of community development and promotes fuller comprehension of their place in the global community. The Future is Ours is a service-learning program that provides community service opportunities for students who want to serve in places like homeless shelters and soup kitchens. Given that SJSU does offer all the fundamental HIPs described by Kuh (2008), it is important that the connection between HIPs, student participation, and student success be assessed.

In this study, our goal was to measure the participation level of transfer students entering the SJSU psychology program. Following Kuh’s

(2008) suggestion that a positive academic effect occurs when students participate in a minimum of two HIPs, one in the first year and one in the senior year, our prediction was that students transferring who had participated in at least one HIP, given that they had not yet reached their senior year, would have higher GPA's. Additionally, we wanted to assess the students' awareness of the available HIPs at their two-year institution prior to transferring, thereby establishing a baseline level of awareness. This will permit us to further track their participation in HIPs and their ability to recognize the HIPs offered at SJSU once they are already enrolled. The second phase of this study will take place during the Spring 2015 academic semester. Those participants who agreed to take part in the second phase of the study will be contacted to complete the same survey, allowing us to analyze their understanding of HIPs and their participation in them. Students' academic courses and GPA will be verified via student records, access to which the participants granted permission, and cross-referenced with their self-reported GPA during the first phase of this study.

Method

The study was conducted at San Jose State University. Upon completion of the psychology department transfer orientation, students were asked by the principal investigator to participate in the voluntary study by completing a questionnaire. Those who consented were invited to remain in the classroom to complete the questionnaire, which took approximately 15 minutes. Out of approximately 250 students approached during six orientation sessions, 133 agreed to participate (95 females and 28 males, M*age* = 23.2, *SD* = 4.7). Ethnicities of the participants were American Indian ($n = 2$), Asian American ($n = 30$), African American ($n = 9$), Hispanic ($n = 45$), Native Hawaiian ($n = 3$), and other ($n = 7$). The participants represented 24 community colleges.

The questionnaire included a consent form, basic demographic questions, and questions about their participation in each of the ten HIPs at their prior institution(s). A definition of each HIP as described by the Association of American Colleges and Universities (AACU) was provided, followed by a "yes/no" question asking whether the student had participated in or had experience with it. If students replied "yes," they were asked to list courses taken or describe their experience. If students answered "no," they were asked if the HIP was not offered at their institution, if it was offered but they chose not to take it, or if they did not know whether it was offered. At the end of the questionnaire, students were informed of the goal

to do a follow up once they were enrolled at San Jose State University. Forty-one students agreed to participate in the follow-up. They provided their contact information and granted permission to access their academic records.

During the Spring 2015 semester, participating students will be contacted to complete a second questionnaire to measure their involvement in HIPs at SJSU and the effect on their academic success. Further follow up will include a transcript analysis. The direct access to personally identified student records will be restricted to Dr. Van Selst. Overall GPA, persistence, and graduation rates will be extracted from the original records.

Results

Using SPSS, an independent sample t-test was used to compare the prior semester GPAs of the two groups of students; those who had participated in one or more HIPs and those who did not participate in any: $t(109) = 2.18$, $p = .029$ (two-tailed). A significant difference was found: students who had participated in one or more HIPs had higher GPAs ($M = 3.40$, $SD = .53$) than those who did not participate in any HIPs ($M = 3.06$, $SD = .85$). The results support our hypothesis that students who participated in at least one HIP would have higher GPAs than those who did not.

Discussion

Although HIPs are conceptually beneficial to students' academic and eventual career success, a concrete assessment of their effectiveness cannot be made, as pointed out by Finley (2011). One method of obtaining measurable data is via the National Survey of Student Engagement (NSSE), founded by George D. Kuh. However, the NSSE only measures six of the ten HIPs. Additionally, each institution's implementation and measurements differ from the state level, and the states' levels differ from the national level. A measurement system has not been put in place to gather concrete data of each individual HIP and to track the success of those students who participate in them.

Further investigations of the effects of HIPs need to be conducted in an effort to change policies and increase funding for these programs. It is important to encourage institutions to commit to providing and teaching HIPs and for students to be willing to learn and participate (Roney & Carney, 2013). Therefore, to get a more detailed assessment of the actual impact of HIP participation on students' success, individual institutional assessments should be made to design, customize, and implement their own programs based on their needs. A useful resource to conduct individual

institutional assessment of HIPs (often referred to as student engagement) is the "Assessing Equity in High Impact Practices Toolkit" developed by the Center for Urban Education at the University of Southern California.

The very definition of "student success" has been questioned. A recent study found that the terminology used to define student engagement by each individual institution varies greatly, with responsibility sometimes placed on the students, sometimes on the institutions, and sometimes both (Vuori, 2014, Price & Tovar, 2014). Student success measurements also have an assortment of metrics, with GPA being the easiest to quantify, as we have done in present study. As we found in this study, participation in HIPs is positively correlated with higher GPAs. Although GPA is only a small factor of a student's overall success, it does serve to confirm the impact of these practices, which warrants further attention. In addition to GPA, other factors that should be taken into consideration when measuring student success include civic responsibility, personal growth, creativity, emotional stability, leadership, and communication skills, among others. As Huber and Hutchings (2004) put it, "learning [is] greater than the sum of its parts" (p. 1). The intentionality from the student as well as the institution accounts for a great deal of learning that takes place.

With tuition rate increases of 40% in public institutions and 28% in private institutions between 2001 and 2011, it is imperative that the educational journey is streamlined in the most efficacious way (U.S Department of Education, 2013). It is to our advantage to carefully weigh the effectiveness of HIPs in helping students to not only obtain a baccalaureate degree, but also finish the process as effective scholars.

Limitations and Suggestions for Future Research

Most research data on HIPs is obtained from the NSSE, a self-reported survey. This limits the reliability of the findings given that the information collected is already biased to some degree. Responding to surveys may not be a priority for typical college students, which raises the question of who does respond to NSSE surveys when there is no incentive to do so. Highly motivated, overachieving, responsible, and self-directed students might very well be the respondents. The same can be said for our study. During the recruitment process during orientation, we observed that students who sat in the front of the classroom, asked questions during orientation, and stayed to speak with the professor afterwards were more willing to participate in our study, thereby creating a potentially biased sample that might be a limitation in our study.

The generalizability of our study is limited because it only focuses on one institution. Furthermore, the sample selection was narrowly limited to only transferring psychology students. We recommend a campus-wide study to incorporate all students of all class standings to obtain a more accurate measurement of the effect of HIPs across all disciplines. Another suggestion for future studies is to concentrate on only individual HIPs instead of all ten, as we have done in this study. Another limitation to our study is the potential for misunderstanding the survey questions. Although the description for each HIP on the questionnaire was based on AAC&U's description, it is possible that it was too lengthy and abstruse.

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The Influences of Academic Self-Efficacy and Educational Aspirations for High Seniors in The Next Step Program

Biography

Born Mary Lashiea Johnson on May 2nd, 1992 in Memphis, TN, Mary was a military child so she moved from state to state when she was younger. However, her parents divorced when she was six years old, and she spent the majority of her childhood and adolescent years in Hanford, CA. She feels being raised in a small town like Hanford was one of the best things that happened to her. Hanford taught her to strive, grow, and thrive. As a first generation college student, some of the leadership positions in which she became involved during her time at San Jose State are President of the Sigma Theta Psi Sorority, Educational Opportunity Program Student, Peer Educator with Peer Connections, and a McNair Scholar. All of these programs have been a benefit and have helped her along the way, for that she is forever indebted. In the Fall of 2015, she will be the first in her family to attend graduate school.

The Influences of Academic Self-Efficacy and Educational Aspirations for Minority High School Seniors in The Next Step Program

Mary L. Johnson
San Jose State University McNair Scholar

ABSTRACT

The purpose of the exploratory research was to identify influences that increase minority high school seniors' academic self-efficacy and educational aspirations in pre college programs. Academic self-efficacy is a person's belief and confidence they can successfully complete an academic task. Educational aspirations are goals that students set for their educations. The study was conducted at a pre-college program in Northern California. There were six participants, which included students and staff members of the program. The participants were individually interviewed and shared their personal opinion on the influences of academic self-efficacy and educational aspirations at The Next Step Program. The study results revealed that the influences were motivation, resources, and parent involvement. These finding may be useful for understanding the importance for pre-college programs specifically for minority students and how it equips them for higher education.

INTRODUCTION/BACKGROUND

An achievement gap in American schools has been well documented within the past decade (Hegna, 2014). When it comes to higher education, that gap is further increased with Black and Latino college students having a much lower rate of degree completion than white students (Museus, Palmer, Davis, & Maramba, 2011). An influential factor in racial minority students' academic achievement has been academic self-efficacy (Kao and Tienda, 1998). When students have a high academic self-efficacy it is likely to increase their educational aspirations. Educational outreach programs can help in providing this academic self-efficacy. The students gain academic-self efficacy through program knowledge, support, and resources. In an attempt to identify the relation between self-efficacy and educational aspirations for minority students, this study will use current studies to examine how pre-college programs affect academic self-efficacy and the aspirations of high school seniors within the program.

Every individual in America should receive the proper academic tools in order to be successful in the education system. Today, college education is evolving from an aspiration, to a necessity in order to survive in the United States. By 2018, it is estimated that 62% of jobs will require some type of college education and more than half will require a diploma from a four-year university (Dyce, Albold, & Long, 2013). With the future of upcoming generations already being determined, the educational system has failed to meet those expectations by not equipping most students with the academic tools and skills to conquer this educational battle (Choi, Park, Yang, Lee, Lee, & Lee, 2012). According to Dyce et al. (2013), minorities, specifically Blacks and Latinos who are underrepresented in higher education, experience a problem with the pipeline that leads to and through higher education. A recent study reported that 30% of White adults completed a four-year college degree, whereas Black and Latino adults combined had fewer numbers of degrees (Bowles, Fisher, McPhail, Rosenstreich, & Dobson, 2014).

Academic self-efficacy and educational aspirations often successfully co-exist in an academic setting. Academic self-efficacy is a student's level of confidence that they can complete a specific academic task (Bandura, 1977). Educational aspirations relate to a student's hope and dreams of their future in education (Kao & Tienda, 1998). The goal of education is to help students plan for today, but most importantly prepare for the future. Through this research I plan to examine the influences of academic self-efficacy and educational aspirations in pre-college programs. This research is critical, because it provides an insight on the importance of pre-college programs and why it is specifically needed for minority students.

LITERATURE REVIEW

In order to fully understand the effectiveness of academic self-efficacy and educational aspirations on academic achievement, there must be examinations of its theoretical background. Academic self-efficacy is rooted in Bandura's (1977) theory of self-efficacy. Bandura (1977) suggests that a person' self-efficacy is the belief that they can succeed in a particular situation. Self-efficacy is not simply possession of a skill, but the belief that the skill can be effectively produced under a variety of circumstances (O'Brien, Bikos, Epstein, Flores, Dukstein, & Kamatuka, 2000). Kao and Tienda (1998) define educational aspirations as a person's beliefs about their educational attainment, and how it will lead to their future success. In past years, the majority of research on educational aspirations focused

specifically on White males (Cooper, 2008). The future of minority students in education has become more important. In the past 10 years there has been an increase in research identity an in self-efficacy and educational aspirations among racial minority students, particularly Black and Latino students during their transition into college. These specific racial minority groups have the lowest rate of high school and college graduates. In the study 70% of Whites and Asians reported they planned to go to college; however only 55% of Black and Latinos stated they desire to go to college due to their circumstances (Cooper, 2008). Cooper (2008) offered recommendations to inform policy makers and practitioners that if they do not help Black and Latinos students through the education system, there will continue to be an achievement gap between the different racial groups.

In Dr. Gloria Ladson-Billings' 2006 AERA Presidential address about the achievement gap between Black and Latinos verse White counterparts she highlighted the real issue in education. Ladson-Billings (2006) argued the achievement gap should be viewed as an educational debt. She further revealed how previous researchers believed that Black and Latino students had pathological life styles, therefore it would be difficult and almost impossible to help this specific population (Ladson-Billings, 2006). In concluding her address, Ladson-Billings (2006) noted that when discussing minority students and education it is important to recognize the historical debt they have faced. For example, one of the important factors when considering the Racial Minority-population is the amount of finances that are used on their education and success. Dr. Ladson-Billings reported that, Chicago Public System (CPS), mainly comprised of Black and Latino students, spent $8,482 per student but Highland Park School District which is a predominantly White population spends $17, 291 per student. The current study aims to unveil some possible issues that hinder minority students. Some of those issues may be lack of resources, motivation, academic exposure, and family involvement. This study highlights the idea that providing pre-college programs can defeat this educational battle.

Kao and Tienda (1998) explain, that parents are originally the first factor that effect their student's educational aspirations: the parents' investment in their child's education, social economic status, and cultural capital affects the student's concrete experiences (Kao & Tienda, 1998). Concrete experiences are the student's reality in education and blocked-opportunities are how individuals perceive their future in the education system. A parent's investment in their child's educational aspirations can be measured by their encouragement and advice (Kao & Tienda, 1998).

Modeling behavior is also a key factor to why parents are the first to have a significant effect on their child's educational aspirations. Kao and Tienda (1998) reports that if a parent is active in school culture and talks to their student about their educational aspirations, the student is more likely to understand the importance of their own educational aspirations.

The intriguing aspect of educational aspirations is that they can be endless. With encouragement from their family, teachers, and most importantly their own confidence, they can decide to pursue any career they want when they enter college. Students use their educational goals to help liberate their lives when everything around them seems to be caving in (Posti-Ahokas & Palojoki, 2014).. The location of this particular study was East Africa. In East Africa there is often less access to education and post-compulsory education (Posti-Ahokas & Palojoki, 2014). The power of these participants' educational aspirations provided hope and insight to an area that is often left in the dark.

Posti-Ahokas and Palojoki (2014) wrote, when the educational system focuses primarily on contribution towards youth goals instead of "failure" or "success" it enhances the potential of young people. More importantly, when students decrease their focus on failure and success they are able to expand their educational aspirations and their thinking. It is never the educational systems duty to limit student's educational aspirations to a specific mindset, but that often happens due to educational policies (Posti-Ahokas and Palojoki, 2014). Having educational aspirations often reminds students why they are pursing and education. Yes, Secondary school is a high encouraged in America, but it is important to teach students why education is important to their individual lives and how it can be applied to their future. In the Posti-Ahokas and Palojoki (2014) study it was reported that 58% of the participants' reason for pursuing education was for "future reasons". The most intriguing theme from the Posti-Ahokas and Palojoki (2014) study was educational aspirations are powerful because education is the key to life. Educational aspirations are centered around hope and often in the minority community; a little hope is needed in order to persevere.

High educational aspirations also provide students with a plan for their future. Cherry and Coleman (2010) conducted a study that focused on students who were academically unsuccessful in the past. In the study, 75 students were told to write a plan for their educational goals. Out of the 75 students, 62 of them successful completed the plan. Cherry and Coleman (2010) noted there was power in an educational plan for the future. The plan allowed the students to learn how to utilize the current resources they had

and how these resources can open doors to the future. With the encouragement from the students' teachers they were able to gain higher educational aspirations. The importance of the Cherry and Coleman (2010) study was to identify how having high educational aspirations could allow students to visualize their academic success. It is important for a student to dream and aspire, but the ultimate goal is for those dreams and aspirations to become a reality for them. Overall, this research reveals that academic self-efficacy and educational aspirations are vital, but there has not been a specific solution provided to students with academic self-efficacy and educational aspirations.

METHODS

Participants & Program

In this study the target population is the staff members and the high school seniors in The Next Step program. There were three staff members who participated in the study. I have provided them with a pseudonym in order to protect their identity. Mike is a 28-year-old male and identifies as Latino. Michael is a 41-year-old male who identifies as Chinese American. Taryn is a 27-year-old female who identifies as Filipino American. The Next Step Program staff members' ages range from 27-41 years old. The high school Next Step Program students' age range is 17-18 years old. There were three student participants in the study. I have also provided them with a pseudonym in order to protect their identity. Ashley is an 18-year-old female. She is Asian American who has been in the program since she was a sophomore. Crystal is an 18-year-old female. She is Mexican American and has been in the program since her freshman year. Rick is an 18-year-old male. He is Mexican America and has been in the program since he was sophomore.

The Next Step Program is a pre-college program affiliated with the California state University system. The mission of the program is to provide students with resources and extra assistance to prepare for higher education. Some of the activities that the students engage in are tutoring, assistance on college applications, college tours, scholarship opportunities, and academic workshops.

Research Design & Measure

This was a qualitative study. In order to identify the influences of academic self-efficacy and educational aspirations the participants were individually interviewed. The participants were asked ten questions about

their opinion of academic self-efficacy and educational aspirations and how those forms in The Next Step Program. I used my knowledge of academic self-efficacy and educational aspirations in correlation to educational programs to draft the questionnaire. Staff and students were asked the same questions regarding the students' academic self-efficacy and educational aspirations. An example of a question was "Do you feel this program has impacted how you think about your future and your educational plans and goals?" Each interview lasted for 15-17 minutes. All of the interviews were audio recoded. The staff and students were administrated consent forms before participating in the study.

There are two research questions that help guide my questionnaire:

Research Questions

- What are the factors that allow high school seniors to have stronger academic self-efficacy and educational aspirations?

- Why are pre-college programs valuable for high school seniors?

FINDINGS

In order to identify the influences of academic self-efficacy and educational aspirations the interviews were transcribed. From listening to the interviews I was able to collect reoccurring words, phrases, and sentences. I listened to all of the participant's response to the first question and identified reoccurring phrases. This process was done for every research question. In order to identify the influences I developed the participants' responses into themes. There were three major themes that were identified in this research; resources, parent involvement, and motivation. There were many themes to choose from but for research purpose the top three that were reoccurring were chosen.

Resources

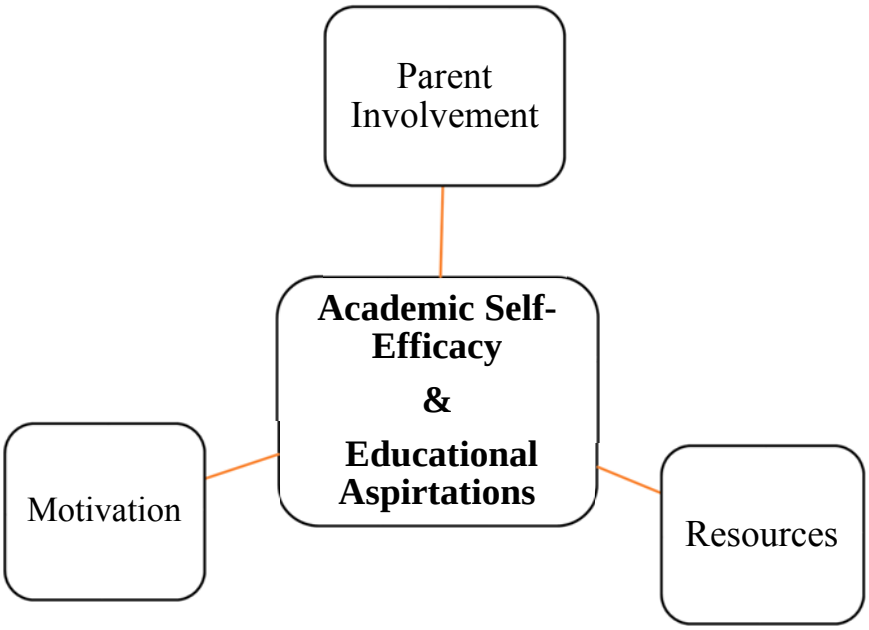
All of the participants talked about the resources The Next Step Program provide. The resources allow the students to succeed academically, and emotionally. Some of the resources the participants discussed were: college visit trips, tutoring, SAT prep, college app prep, workshops, and financial aid education. The resources are centered on assisting the students to enter higher education. Many of the students explained that the resources allowed them to be more knowledgeable in the program and at their schools.

Parenting Involvement

Parent involvement was identified when any of the participants talked about parents being involved in the program. Many of the participants also said it was important for the parents to be involved in their academics in and outside of school. In this study participants used phrases such as “attending program meetings”, “providing a ride to the program”, “attending program events”,” building relationships with the program staff”, “other parents in the program”. The program does have a point system and the students do lose points if their parents do not attend at least three of the activities. All three of the staff members expressed the importance of parent involvement in their interview. They expressed the issues the students face in the program could be combated with parent involvement. The program is designed to include the parent and child, but the program staff cannot force the parent involvement.

Motivation

Motivation was one of the themes that seem to connect parent involvement and resources together. Many of the students used phrases such as; “keep me going”, “makes me strong”, “feel unstoppable” “drive and determination”. Having parent involvement and resources help strengthen the students motivation to successfully complete school. The staff members spoke about motivating the students by interacting with them 1-on-1, being educated on their students’ lives, and leading by example.



DATA ANALYSIS

Data from the various interview transcripts were analyzed and explored for common themes. In this study, I will be using case study research for my data analysis. Case study research is usually identified as a bounded system. Through this research I was able to answer the two research questions. The factors that allow high school seniors to have stronger academic self-efficacy and educational aspirations were resources, parent involvement, and motivation. The important aspect about these factors is that the students may have not been provided with these factors if they were not a part of The Next Step Program. Participant Crystal stated that "I have been in this program since I was a freshman and this experience has provided me with support, now I believe I can do anything I can put my mind to." The second research question was why pre-college programs are valuable for high school seniors? In this research I was able to identify that The Next Step Program equip the students with skills they were not being provided with in school. Participant Mike revealed, "This programs does a great job at laying out options for the students. Before this program some

of the students were unaware that they even had options and control of their educational aspirations."

The future of the United States education system has reached a pivotal moment. The academic preparation is the key for the future of education in America. If there is not enough academic preparation, many students will fall through the cracks of the pipeline that leads to higher education. The students who are behind in academic preparation are minority students (Dyce et al., 2013). Poor academic preparation leads to a lack of resources, institutional barriers, and ultimately a wider educational achievement gap (Dyce et al., 2013) The Next Step Program's mission is to prepare students in education with services they might not receive otherwise. These program opportunities can lead to increasing students' educational aspirations.

DICUSSION

Power of Pre-College Program

This research was eye opening, because it solidifies the importance of pre-college programs. Pre-college programs allow high school students to "test drive" college and gain skills they need for higher education. Academic self-efficacy and educational aspirations are needed in order for students to be successful throughout their educational career. Racial minority students are a major focus in academic research because of the achievement gap. Many researchers ask the question of what we can do to empower this population and pre-college programs is the launching pad. In educational research there is never one solution to a problem and pre-college programs is not the only solution, however it is a start.

When academic preparation is discussed it is important to note that we should not focus on changing the larger social inequalities that ultimately deny access to proper academic preparation (Dyce et al., 2013). Some of those social inequalities are demographic segregation, public school funding, and the lack of qualified teachers in lower SES school districts (Dyce et al., 2013). It is important to remind educators to focus more on the student and not the situation around them. Teachers, mentors and faculty are ultimately preparing students with academic skills to conquer their own educational battles regardless of the social inequalities. Building academic self-efficacy is an example of a skill a student can use to combat their social inequalities.

Limitations

The major limitation of this study is the low external validity. There were only six participants in the study and I only focused on one pre-college program. These research findings cannot prove that parent involvement, resources, and motivation leads to academic self-efficacy and educational aspirations but it is an influence it. In addition, as a researcher I was the only one listening to the interviews and transcribing. There may have been key phrases and words I missed. Many of the studies limitations can be dissolved with future research.

Future Research

While conducting this study I learned that preparing students for higher education is only half the battle. Many of these students need mentorship and academic programs they can go to while they are in higher education. In the future a study should be created where the students in the pre-college program are followed on their journey into higher education. The development of academic self-efficacy is not just for one academic setting. Hegna (2014) reveals, there are many new challenges students will face in college. That is why it is critical to spend time preparing students for what is to come in the future. There is not enough time to teach students every skill they will need for the rest of the educational career. The idea is to prepare them to be able to apply different academic skills to multiple situations.

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Lilly Nguyen

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Physician Participation Rates in AHCCCs in Maricopa County's Large Cities

Biography

Lilly Nguyen is originally from Southern California. She is the first in her family to graduate college with a bachelor's of science in health science with a concentration in health care administration. She hopes to pursue her graduate degree in health care administration at Tulane University in Louisiana. In her spare time she likes to leisurely read, catch up on her television shows, or Yelp new places to go eat with her friends.

Under the Patient Protection and Affordable Care Act (PPACA), about half of the states have expanded their Medicaid programs. In the past, Medicaid eligibility was only available to pregnant women, disabled individuals, low-income children, and the elderly. With the present incentives under the PPACA, Medicaid enrollment is expected to increase over the next few years for three reasons: (a) low-income adults whose income falls below 138 percent of the poverty line are now eligible for Medicaid; (b) there are significant outreach efforts and assistance in helping individuals to enroll, and there is no time constraint to apply for Medicaid as enrollment assistance is available year round; and (c) the enrollment process is less tedious than it previously was. Under the PPACA, all states, including those who are not expanding their Medicaid programs, must offer multiple application options and use electronic data to verify information (Artiga & Rodwitz, 2014). The new system allows individuals to apply directly to Medicaid or to apply for Medicaid through a state or federal marketplace. Through one of these application processes, individuals will be enrolled in the Medicaid program or a program for which they are most eligible. These systemic changes brought about by the PPACA will increase the number of Medicaid enrollees and decrease the number of the uninsured.

Arizona is one of the states that has recently expanded its Medicaid program. Of the 15 counties in Arizona, Maricopa County is the most populous, with a population of 4,009,412 people in 2010 (Carney & Morales, 2014). Maricopa County encompasses the fourth most populous city in the United States and is ranked fourth in the top ten fastest growing cities in the nation (Carney & Morales, 2014). According to the U.S Census Bureau (2010), the ethnic groups with the largest percentage of growth in Maricopa County are as follows: White 57.8 percent, Hispanic 30.0 percent, and Black 5.0 percent. The average family income in Maricopa County is $51,827. Although Maricopa County is one of the largest counties in Arizona, about 11.7 percent of the population lives below the poverty line (US Census Bureau, 2010). Because these 469,101 people live below the poverty line, they are eligible for Arizona's Medicaid program, the Arizona Health Care Cost Containment System (AHCCCS), as this is the State's means of assisting lower income individuals.

According to the AHCCCS (2014) website, there are currently 869,945 Medicaid participants in Maricopa County, a number representing a 14 percent increase since last year. In 2015, it is estimated that AHCCCS enrollment will increase between 257,000 to 292,000 individuals because possessing health insurance will become the norm (AHCCCS, 2014). In Maricopa County, Medicaid patients have the option to enroll in one of the nine health plans through AHCCCS. All health plans provide the same services to patients; however, patients may work with different physicians, hospitals, and pharmacies depending on the plan they choose. As the number of AHCCCS patients continues to increase, the number of physicians accepting AHCCCS patients is uncertain. The expansion of Medicaid under the PPACA will place tremendous pressure on the capacity of the workforce to meet the needs of the Medicaid population. Therefore, it is vital that the AHCCCS physician-participation rates are evaluated to see if there are enough physicians to provide services for new enrollees.

There are many studies that look at the physician-participation rate from a multistate or national perspective. However, there is no research on physician participation specifically in Arizona or in Maricopa County. According to the AHCCCS website, nearly 300,000 individuals will enroll in Medicaid by 2015. For this reason, research should be done to measure the current impact of the PPACA on the number of physicians accepting new Medicaid patients in order to evaluate whether there will be enough health care providers to work with future AHCCCS patients.

Literature Review

Magnitude of the Problem

Historically, physicians avoided participating in Medicaid transactions because it had the lowest payment rates compared to private insurance and Medicare. Until recently, only partial estimates of the number of physicians participating in Medicaid have been available. The national rate of physicians accepting new Medicaid patients was 52 to 69.4 percent (Cunningham & May, 2006; Decker, 2012). In comparison, 50 to 76 percent of physicians participate in state Medicaid programs (Sloan, Mitchell, & Cromwell, 1978; Backus, Osmond, Grumbach, Vranizan, Phuong, & Bindman, 1998).

Physicians with small practices or those who practice in urban areas have low levels of participation in Medicaid. The physician-participation rate in Medicaid in urban areas is 62 percent. However, these practices serve nine percent or less of Medicaid patients (Perloff, Kletke, Fossett, & Banks, 1997). In contrast, about 18 to 19 percent of physicians who practice in rural areas accept new Medicaid patients (Mitchell, 1991; Decker, 2012). Physicians are also more likely to accept new Medicaid patients if they practice in counties where the federal poverty level is 15 percent of the population or higher (Decker, 2012).

Determinants of Full or Limited Physician Participation

A physician's decision to accept Medicaid patients can be related to the two-market demand model known as *price setting* and *price taking*. Price setting occurs when physicians can set their own prices, and in the case of Medicaid, price taking occurs when physicians provide services at a fixed price (Perloff, et al., 1997; Mitchell, 1997). In the two-market demand model, low reimbursement rates and the amount of administrative work influence whether physicians are in favor of or reluctant to participate in Medicaid programs.

Low Reimbursement Rates

Under this model, researchers predict that physicians will prefer patients from the profitable price-setting market as long as revenues surpass those generated by serving Medicaid patients (Perloff, Kletke, & Fossett, 1995; Perloff, et al., 1997). Medicaid fee levels vary from state to state, and prior research has consistently shown states with higher reimbursement rates have a higher physician-participation rate in Medicaid programs (Decker, 2012; Cunningham & May, 2006). Decker (2012) analyzed the percentage of 4,326 physicians accepting any new patients and found that 96 percent accepted new patients depending on their payment type. Of the various accepted payment forms, Medicaid was the lowest in comparison to self-pay (91.7 percent), Medicare (83 percent), or privately insured patients (81.7 percent) (Decker, 2012). Similar to Decker's findings, Gindi, Kirzinger, & Robin (2012) reported that less than 75 percent of physicians accepted new patients with public coverage in 2012.

Many studies have found that inadequate payments is the main reason most physicians are reluctant to accept Medicaid patients. According to Cunningham and May (2006), 84 percent of physicians rejected Medicaid

patients, claiming the reason was inadequate reimbursements. Sixty percent of physicians who provide services to Medicaid patients report that only 20 percent of their total practice revenue is derived from Medicaid (Cunningham & May, 2006). These findings suggest that physicians' acceptance of Medicaid patients will increase if Medicaid payment rates increases as well.

Administrative work

Another factor that influences whether physicians accept Medicaid patients is the administrative load. Additional administrative issues under Medicaid, such as payment delays, time consuming forms, and returned paperwork, is a reason physicians refuse to accept Medicaid patients (Sloan, Mitchell, & Cromwell, 1978). About 40 percent of 1,000 physicians indicated this deterred them from participating in Medicaid (Sloan, Mitchell, & Cromwell, 1978).

Personal Characteristics

The two-market demand model theorizes that physicians who provide few services in the non-Medicaid market will most likely participate in Medicaid. Those who do participate in Medicaid programs tend to have the following characteristics: not board certified, a graduate from an international medical school, a minority physician, female, or holding a liberal attitude about the government's role in healthcare (Perloff, et al., 1997; Silverstein & Kirkman-Liff, 1995). Additionally, many studies have discovered that physicians' participation in Medicaid programs varies depending on their specialty or whether they practice solo or in a group (Perloff, et al., 1997). Acceptance rates were higher in large practice groups and institutional settings such as hospitals, community health centers, and medical centers. Because they generate little or no revenue, small office-based group physicians were less likely to accept new Medicaid patients (Cunningham & May, 2006).

Community characteristics

The two-market demand model predicts that physician participation in Medicaid is related to the increase in supply and demand. States with Medicaid expansion will increase program eligibility, which will raise the demand for Medicaid services, encouraging physicians to participate (Mitchell, 1991; Perloff, et al., 1997). Mitchell (1991) compared the participation rate in 1977–78 to that of 1984–85 to see if Medicaid cutbacks

during the Reagan administration affected physicians' willingness to participate. Where the pool of Medicaid recipients is large, the demand for services increases as well. The research conducted by Mitchell (1991) found that a 10 percent increase in the number of eligible people raised the participation rate 1.5 percent in urban areas and 2 percent in rural areas, thus supporting this claim.

Location is also an important component influencing physicians' participation in Medicaid programs. Physicians are less likely to accept new Medicaid patients if they live in large cities. In urban areas, physicians have more choice in the type of patients they accept because of the larger number of people and medical provider's available (Cunningham & May, 2006; Mitchell, 1991). In contrast, physicians in rural areas are obligated to take Medicaid patients because there are fewer physicians for Medicaid patients to go to (Cunningham & May, 2006). Perloff, et al. (1997) further confirmed this claim in a study involving 1,300 urban physicians and found that those who participated in Medicaid practiced in low-income communities and in less racially segregated cities. Furthermore, Decker's (2011) study correlated the acceptance rate of Medicaid patients with the area in which physicians worked. Results showed that those outside of metropolitan areas were 19 percent less likely to accept new patients because of the available competition, validating this assertion (Decker, 2011).

Limitations of These Studies

Many of the studies described in the previous sections had several limitations. Some are limited to certain states (Backus, et al., 1997; Sloan, et al., 1978). The data in these state studies are limited to only allopathic or osteopathic physicians (Baugh &Verghese, 2012). This demographic does not accurately represent other types of providers and states. Some of the studies only targeted office-based physicians or specialists (Perloff, et al., 1997). Another limitation to consider is that the majority of these studies used the Socioeconomic Monitoring System (SMS) maintained by the American Medical Association (AMA). This list surveys the entire population of US physicians. The numbers reported in the AMA file may be understated and therefore may not be an accurate representation of the number of Medicaid patients being served and the number of physicians participating. It is also noted that many of these studies used self-reported data from physicians (Mitchell, 1997; Backus, et al., 1997). Previous research has shown that physicians tend to overestimate the services they provide or the number of Medicaid patients they serve (Perloff, et al., 1995).

Knowledge Gaps

Together, these findings are troubling because they indicate that the number of physicians available to provide care to Medicaid patients is lacking. From January 1, 2013 through December 31, 2014, states were required by law to reimburse medical providers at the rate that would be paid for the services under Medicare. If the PPACA goes as planned, Medicaid payment rates for primary care services will increase to 100 percent of Medicare rates (Decker, 2011). Prior evidence indicates that an increase in Medicaid payments will increase the number of physicians participating in Medicaid programs. Under the provisions of the PPACA, Medicaid enrollment will surpass the number of available physicians accepting Medicaid patients. Therefore, it is vital that the number of physicians available to accept new Medicaid patients under the PPACA is adequately assessed.

This paper will address the following question: what is the physician participation rate in AHCCCS in large cities in Maricopa County? It is hypothesized that there is no difference between physician participation rates in each of the cities in Maricopa County.

Methodology

This research will examine the physician-participation rate in AHCCCS in Maricopa County's large cities. The following cities have a population of 100,000 or more people: Chandler, Glendale, Peoria, Phoenix, Scottsdale, Gilbert, Mesa, and Tempe.

The research is designed as a cross sectional comparison study. The main objective for this research is to determine the current physician-participation rate in AHCCCS; therefore, the data was collected at a single point in time, and multiple AHCCCS health plans were used to compare the rate of physicians' participation. Data was collected from a listing of all 2013 licensed physicians in the State of Arizona from the State Board of Allopathic Medical Association for MDs and from the Arizona Osteopathic Medical Association for DOs.

Using the physician directories of three plans, the following details were recorded: the physician's name, practice location(s), specialties including primary care (family practice, general practice, internal medicine, and pediatrics), OB/GYN, and other specialists not mentioned.

The following factors were also recorded: whether the physician participated in AHCCCS, whether the physician accepted new AHCCCS

patients, and whether they accepted new patients in each plan. The independent variable for this study is the physicians' specialty (primary care, OB/GYN, or specialist). The dependent variable is the physicians' participation rate in AHCCCS.

After all the data was recorded, duplicate data for physicians who work in different office locations were excluded. There were 1392 duplicates removed from this study. If a physician accepted new AHCCCS patients under one plan but not another, it was recorded as accepting new AHCCCS patients.

The following calculations were used to determine the rates of physician participation and accepting new AHCCCS patients. These calculations were used for the three plans for which data were collected:

Physician participation rate	$\frac{\text{Total \# accepting patients}}{\text{Total \# of physicians}}$
Physicians accepting new AHCCCS patients	$\frac{\text{Total \# of physicians accepting new AHCCCS patients}}{\text{Total \# of physicians accepting AHCCCS patients}}$

Results

There are 8,669 physicians practicing in Maricopa County; however, the three health plans for which data were collected only covered 1,661 physicians (19 percent). Of these physicians participating in AHCCCS, about half are primary care physicians (50.7 percent), 13.5 percent are OB/GYN, and 35.8 percent are specialists.

Table 1 displays the percentage of AHCCCS physicians in each specialty. In Chandler, 60.5 percent of primary care physicians participate in AHCCCS. In contrast, only 42.4 percent of primary care physicians in Mesa participate. Glendale had the highest OB/GYN participation rate at 21.2 percent. In Peoria, 1.1 percent of OB/GYN physicians participate. When comparing specialists in each city, Peoria had 59.6 percent specialists participating in contrast to Chandler, which has a 27.4 percent participation rate.

Table 1. Types of Physicians Participating in AHCCCS

Cities	Total Number of Physicians	Primary care	OB/GYN	Specialists
Chandler	124	75 (60.5%)	15 (12.1%)	34 (27.4%)
Gilbert	90	45 (50.0%)	19 (21.1%)	26 (28.9%)
Glendale	137	61 (44.5%)	29 (21.2%)	47 (34.3%)
Mesa	179	76 (42.4%)	25 (14.0%)	78 (43.6%)
Peoria	94	37 (39.5%)	56 (1.1%)	56 (59.6%)
Phoenix	881	466 (52.9%)	291 (14.1%)	291 (33.0%)
Scottsdale	107	54 (50.4%)	47 (5.6%)	47 (44.0%)
Tempe	47	26 (55.3%)	15 (12.7%)	15 (32.0%)

Source: The State Board of Arizona Allopathic Medical Association for MDs and from the Arizona Osteopathic Medical Association for DOs and AHCCCS Physician Directories

Table 2 presents the breakdown of physician-participation rates in the eight large cities in Maricopa County. Physicians in Peoria are most likely to accept new AHCCCS patients. In comparison, 93.4 percent of physicians in Scottsdale are unlikely to accept new AHCCCS patients. Scottsdale has one of the lowest federal poverty-level rates of 5.8 percent. This may be a factor in why physicians in this city are reluctant to accept new AHCCCS patients.

Table 2. Physicians Accepting New AHCCCS Patients

Urban cities in Maricopa County	Accepting new AHCCCS patients
Peoria	**93 (41.3%)**
Chandler	119 (29.0%)
Glendale	134 (28.0%)
Mesa	177 (22.0%)
Gilbert	88 (21.2%)
Phoenix	859 (19.4%)
Tempe	47 (17.0%)
Scottsdale	105(6.6%)

Source: The State Board of Arizona Allopathic Medical Association for MDs and from the Arizona Osteopathic Medical Association for DOs and AHCCCS Physician Directories

Discussion

Previous studies reported that the national rate for physicians accepting new Medicaid patients was 52 to 69.4 percent (Cunningham & May, 2006; Decker, 2012). The Medicaid participation rate in Arizona is about 58 to 69.5 percent (Baugh &Verghese, 2012). In this study, the rate of physicians accepting new Medicaid patients (97 percent) far exceeds the national acceptance range. Therefore, from the data collected thus far, it is predicted that the acceptance rate will continue to surpass the national acceptance rate when the data from all nine plans is examined and calculated. However, a comparison to the national rate cannot be made at this time due to incomplete data on the number of participating physicians. Completed calculation of data on all nine plans will provide a more accurate rate of Arizona's physician-participation rate as compared to the national rate.

Prior studies found that specialists are more likely to accept new Medicaid patients. However, data in this study showed that primary care

physicians were more likely to accept new Medicaid patients. Fifty percent of primary care physicians participate in AHCCCS compared to only 35.8 percent of specialists. The finding of the current study that primary care physicians have increased participation is similar to the trend predicted by some earlier work. Decker (2012) asserts that participation by primary care physicians will increase under the provisions of the Affordable Care Act in 2013 and 2014. Prior evidence indicates that physicians' acceptance of Medicaid patients will increase as Medicaid payment reimbursement increases. This may explain why there are now more primary care physicians accepting new AHCCCS patients.

Conclusion

The state of Arizona is one of many states that chose to expand its Medicaid program. The number of Medicaid patients is expected to increase under the PPACA. Due to time constraints, limited data was collected in this study. Therefore, the results thus far do not accurately represent all physicians accepting new AHCCCS patients and all those who are participating in large cities in Maricopa County. Consequently, the question "what is the AHCCCS physician-participation rate in Maricopa County's large cities" remains unanswered. The completion of data collection on all nine health plans will provide important data on the overall physician-participation rate in Arizona's major cities, and these results will allow for a more accurate comparison with the national acceptance rate and the national participation rate.

For future studies, physician participation in rural areas of Arizona should be assessed along with participation in urban areas. These rates can provide a better baseline to determine the overall participation rate and the rate of those accepting new patients. Physician assistants and nurse practitioners should also be considered in future studies as well.

Limitations

There were a few limitations to this study. A significant factor was working within time limitations for recording data. During the six weeks, only three of the nine plans that were available were recorded: Mercy Care Plan, Phoenix Plan, and Maricopa Health Plan. These health plans were the smallest of the nine plans. Therefore, the data are only preliminary and may not cover the number of physicians necessary to see a significant difference between the cities. Additionally, these numbers cannot be generalized to Maricopa County as a whole. Another limitation was that the information

provided in these plans may no longer be accurate, as some physicians may not participate in AHCCCS any longer.

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How Authority Figures Influence High School Seniors' Academic Achievement

Biography

Anissa is originally from southern California and grew up with both parents and her younger brother. From childhood through adolescence she identified as a student-athlete and now is a student researcher. Through high school and her undergraduate college career, she has been driven to be successful due to her parents' support. Anissa came to San Jose State straight out of high school eager to meet new people. Anissa also focused on her academic research interest in psychology and found a network of inspiring professors. She met each of her goals and looks forward to what graduate school has to offer. When she is not focused on schoolwork, she works at a childcare center and also enjoys yoga, watching classic films, and painting.

How Authority Figures Influence High School Seniors' Academic Achievement

Abstract

The purpose of this research was to determine the influence of parental expectations, sibling(s) comparison, and teacher expectations on high school seniors' academic achievement in an economically disadvantaged area in East Palo Alto, California. The participants (N = 5) were asked to complete a questionnaire about how these factors influenced their academic career. The results indicated that parents had the highest influence on the participants' academic achievement; moderately high influence was placed upon teacher expectations and low to moderate influence was placed upon sibling(s) achievement.

Keywords: Parental expectations, Sibling comparison, Teacher comparison, Academic achievement, Motivation, School setting.

Introduction

Making major life decisions seems to start in adolescence, specifically, during the final year of high school. At this time, students are making choices, such as to further their education, begin working, take a break, attend trade school, or study abroad. High school seniors are emerging adults that have been through the education system since kindergarten and experienced the pressure of succeeding, the influence of expectations, and the competitive spirit of their peers and siblings. With their years of experience, these students are qualified to make judgments and assessments of how their relationships have affected their academic success.

While researching how parental expectations influence high school seniors' academic achievement, one must take into consideration the factors that contribute to academic success. There is not one universal formula causing a student to be academically successful; therefore, researchers have examined possible factors that will correlate positively, such as parental expectations, sibling(s) comparison, and teacher expectations.

A high correlation is thought to exist between expectations and performance, with high expectations associated with strong academic performance, and low expectations associated with less academic success (Jiang,

Song, Lee and Bong, 2014). The reason I am pursuing this research topic is because of the first-hand experience of being a student with parents who had moderately high expectations of my academic abilities and the belief that it correlated with my academic success. Expectations are not the only determinant of academic success, however. Given that many students of color experience bias in the classroom, it is crucial to learn ways that youngsters might cope with negative academic expectations.

Research has shown that when a teacher expects a student to fail, the adolescent will be more likely to perform poorly compared to the student who is expected to perform well (Davis-Kean and Sexton, 2009). The current study examines the influence of expectations of authority figures on high school seniors' academic achievement. The method used was a questionnaire about the expectations of parents and teachers as perceived by the participants. Responses were rated using a Likert scale. Students given high expectations concerning academics will be compared to the students given low expectation to see who would be considered more academically successful.

Literature Review

Ethnicity Based Research

Stewart (2007) interviewed African American students twice in a span of two years. The results indicated that individual-level predictors of increasing academic achievement include student effort, parent-child discussion, and associations with positive peers within the African American community. The parent-child discussion included homework help outside of school setting.

Rimkute et al (2012) examined the academic expectations of Finnish parents and their offspring when the students were in 7th grade and again in 9th grade. Results showed a high positive correlation between parents having high expectations and offspring having high expectations at both time periods.

Jiang et al. (2014) examined how perceived academic goals of significant others (teachers, peers, parents) would predict the high academic self-efficacy and high achievement goals of Korean adolescents and how self-efficacy and achievement goals predicted their actual level of achievement. The study included elementary and middle school children who completed a survey with questions concerning mathematics, achievement goals, and self-efficacy. The results did not show a significant correlation between perceived expectations others had for their academic achievements and the students' self-motivation to succeed in school. This is possibly due to the fact that students did not

understand how they were being affected because they have not reached adulthood.

Kiang, Andrews, Stein, Supple, and Gonzalez (2013) examined how socioeconomic stress may lead to academic achievement. This study included Asian American adolescents in early and late high school years, and the results showed that socioeconomic stress directly correlates with poor academic achievement. The researchers concluded that these low performing students were struggling because they felt pressure to meet family obligations (the need to succeed instead of wanting to succeed academically). None of the participants in the study explicitly said they felt forced to succeed, but the results implicitly suggested the participants wanted to make their parent's proud.

Roosa et al (2012) studied parent-child relationships in early adolescents with a Mexican American background. The parents' education, home stability, academic and occupational family role models, and individual characteristics were examined. Results showed that the individual characteristic of externalizing symptoms negatively affected the adolescents' academic performance, and that being a female adolescent positively affected academic success. Most of the participants in this study identified as Latina Americans, which is similar to the present study's participants.

Parental Support Relationships

In Gordon and Cui's (2012) longitudinal school-based study, a sample of adolescents in grades 7 through 12 completed in-home interviews, provided demographic information, and responded to questions about their family structure. The results suggested a positive association between parenting processes (high academic expectations) and adolescent academic achievement.

Cheng, Ickes, and Verhofstadt (2012) examined how family support influences college students' overall GPA. The researchers considered financial support and social support. The results revealed that family social support is a more important factor in women's success in college than in men's success.

Henry's study (2011) examined how parental involvement influences adolescent academic achievement in the Latino community. Using a self-report method, this study compared three types of families: intact, stepfather, and single mother. The most successful adolescents from stepfather families received academic support (help with homework, reminders to study). Results also revealed that monitoring is the most important parenting skill for intact and single mother families.

School Climate

Students in Hopson and Weldon's (2013) study completed a 217-item survey with 28 subscales that measured risk and protective factors in students, neighborhoods, peer groups, and families. This survey was anonymously completed online and examined school climate, parental support, and parental expectations. The results showed that there is a significant interaction between perception of school climate and parental expectations for grades. For instance, students who enjoy being at school have a positive perception of the school climate and are more likely to be driven to succeed.

Teacher Relationships

Wiesman (2012) studied academic motivations of high school students and asked if instructors affect these motivations. Results indicated that students are more likely to attribute their success to intrinsic motivation. Wiesman suggested that teachers do not focus on how students are motivated but need to do this in order to increase academic achievement. The topic of teacher expectations is relevant to the current study because one of the measures is the perception of teachers' expectations. Teachers facilitate student motivation by creating caring classroom environments, developing positive relationships with students, and showing empathy to students (Wiesman, 2012).

Analysis/Conclusion

On the basis of this research, I conclude that the factors that help students achieve good grades are having parents and teachers with high expectations, having teachers with appropriate motivational skills, and perceiving positive school climate.

Background

Previous research has demonstrated that students reared with high academic expectations tend to perform better than students whose parents have lower academic expectations (Gordon and Cui, 2012). Are parents, teachers, or siblings the most influential aspect when it comes to academic achievement? The first hypothesis for the current study asserts that students whose parents enforce high expectations tend to perform better academically than students whose parents do not have high expectations. The second hypothesis proposes that students whose teachers enforce high expectations tend to perform better

academically that students whose teachers do not. The third hypothesis states that students whose siblings earn high academic marks are positively influenced to also perform well academically. If the first hypothesis is null, is it due to the fact that the parent(s) had low expectations, but the student was intrinsically motivated and wants to be the opposite of the parents? Another possibility is that the parents place too high expectations on students, which leads to the student performing poorly. In some cases, siblings feel too much pressure to live up to the high standard that an older sibling has set, which can lead to poor academic achievement.

The last variable examined was teacher expectations. For instance, after a teacher labels a student, will the student perform opposite of their expectations? If a teacher had a student's older sibling with high academic achievement, (disproving the hypothesis) will the student have low academic achievement? When observing how siblings affect academic achievement, it is interesting how two children with the same parents, financial support, and home can end up with similar, opposing, or varying success.

The participants in this study will consist of students ranging in age from 18 and older, without any particular ethnicity to be focused on. Seniors that are graduating from high school are the focus because this is the time period when students are deciding what the next major step in their lives will be. The participants were chosen from "College Track," an after-school institution that is focused on the transition from high school to college acceptance and prepares high school students for college work.

Methods

The subjects were College Track high school seniors, and all were first-generation college students. The participants were given questionnaires and asked to answer each of the questions to the best of their ability. They were allowed to circle more than one answer and skip questions they did not understand or feel comfortable with. Questions asked for information on parental expectations, sibling(s) comparison, and teacher expectations. A consent form and brief description of the study was explained. The questionnaire included ratings using a Likert scale as well as open-ended questions and multiple-choice questions. College Track is located in Palo Alto, California, where I conducted the study in a quiet room with the door closed. There was little identifying information on the questionnaire. Students answered the questions and handed me the questionnaire. The questionnaire took 20–30 minutes to complete.

Results

Demographics

Five female, first-generation high school seniors participated in this study. Four of the five participants identified as Latin American and one of the participants identified as Asian American: Pacific Islander. Three of the five participants had one sibling, and two the five had two siblings.

Parent Expectations

All five participants reported that their parents expected "A/B grades." All five also reported that their parents expected them to "finish homework without a reminder." There were mixed results when students were asked how often their parents expect them to receive high marks on major assignments. The majority of the participants (3/5) reported that their parents expected them to "mostly always receive high marks on major assignments." One participant reported that her parents "always expected high marks on major assignments" (1/5), and one participant (1/5) said that her parents both always and mostly expected high marks on major assignments. When the participants were asked how often their parents expected them to attend school, all participants reported their parents expected them to "always attend [school] with the exception of [illness] or emergency." When asked what their parents' expectations are concerning time management skills with major assignments, three reported their parents always expect them to manage their time well and two reported that their parents mostly always expect them to manage their time well.

Sibling/Teacher Influence

Participants were asked about the academic reputation of their sibling(s). The results were mixed; two participants reported that their siblings were poor students, two reported that their sibling(s) were excellent students, and one reported that her sibling was a good student. None of the participants ever felt compared to their sibling(s) by a teacher. On the question asking if participants felt that teachers expected them to earn the same grades as their siblings, there were mixed results. Two participants strongly disagreed their teachers expected the same grades from them as their sibling(s), two disagreed their teachers expect the same grades from them as their sibling(s), and one agreed her teachers expect the same grades from her as her sibling(s).

Open Ended Questions

Three open-ended questions asked participants how they were influenced by their parents' expectations, sibling academic performance, and teacher expectations. For the qualitative results the scores were rated on a scale between 0-9, (0-3) indicated the participant was not significantly affected by any of these factors, (4-6) indicated the participant was moderately affected and possibly negatively affected by these factors, and (7-9) indicated the participant was highly and positively affected by these factors. The following table demonstrates the questionnaire results. The numerical data presented below is a summation of points for the three open-ended questions. For instance, if the participant was highly and significantly affected by all three factors measured that participant would score a 9/9.

9	Questionnaire 1
9	Questionnaire 2
9	Questionnaire 3
5	Questionnaire 4
6	Questionnaire 5

Analysis

From this study, the hypothesis that high expectations predict high academic performance is mostly proven to be true when considering parental influence. All of the participants agreed that their parents had consistently high academic expectations. All of the participants also reported receiving high overall grades, which would mean high expectations are associated with high academic performance. However, for the other two factors there were not such high correlations.

When asked about sibling-comparison influences, none of the

participants reported they were compared to their sibling(s) on one question, but on another question on the same topic there were mixed answers. The contradicting result with the one participant may be due to a lack of understanding of the question. Within the open-ended question, siblings seemed to either highly influence the participant or not affect the participant at all. These mixed results were unexpected when comparing the hypothesis to the results.

Concerning teacher expectations influencing participants' academic performance, none of the participants discussed having one significant teacher in their academic career that significantly influenced their academic success. Most of the responses referred to teachers in general having a positive influence, but not as much of an influence as their parents. From the data results, teachers tend to have a larger impact on the participants than their sibling(s); this was an unexpected result that was proven through the participant's lack of connection of teacher expectations with her academic achievement.

Discussion

The hypothesis proposed that parental expectations, teacher expectations, and sibling competition would positively influence the participants' GPA. The factor with the greatest influence was parental expectations. All of the participants rated their parents' expectations as high, and all of the participants reported a GPA within the 3.0-4.0 range. The results and limitations of this study could be due to the fact that most of the questions in the survey were about parental expectations and fewer questions were asked about teacher expectations and sibling competition. If the questions were more evenly distributed, the results may have differed.

When discussing the teacher expectations and sibling competition, there were two items on the survey that addressed these topics. Most of the participants did not believe that teachers expected the same grades as their siblings on one item, yet on the next item there was a contradictory report. The participant claimed to not be affected by teacher expectations on the first item, then somewhat effected on the second item. This leads me to believe the participant did not fully understand the question presented.

Due to the fact that the students were recruited from a program dedicated to helping students get into a four-year program, the data may be biased toward students having high academic achievement. In order for the students to be members of this organization they must go through a somewhat intense application process that mostly high academic achieving students would be

willing to endure.

Because this was a pilot study, I did not have the time to further research the topic and would have liked to ask more about the following: which sibling they were referring to, and what the family dynamic was (married parents living with sibling(s), divorced, step parents etc.) Another example would include adding more questions targeting teacher relationships and expectations. In order for further research to be conducted on this topic these limitations must be addressed.

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Victor Rodriguez II

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Crafting the Illusion of Pax Atomica: U.S. Atomic Energy Policy
1943-1950

Biography

Born in San Jose, California. Victor Rodriguez II is a history major. His focus in research is modern U.S. history with an emphasis in Cold War U.S. international relations (or U.S. Cold War diplomatic history). He wishes to attain a PhD in this field by studying U.S.-Latin American relations during the Cold War. However, he also studies U.S.-Soviet relations, domestic U.S. history, and the history of technology and the space race. Ultimately he aspires to teach and conduct research at a university or research institution.

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Crafting the Illusion of Pax Atomica: U.S. Atomic Energy Policy 1943-1950

Abstract

Perhaps the most awesome technological achievement of World War II was the atomic bomb. The United States, the first country to create and use this weapon, was also the first to demonstrate its destructive power on the Japanese cities of Hiroshima and Nagasaki in August of 1945. By committing this act, the U.S. not only unleashed the most powerful energy source discovered by humankind, it also fortified its position in the postwar era as one of two superpowers, the other being the Union of Soviet Socialist Republics (USSR). Until 1950, America relied on its atomic monopoly as a tool of leverage in drafting military, political, and international policy. Under the illusion of Pax Atomica, or atomic peace or peace in an atomic era, the United States established a conflicting international policy of cooperation and sharing of atomic information, and domestic legislation insuring the protection and secrecy of the nation's atomic weapon.

Introduction

The Second World War was brought to an end with two atomic explosions over the Japanese cities of Hiroshima and Nagasaki in the late summer of 1945. The United States had funded, experimented, developed, and was the first to successfully deliver an atomic bomb to its enemy in an attack. The Roosevelt and Truman administrations had won the wartime atomic arms race, thereby giving the country an atomic monopoly for the following five years. With this advantage, President Truman sought to construct a postwar world that would secure U.S. power and establish peace in a nascent nuclear era. These conflicting ideals created an irony in American atomic energy policy. Global peace meant international openness and cooperation in atomic science and technology, while the preservation of the country's atomic supremacy called for maintaining secrecy in the U.S.'s method and means for producing atomic weapons. The Soviet Union's position as the only other superpower complicated matters further because of its souring relationship with United States after the end of the war. Mutual suspicion of world domination between the two countries fueled the embryonic Cold War and helped to cultivate U.S. nuclear policy. Ultimately, political and military opinion in favor of a U.S. advantage coupled with rising hostilities between the USSR and the USA shifted

American atomic policy to a westernized directive designed for the primary benefit of the United States.

Methodology

My methodology for researching this paper consisted of reading, note taking, and writing in an analytical and critical fashion. An array of primary sources and secondary sources were used. The primary sources were personal correspondence, meeting notes, government memorandums, government documents, Congressional bills, personal journals, and memoirs. The secondary sources included biographies of key figures in the Truman administration and State Department, monographs by established historians such as John Bledsoe Bonds, Gregg Herken, and Raymond P. Ojserkis. General histories were also used to assess the military perspective during this era; sources such as *America's Armed Forces: A History* by James M. Morris, and *The American Way of War: A History of United States Military Strategy and Policy* by Russell F. Weigley were used.

Acquiring sources required the utilization of the Dr. Martin Luther King Jr. Library, San Jose State's Burdick Military History Project, and multiple online databases. The library allowed me to obtain secondary and primary source material from their personal collection and Link Plus. The Burdick Military project gave me access to numerous secondary sources on military history. Online databases included nuclearfiles.org, trumanlibrary.org, and atomicarchives.com. Through these sites, government correspondence, congressional bills, memorandums, and personal papers were used.

Literature Review

The literature review for this paper will be selective and brief in its material because my research and argument was primarily based on primary sources. In addition, there were only several monographs and histories that were helpful to my research and understanding of the era.

Raymond P. Ojserkis' book *Beginning of the Cold War Arms Race: The Truman Administration and the U.S. Arms Race Build-up* looks into the issue of what actually prompted the arms build-up. Ojserkis traces the administrative and State Department records to reveal growing tensions between the Soviets and U.S. between 1945-1952. Only through NSC-68, along with the outbreak of the Korean War and U.S. suspicion of Soviet

involvement in the conflict, does the U.S. engage in a massive military buildup in air power and nuclear weaponry. Ojserkis examines military and State Department papers to come to this conclusion, as well as the interplay of conflict within the Truman Administration. *The Winning Weapon: The Atomic Bomb in the Cold War 1945-1950* by Gregg Herken was the most informative and useful monograph in my secondary source research. Herken discusses the importance of the atomic bomb in U.S. politics, military development, and international policy during the early Cold War. He argues that the country's atomic monopoly was the crux of these three factors in American government that statesmen, military officers, and civilians relied on to maintain superiority over Europe, Asia, and Russia. Herken examines World War II documents like the Quebec Agreement to establish the western slant in atomic policy. He then launches into analysis of postwar media articles, Congressional bills such as the May-Johnson Bill and MacMahon Bill, which created the U.S. Atomic Energy Commission, NSC documents, and the Baruch Plan (an international plan that further slanted atomic energy to the advantage of the American monopoly.)

World War II: A Prelude to Postwar Atomic Policy

Albert Einstein was among the first to notify the Roosevelt administration—that is to say, the President himself—about the potential of nuclear energy in a private letter dated August 2, 1939. He began by stating that Dr. Leó Szilárd, his colleague performing the experiments, was "greatly concerned about the lack of adequate contact between scientists who are doing this work and members of your Cabinet who are responsible for formulating policy."[3] Before explaining to Roosevelt the significance of this scientific breakthrough, Einstein was concerned with placing the new technology within a proper "policy" maintained through the advisement of the President's Cabinet. The U.S. was placed at the center of nuclear international policy by one of the most brilliant men of the early twentieth century prior to the actual wartime arms race to construct an atomic weapon.

[3] Albert Einstein, "Letter to President Franklin Delano Roosevelt," August 2, 1939, under Atomic Bomb Documents (1920-1950 Documents only), http://www.pbs.org/wgbh/americanexperience/features/primary-resources/truman-ein39/.

The famed scientist was undoubtedly aware and concerned about the security of the emerging Pax Atomica era (or global atomic peace) that would characterize world interaction once the weapon was completed. Given the growing tensions and hostilities of the period, it seemed appropriate to Einstein to place the responsibility of the new energy source with a powerful country that was both farthest and furthest removed from the ensuing European war.

Achievement of a nuclear reaction, he stressed, was not only attainable in the near future, but would soon after be used to construct bombs.[4] Therefore, Einstein urged that it was in the administration's best interest to take quick action in facilitating this discovery and conduct further experiments on it. He advised Roosevelt to create a group of physicists tasked by the government to construct an atomic bomb. "You may think it desirable to have some permanent contact maintained between the Administration and the group of physicists working on chain reactions in America."[5]

Among the teams of physicists organized under the direction of the U.S. government during World War II, the most important in producing the bomb and drafting early policy for atomic power was the top secret government program, The Manhattan Project, located at Los Alamos, New Mexico. After Roosevelt's approval of the atomic program on October 9, 1941, the President's "Top Policy Group," consisting of Vice President Henry A. Wallace, President and Professor of Harvard James B. Conant, Head of the U.S. Office of Science Research and Development Vannevar Bush, Secretary of War Henry L. Stimson, and Chief of Staff of the Army, General George C. Marshall, oversaw the progress of the project and helped to shape postwar atomic policy. Directors of the program, Major General Leslie Groves of the U.S. Army Corps of Engineers and physicist J. Robert Oppenheimer, director of the Los Alamos National Laboratory, also contributed.

Approximately a year before the end of World War II, Vannevar Bush and James Bryant Conant sent a letter to Henry Stimson concerning

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[4] Ibid.

[5] Ibid.

the future of nuclear technology. The letter focused specifically on the postwar era and the possibility of a global arms race. The document expressed that the prevention of another major war and the creation of a stable postwar world require international public handling of atomic information. "There is hope that an arms race on this basis can be prevented and even that the future peace of the world may be furthered, by complete international scientific and technical interchange on this subject, backed by an international commission acting under an association of nations and having the authority to inspect."[6] With this statement, Bush and Conant hoped to define the role of nuclear power in the Cold War. This assessment undoubtedly contributed to the creation of the Atomic Energy Commission—the organization that monitored the use and development of nuclear technology.

Another policy that was set forth in this memorandum was the termination of selective international relationships regarding information concerning the atomic bomb. This specifically criticized the Anglo-American correspondence in developing the weapon. Bush and Conant wrote, "It is our contention that it would be extremely dangerous for the United States and Great Britain to attempt to carry on in complete secrecy further developments of the military applications of this art. If this were done Russia would undoubtedly proceed in secret . . . and so too might certain other countries including our defeated enemies."[7] The two authors also presented the issue of inhibiting the flow of scientific information regarding atomic technology by keeping its development secret. By voicing these concerns, Bush and Conant anticipated an impending problem in the near future. Although their stipulations would be challenged in the years to come, these men laid the bedrock of atomic power policy that was able to span into international relations. Bush and Conant emphasized lastly, "Under these conditions there is reason to hope that the weapon would never be employed and indeed that the existence of these weapons might decrease the chance of another major war."[8]

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[6] V. Bush and J.B. Conant, "Letter to U.S. Secretary of War," September 30, 1944, under "Correspondence," in Atomic Bomb Documents (1920-1950 Documents only), http://www.nuclearfiles.org.

[7] Ibid., 2.

[8] Ibid., 3.

At the dusk of the Second World War, Henry Stimson, possibly influenced by Bush and Conant's document, sent a memorandum to President Truman discussing international sharing of nuclear technology. Stimson acknowledged the fact that currently the only nations with full capability for building the atomic bomb were U.S. and Britain, but then explained that scientists in many countries were aware of the process of production. The Secretary of War also explained that eventually easier and cheaper methods would be discovered to make an atomic bomb, making its construction accessible to all countries. The question of human morality compared to technological advancement loomed over Stimson's assessment of atomic power in the postwar world: "The world in its present state of moral advancement compared with its technical development would be eventually at the mercy of such a weapon. In other words, modern civilization might be completely destroyed."[9] His words need little more explanation; the first half of the twentieth had been a violent affair—human kindness had been neglected and human intelligence was used to create rapidly advancing weapons technology. Barbarism seemed to reign supreme over all other human characteristics for the past fifty years, and Stimson was wary that such sentiments, hardened over two world wars and a global depression, would not disappear overnight.

Therefore, in an almost Wilsonian fashion, the Secretary of War recommended that the U.S. place itself in the center of nuclear foreign policy because it had been the first to develop (and soon use) the bomb. "In light of our present position with reference to this weapon," Stimson wrote, "the question of sharing it with other nations and, if so shared, upon what terms, becomes a primary question of our foreign relations. Also our leadership in the war and in the development of this weapon has placed a certain moral responsibility upon us which we cannot shirk without very serious responsibility for any disaster to civilization."[10] This assessment provided a moral high ground for the United States to occupy after the war. Stimson's analysis of the present situation and what needed to be done in the near future fit well with American ideas of superiority and responsibility. Indeed, the U.S. would occupy the position of superpower

[9] Henry Stimson, "Top Secret Letter from Henry Stimson to Harry S. Truman," April 25, 1945, under "Correspondence," in Atomic Bomb Documents (1920-1950 Documents only), http://www.nuclearfiles.org.

[10] Ibid.

with the close of the war, but this had no direct correlation to the future management of nuclear power. It was instead the collective idea amongst the men of Truman's administration, the State Department, and the military branches. Stimson, as the Secretary of War, collated these sentiments into a presentable policy that would soon evolve into a major part of U.S. Cold War foreign policy.

Starting in the spring of 1945, Truman established the Interim Committee on Atomic Energy to aid him with creating domestic and international policy for nuclear weapons and technology. Chaired by Secretary of War Henry L. Stimson and comprising top U.S. statesmen and scientists involved in the Manhattan Project, the committee discussed possible atomic policies and the political implications associated with them. As stated in the Interim Committee Log: "The Secretary of War explained that the Committee had been established by him, with the approval of the President, to study and report on the matter of temporary war-time controls and publicity and to make recommendations on post-war research, development, and control, and on the legislation necessary for these purposes."[11] The creation of such an organization set a precedent for other commissions with more authority such as the Atomic Energy Commission (A.E.C.) for the United States. This committee also established the military's involvement in nuclear policy: "It was suggested that a Military Panel might be organized with membership drawn from high levels in the Army and Navy. The Committee agreed that the views of representatives of those industries most directly concerned with the project should be obtained."[12] Such a recommendation would later create inter-military rivalry over the control of atomic weapons. It would also establish a very fine line between military and civilian authority over the use of the technology.

Among the numerous technical scientific and political aspects behind atomic policy, the Interim Committee also addressed the broader issue of whether the technology should be treated as a simple military weapon. Sharing the view of General George C. Marshall, the Committee log stated: "This discovery might be compared to the discoveries of the

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[11] "Interim Committee Log," May 9-July 1, 1945 under "Nuclear Weapons," in http://www.nuclearfiles.org.

[12] Ibid.

Copernican theory and of the laws of gravity, but far more important than these in its effect on the lives of men."[13] The comparison of Copernican theory to the discovery of atomic energy showed that the committee recognized the significance of their duty to place nuclear power within the proper context of civilian use and access. The meeting notes continued, "while the advances in the field to date had been fostered by the needs of war, it is important to realize that the implications of the project went far beyond the needs of the present war. It must be controlled if possible to make it an assurance of future peace rather that a menace to civilization."[14] The committee then addressed the future of military weapons, international competition, research, controls, and the development of non-military atomic applications. On the topic of secrecy and research, Nobel Prize winner and Manhattan Project scientist Dr. Arthur H. Compton expressed that it was nearly impossible to keep technological advances secret, as many countries were already aware of the scientific knowledge and theory of atomic power.[15]

Regarding the secrecy and control of atomic technology, the Interim Committee then turned to the enigma of the Soviet Union. Oppenheimer assessed that "Russia had always been very friendly to science and suggested that we might open up this subject with them in a tentative fashion" so that they are not given any specific information.[16] A scientist stating such an opinion of the Soviets would not hold validity among the Truman administration or State Department; fortunately, General Marshall expressed similar sentiments. The Army Chief of Staff stated that most of America's allegations against the Soviets proved unfounded, as it was their means to maintain military security. Marshall favored "the building up of a combination among like-minded powers, thereby forcing Russia to fall in line by the very force of this coalition."[17] By forcing Russia into a makeshift coalition for international atomic policy, the Soviets would not have a choice but to proceed with the established diplomacy, but this only led to further conflict between the superpowers after the war.

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[13] "Interim Committee Log," Thursday May 31, 1945 under "Nuclear Weapons," in http://www.nuclearfiles.org, 1.

[14] Ibid.

[15] Ibid.

[16] Ibid.

[17] Ibid.

Days after the end of the Second World War, physicist Dr. Henry DeWolf Smyth, a participant in the Manhattan Project, published an administrative and scientific history of building the atomic bomb. Referred to as the "Smyth Report," its release on August 12, 1945 gave the public not only general information about the bomb, but also presented them with the unanswered questions of the weapon's future in international politics. "The ultimate responsibility for our nation's policy rests on its citizens and they can discharge such responsibilities wisely only if they are informed," wrote Smyth.[18] He assessed that because of the weapon's secrecy Congress and the people had previously been denied the ability to debate the placement of nuclear energy in diplomatic and domestic law. "The future possibilities of such explosives are appalling, and their effects on future wars and international affairs are one of fundamental importance."[19] Smyth hoped that public information combined with the education and experience of the scientists and government personnel who worked on the bomb could craft effective and lasting policy for a Pax Atomica. "These questions are not technical questions," Smyth explained, "they are political and social questions, and the answers given to them may affect all mankind for generations."[20]

Only months before the bombing of Hiroshima and Nagasaki, a memorandum and letter arrived on Stimson's desk with similar perspectives on the use of the atomic bomb. George L. Harrison, former President of the Federal Reserve Bank of New York, special assistant to Stimson, and member of the Interim Committee authored the memorandum, and J. R. Oppenheimer wrote the letter. Both men revealed apprehension over using the bomb, because they feared military retaliation and the souring of foreign relations. Harrison, like Oppenheimer, voiced the educated opinions of the scientists working on the technology. "Some are fearful that no safe system of international control can be established," he wrote. "They, therefore, envisage the possibility of an armament race that may threaten

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[18] Henry Smyth, *Atomic Energy for Military Purposes: The Official Report on the Development of the Atomic Bomb Under the Auspices of the United States Government*, August 12, 1945 in http://www.atomicarchive.com/Docs/SmythReport/

[19] Ibid.

[20] Ibid.

civilization."[21] Oppenheimer mirrored his sentiments: "We are not only unable to outline a program that would assure to this nation for the next decades hegemony in the field of atomic weapons; we are equally unable to ensure that such hegemony, if achieved, could protect us from the most terrible destruction."[22]

Ultimately, Truman believed hegemony through atomic monopoly would secure the safety of the postwar world and more importantly the United States' position in it, while Harrison and Oppenheimer assessed that instability would result instead. Inadequate military counter-measures to an atomic attack, the improvement of nuclear weapons, and the tarnishing of the country's moral image through the use of the bomb would weaken the security of international relations. It was feared that U.S. utilization of the weapon "might sacrifice our whole moral position and thus make it more difficult for us to be the leader in proposing or enforcing any system of international control designed to make this tremendous force an influence towards the maintenance of world peace rather than an uncontrollable weapon of war."[23]

By the end of the war, the United States was setting the stage for the postwar world and was sensitive to any and all factors that would compromise her power within it. Therefore, hopes of congressional and public discourse writing official international atomic policy, as portrayed in the "Smyth report," would come second to presidential and administrative authority in the postwar era. Thus, the controversial issue of the atomic bomb was of momentous significance for the Truman administration, making Harrison's words valuable and authoritative. To close his memorandum, Harrison discussed the effect the bomb would have on U.S.-Russian relations. He simply suggested that Russia should be acknowledged

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[21] George L. Harrison, "Memorandum on Fears of Use of the Bomb to Henry Stimson," August 17, 1945, under *Manhattan Engineer District—Top Secret, Harrison-Bundy files, folder 77, National Archives, Washington, D.C.*, in Atomic Bomb Documents (1920-1950 Documents only), http://www.nuclearfiles.org.

[22] J. R. Oppenheimer, "Letter on Future of Atomic Energy, to Henry Stimson," August 17, 1945 under "Correspondence," in Atomic Bomb Documents (1920-1950 Documents only), http://www.nuclearfiles.org.

[23] Harrison, "Use of the Bomb to Henry Stimson," August 17, 1945.

and informed about the atomic scientific breakthrough so the Soviets would remain cooperative and friendly. Oppenheimer had a more solemn conclusion: "The development, in the years to come, of more effective atomic weapons, would appear to be a most natural policy of maintaining our military forces at great strength; nevertheless we have grave doubts that this further development can contribute essentially or permanently to the prevention of war."[24] The scientists provided Stimson with a paradox regarding the assumption that through the use of this weapon, the U.S. would maintain a force of influence to keep the peace. Oppenheimer warned that with the existence of such a terrible weapon, war could not be avoided, only instigated. With this foresight, the future of the world looked bleak, and the U.S. at the helm of control over nearly all aspects of the global situation would need to draft foreign policy to compensate for such an outcome.

The Origins of Nuclear International Policy: The Anglo-American Atomic Partnership

The crafting of the postwar world began on August 14, 1941, with the Atlantic Charter, a joint declaration between Franklin Roosevelt and Prime Minister Winston Churchill. The Charter stated eight stipulations for the creation of a peaceful and cooperative world after World War II. Among its goals was the right and respect for people to choose their own form of government, and the "desire to bring about the fullest collaboration between all nations in the economic field."[25] In addition, the Charter expressed that "they hope to see established a peace which will afford to all nations the means of dwelling in safety within their own boundaries . . . in freedom from fear and want."[26] This document created an Anglo-American partnership for rebuilding the postwar world, which characterized the early Cold War, especially during the Truman Administration. Furthermore, it established a westernized tone in international policy for the postwar era leading to an ultimate conflict between the Soviet Union and the United States. Examples of western policy were the Truman Doctrine and Marshall

[24] Oppenheimer, "Letter on Future of Atomic Energy," August 17, 1945.

[25] Franklin Roosevelt and Winston Churchill, "The Atlantic Charter," August 14, 1941, in *Debating the Origins of the Cold War: American and Russian Perspectives* ed. Ralph B. Levering (New York: Rowman & Littlefield, 2001,) 65.

[26] Ibid.

Plan, which fit in nicely with the concepts of collaboration in the economic field, preserving the people's forms of government, and "dwelling in safety" within a country's "own boundaries." The containment of communism and economic aid to Europe became primary characteristics of U.S. policy in the early Cold War and can find their roots in the Atlantic Charter.

An extension of Anglo-American cooperation came in 1943 with the Quebec Agreement, which stipulated collaboration in developing and researching nuclear technology. Signed by President Roosevelt and Prime Minister Churchill, the document formalized the exchange of information and resources, and created an almost exclusive relationship between the two countries regarding atomic power. The agreement expressed five stipulations including the promises that "we will never use this agency against each other," that "we will not use it against third parties without each other's consent," and that third parties would not be included in the exchange of information.[27] The President and Prime Minister even added a clause concerning atomic control after the war, which reveals that Britain and the U.S. sought to exploit their future position of superiority as the only two countries capable of producing nuclear technologies. "The British Government recognize that any post-war advantages of an industrial or commercial character shall be dealt with as between the United States and Great Britain on terms to be specified by the President of the United States to the Prime Minister of Great Britain."[28] The document closes with the statement that a committee will be set up in Washington to maintain any and all factors of the arrangement between Britain and America. Ultimately, it can be argued that through the Atlantic Charter, Anglo-American collaboration enabled the establishment of international nuclear policy, creating a foundation to implement the atomic era onto the global stage.

President Harry S. Truman sought to maintain the agenda of the late Roosevelt, such as maintaining the Anglo-American relationship, while simultaneously filling in the gaps left by the former head of state, which included maintaining the peace at the dawn of the atomic era. Truman wrote

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[27] Franklin Roosevelt and Winston Churchill, "Quebec Agreement," August 19, 1943, in Atomic Archives, http://www.atomicarchives.com.

[28] Ibid.

in his memoirs, "I wanted to make it clear that I attached the greatest importance to the establishment of international machinery for the prevention of war and the maintenance of peace."[29] Of course, the President meant by this a broad array of organizations, yet atomic energy was a major aspect of this undertaking. "The atomic program, furthermore, had to be geared to the needs of our foreign policy as well as of our national defense, and it was my responsibility as President to maintain a balance between these and other factors all the time," Truman wrote.[30]

To further Roosevelt's objective of Anglo-America cooperation, on November 15, 1945, Truman together with Prime Ministers Clement Attlee of Britain, and Mackenzie King of Canada issued a Declaration of the Atomic Bomb from the White House. The document called for the global sharing of scientific knowledge regarding atomic energy, but excluded the production of nuclear weapons through the United Nations Organization. Despite this attempt at creating a peaceful postwar world, this memorandum—similar to others drafted at this time—excluded eastern powers such as the Soviet Union. The declaration asserts a western obligation to shape international atomic policy, which irritated the Soviets. "We desire to emphasize that the responsibility for devising means of destruction, rests not on our nations alone but upon the whole civilized world. Nevertheless, the progress that we have made in the development and use of atomic energy demands that we take an initiative in the matter, and we have accordingly met together to consider the possibility of international action."[31].

However, it soon became apparent that Anglo-American cooperation on atomic energy was merely a wartime pact made obsolete by the death of Roosevelt and success of the Manhattan Project. Britain's social, political, and economic devastation from the war put the country at a disadvantage in negotiating postwar nuclear policy. Historian Gregg

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[29] Harry S. Truman, *Memoirs, Volume One: Years of Decision* (Garden City, New York: Doubleday, 1955), 271.

[30] Harry S. Truman, *Memoirs, Volume Two: Years of Trail and Hope* (Garden City, New York: Doubleday 1956), 297.

[31] Harry Truman, Clement Attlee, and Mackenzie King, "Declaration on the Atomic Bomb," November 15, 1945, in Atomic Bomb Documents (1920-1950 Documents only), http://www.nuclearfiles.org.

Herken argues that Truman "acquiesced in Churchill's bid for an Anglo-American union as a means of uniting public opinion behind the hard line with Russia."[32] The President had no intentions of revitalizing an alliance on atomic energy "as Churchill spoke of future Anglo-American collaboration on atomic energy, American policy on the subject was moving entirely in the opposite direction."[33]

An example of this turn from an Anglo-American alliance was the attempt at redrafting the Quebec Agreement in late 1945 and early 1946. Secretary of State James F. Byrnes appointed General Graves to help write the new agreement. The General witnessed the shift to American superiority in the field of atomic science, therefore making British involvement unnecessary. In addition, Groves believed that involving Britain in the exchange of atomic information would jeopardize the American economic and political position in the postwar world. The secretive nature of the early Anglo-American alliance being reinitiated in 1946 would also compromise the new United Nations Charter. Groves argued, "the Anglo-American cooperation on atomic energy 'could well be considered as tantamount to a military alliance,' and as such was in violation of Article 102 of the recently signed UN Charter, the stipulation forbidding secret executive agreements between members states."[34] Under Secretary of State Dean Acheson discussed the recasting of the Quebec Agreement in his memoirs and Groves' reservations about its amendments. "The amendments . . . caused considerable concern, not least to their co-author, General Groves, who until the Atomic Energy Act of 1946 remained in charge for the Army of all our Government's operations in the atomic field."[35] Despite attempts at revitalizing an alliance between Britain and the U.S., Groves used his authority in the Manhattan Project and the Army to secure America's atomic monopoly for the postwar era. "The honeymoon of Anglo-American relations existing during the war was clearly coming to an end," concluded Acheson, "and some of the commitments of the marriage seemed to be

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[32] Gregg Herken, *The Winning Weapon: The Atomic Bomb in the Cold War 1945-1950* (New York: Alfred A. Knopf, 1980), 144.

[33] Ibid.

[34] Ibid., 145.

[35] Dean Acheson, *Present at the Creation: My Years in the State Department* (New York: W.W. Norton and Company, 1969), 166.

causing pain to one of the spouses."[36] General Groves was not alone in his view of preserving U.S. atomic information; many Americans believed that it was the U.S.'s destiny to solely shape the new era of Pax Atomica.

Shaping American Atomic Policy, 1945-1947

Kindling for the Cold War can be seen in Henry Stimson's letter and memorandum to President Truman dated September 11, 1945. In the document, Stimson expressed his concern about sharing the bomb with the Soviets because of their "attitude toward individual liberty."[37] The Secretary of War was referring to the original policy of the U.S. to share the bomb only if the Soviets altered their government to a western democratic system that protected individual liberties. As the atomic bomb signified a profound influence on military and political power, it was necessary, he argued, to maintain a friendly, cooperative relation with the Soviets because if the U.S. kept the bomb from them, the alliance would be poisoned and they would simply develop the weapon on their own. Risking an assumption of good faith with the Soviets was better than prompting a secret arms race. Stimson also expressed the idea that atomic technology was a historic cornerstone for humanity that could not be treated merely as another military weapon; instead, the weapon was "a first step in a new control by man over the forces of nature too revolutionary and dangerous to fit into the old concepts" of international relations and military secrecy.[38] The Secretary of War continued, "it really caps the climax of the age between man's growing technological power for destructiveness and his psychological power of self-control and . . . moral power."[39] If this were the case, America's method of approach toward the Soviets was of vital importance to the evolution of human progress because beginning a nuclear age with tension and suspicion between the two standing powers after World War II would mean rivalry and mass production of atomic weapons, which spelled doom for the human race.

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[36] Ibid.

[37] Henry Stimson, "Memorandum on the Effects of the Atomic Bomb," September 11, 1945, under "Correspondence," in Atomic Bomb Documents (1920-1950 Documents only) http://www.nuclearfiles.org/menu/library/correspondence/stimson-henry/corr_stimson_1945-09-11.htm.

[38] Stimson.

[39] Ibid.

Unfortunately, the first piece of legislation to reach the President and Congress was not characterized by international cooperation. On October 3, 1945, Congressman Andrew J. May, chairman of the House Military Affairs Committee, and Senator Edwin C. Johnson, member of the Senate Military Affairs Committee introduced the May-Johnson bill, which gave the military control over nuclear research and development of the weapons. Drafted by the War Department under the advisement of General Groves, the bill aimed to establish a permanent "Manhattan District." Truman agreed to sign off on the bill only if it were amended to provide for civilian supremacy.[40] The President explained that government monopoly not military control would regulate the use of atomic technology by means of congressional committee composed of civilians. "The benefit of atomic energy are the heritage of the people," Truman argued, "Government monopoly alone will assure both the material safety and the maximum utilization of atomic energy."[41] Ultimately, the May-Johnson bill was killed by Truman's assessment and objections from the scientific community. Despite the bill's militarized tone for American atomic control, congressional bipartisanship and the continued call for international control of nuclear technology would help create more liberal legislation for both domestic and global application.

During the drafting of atomic foreign policy, Truman realized the importance of bipartisan support within the United States as the key to creating strong diplomatic relations with other countries. Truman explained in his memoirs, "I was anxious to keep partisanship out of the discussion of the area of atomic energy policy, just as I always sought to keep foreign policy bipartisan."[42] The President's approach toward nuclear policy was influenced not only by his own intuition, but also by his goal to maintain Roosevelt's postwar agenda. Historian John Bledsoe Bonds explains the late president's plan: "Recognizing Wilson's error, he carefully involved the Republican leadership in foreign policy roles during the Second World War. Truman continued that policy, and even while in the minority Senator Arthur Vandenberg of Michigan received significant attention from his

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[40] Truman, *Memoirs Volume Two, Years of Trail and Hope*, 3.

[41] Ibid., 3-4.

[42] Truman, *Memoirs, Volume One: Years of Decision*, 529-530.

administration."[43] As a leader of the Republican Party and a conservative anti-New Dealer, Senator Vandenberg offered Truman's administration broad appeal both in Congress and with the public. Not wasting any time, the President appointed the senator as chairman of the Foreign Relations Committee and requested that he along with Senators Tom Connally and Scott Wike Lucas create a bill for domestic and international control of atomic production through government agency.[44] Bonds observed that, "the administration readily accepted Vandenberg's nonpartisan approach, and with the appointment of General George C. Marshall as Secretary of State, actively pursued Vandenberg's ideal."[45]

Arthur Vandenberg did everything is his power to make the machinery of international atomic policy effective as an instrument for world peace after the Second World War. After the fate of Hiroshima and Nagasaki had been revealed, a stream of bills were introduced to Congress varied in objectives from complete military control of nuclear energy to the abandonment of atomic weapons for military purposes. In addition, by September of 1945, various congressional committees claimed jurisdiction over atomic legislation. Vandenberg resolved the situation by introducing the Concurrent resolution. "No one Committee could possibly have clear jurisdiction over a question of such all-embracing import. Soon we shall have rivalry between these Committees and a rush to get somebody's pet Bill reported . . . . To meet this situation I introduced a Concurrent Resolution last week to provide a Joint Congressional Committee . . . to take jurisdiction over the entire question of the development, control and use of atomic energy."[46] The Senator recognized the impossibility of maintaining an atomic monopoly and voiced the importance of worldwide control and inspection of nuclear research and development. However, Vandenberg revealed staunch suspicion toward the Soviets concerning the nascent technology. "It would be unthinkable . . . for us to voluntarily permit Russia to take the secret of atomic energy behind its blackout curtain to do with it whatever Moscow pleases," the Senator explained. "On the other hand,

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[43] John Bledsoe Bonds, *Bipartisan Strategy: Selling the Marshall Plan* (Connecticut, Westport: Praeger, 2002), 1.

[44] Truman, *Memoirs, Volume One*, 529.

[45] Bonds, 2.

[46] Arthur H. Vandenberg, *The Private Papers of Senator Vandenberg* (Kingsport, Tenn.: Kingsport Press, 1952), 222.

even if we can get a complete and adequate international inspection, we shall still be at the mercy of any brutal aggressor who may suddenly decide to use the atomic bomb against us."[47] Ultimately, it was proposed to establish free exchange of scientists and scientific information with Russia, which Vandenberg grudgingly agreed to while maintaining his unwavering position on nuclear weapons. "We agree that Russia can work out this atomic science . . . but we are unanimously opposed to hastening the day unless and until there is absolute and effective agreement for world-wide inspection and control. This is the crux. We want to banish atom bombs from earth."[48]

Using Senator Vandenberg's advice as well as other information from his advisors, President Truman addressed Congress on October 3, 1945, to urge the formation of domestic policy for atomic energy in the United States. Truman knew that in order to build a foundation for stable international policy that enabled the preservation of peace in the postwar world, he needed to start at home first. By showing the world that the United States was capable of creating its own legislation for the maintenance and control of nuclear power, the country could place itself in a stronger position to dictate the terms of atomic foreign policy. It was under this premise that the President spoke to Congress: "I therefore urge, as a first measure in a program of utilizing our knowledge for the benefit of society, that the Congress enact legislation to fix a policy with respect to our existing plants, and to control all sources of atomic energy and all activities connected with its development and use in the United States."[49] It was during this speech that Truman introduced the idea of the AEC, the national organization that would function under the United Nations, drafting international nuclear policy and monitoring global nuclear development. The Commander in Chief also set the precedent of nationally controlling the raw materials that contributed to the development of nuclear power.[50] This concept was later implemented into the Acheson-Lilienthal Plan, a document stating that the AEC had control of the mines and goods for atomic technologies. To conclude, Truman reminded the Congress that the legislation needed to be

[47] Ibid., 223.
[48] Ibid., 228.
[49] Ibid., 531.
[50] Ibid., 531.

passed soon and fast not only for the sake of the country, but for civilization as well. "Civilization demands that we shall reach at the earliest possible date a satisfactory arrangement for the control of this discovery in order that it may become a powerful and forceful influence toward the maintenance of world peace instead of an instrument of destruction."[51]

The first step to fulfill these goals was the passage of the McMahon Bill or later known as the Atomic Energy Bill of 1946. Introduced to the Senate by Senator Brien McMahon of Connecticut, the bill addressed the controversial issue of civilian versus military control of atomic technology. It expressed that atomic weapons be held in civilian custody and managed to garner support from the scientific community. Despite obvious military rejection, the Senate finally passed the bill on June 1, 1946, and Truman signed the McMahon Act officially known as the Atomic Energy Act of 1946 on the first day of August.

The act maintained the government monopoly of atomic information while enabling many of the measures called forth by Truman in his address to Congress. According to the act, "it is hereby declared to be the policy of the people of the United States that . . . the paramount objective of assuring the common defense and security, the development and utilization of atomic energy shall . . . be directed toward improving the public welfare . . . and promoting world peace."[52] To carry out these duties, an American Atomic Energy Commission was established under control of the government and the president. The Commission worked in conjunction with scientists in both the private and public sectors, and cooperated with the military—even possessing a Military Liaison Committee composed of representatives from the Departments of War and Navy. Ownership of fissionable materials was transferred to the Commission, but the act stipulated "there shall be no exchange of information with other nations with respect to the use of atomic energy for industrial purposes."[53] Thereby the government controlled production, ownership, and use of the fissionable material. The President also reserved the right to direct the Commission to produce atomic weapons and materials to the military in the interest of national defense. Thus, even while creating organizations that would promote security and peace in a

[51] Ibid., 532.

[52] Atomic Energy Act of 1946, August 1, 1946 in ttp://www.osti.gov/atomicenergyact.pdf

[53] Ibid.

nuclear era, the United States preserved its power by sharing a minimal amount of atomic information with the world.

Fortunately, the Truman administration recognized the importance of crafting a plan for international control of nuclear weapons and technology. The Committee on Atomic Energy, established by Secretary of State Byrnes, appointed Under Secretary of State Acheson as Chairman to draft a workable plan to be presented to the State Department. Acheson appointed a board of consultants for "technical advise" on atomic energy, with David E. Lilienthal as chair of the board. Lilienthal was an ideal candidate for the position, having experience in public administration through the Tennessee Valley Authority, a federal corporation that provided flood control, electricity, and economic development in the Tennessee Valley. Together the men devised a report later referred to as the Acheson-Lilienthal Report.

The Acheson-Lilienthal Report sought to provide a foundation for international control of atomic technology acceptable for diplomatic negotiation on the global stage. "We were given as our stating point," stated the report, "a political commitment already made by the United States to seek by all reasonable means to bring about international arrangements to prevent the use of atomic energy for destructive purposes and to promote the use of it for the benefit of society."[54] Essentially, the report assessed that control of atomic energy through inspection and the outlawing of production of nuclear weapons by the United Nation AEC was not going to succeed. It proposed that all fissionable material be owned by an international agency called the Atomic Development Authority. Giving this agency control of the raw materials prevents the construction of weapons as well as technologies for the benefit of society, but there would be international control of atomic power. "The plan must be one that will tend to develop the beneficial possibilities of atomic energy and encourage the growth of fundamental knowledge," explained the report, "stirring the constructive and imaginative impulses of men rather than merely concentrating on the defensive and negative."[55] Yet, sacrificing national

[54] "A Report on the International Control of Atomic Energy," March 16, 1946 in http://www.nuclearfiles.org/menu/key-issues/nuclear-weapons/history/cold-war/strategy/acheson-lilienthal-report_1946-03-06.html

[55] Ibid.

ownership of fissionable materials included the United States, making it difficult for the government to accept the plan. More controversial was the stipulation that the U.S. monopoly will not last through this plan. "International control implies an acceptance . . . that our monopoly can not last. It implies substituting for a competitive development of atomic armament a conscious, deliberate, and planned attempt to establish a security system among nations . . . that would give protection against surprise attack with atomic weapons."[56] Releasing the U.S. monopoly included its atomic knowledge, which Acheson claimed should be shared with the Soviets under the mutual agreement that neither would produce atomic weapons. This openness the Under Secretary believed would stem the possibility of "competitive development of atomic armament." Yet, this leap of faith by the American government proved too dangerous in conjunction with relinquishing ownership of its fissionable material, making the Acheson-Lilienthal Report lose appeal in the State Department.

On June 14, 1946, American financier, statesman, and political consultant Bernard Baruch presented a plan for international atomic regulation and control to the United Nations AEC. Designated the Baruch Plan, it incorporated the Atomic Development Authority from the Acheson-Lilienthal Report and allowed the U.S. to retain its nuclear monopoly. It proposed that the Commission, through the Atomic Development Authority, extend to all nations the exchange of basic scientific information, control atomic energy for peaceful purposes, eliminate national armaments of atomic weapons, and create "safeguards by way of inspection and other means to protect complying States against the hazards of violations and evasions."[57] In addition, the plan stripped all members of the UN of their veto power over control and inspection. "There must be no veto to protect those who violate their solemn agreements not to develop or use atomic energy for destructive purposes," explained Baruch.[58] Only after the plan was fully implemented would the U.S. destroy its nuclear arsenal. The Soviets rejected the proposal on the grounds that the U.S. and its western allies dominated the UN, and that the U.S. would retain its atomic monopoly until the USSR had given up all fissionable material and submitted to

[56] Ibid.

[57] Bernard Baruch, "The Baruch Plan," June 14, 1946 in http://www.atomicarchive.com/Docs/Deterrence/BaruchPlan.shtml.

[58] Ibid.

inspection. Secretly in the process of developing their own bomb, the Soviets were not about to submit their resources to an organization of international control. The debate over the plan continued into1948; however, the initial Soviet objection stopped any serious advancement after the summer of 1946.

By early 1947, international control of nuclear energy had collapsed due to American reluctance to relinquish their atomic monopoly onto the global stage and Soviet resistance to adhere to western dominated diplomatic rhetoric. An atomic curtain had been dropped behind the iron curtain as Russia developed its own atomic weapon and around the United States to protect its nuclear hegemony. American policy hardened into a U.S.-centric approach that changed little since its origins in the Second World War. The legislation for a Pax Atomica under the guidance of the United States had faltered, leaving in its place the individual voices of the Truman administration to shape atomic policy through their own personal influence.

Individual Voices in American Atomic Policy 1946-1948

Diplomat George F. Kennan was perhaps one of the most influential men in U.S. policy during the Truman administration. His advocacy of the containment policy and creating an American sphere of influence in Europe and Latin America not only helped to develop nuclear doctrine, but defined the next forty years of the Cold War. While on a diplomatic mission in Moscow in September of 1945, Kennan dispatched a message to Washington concerning the possible development of a Russian bomb. "There is nothing," he wrote, "in the history of the Soviet regime which could justify us in assuming that the men who are now in power in Russia . . . would hesitate for a moment to apply this power against us if by doing so they thought that they would materially improve their own position of power in the world."[59] Such an initial analysis of Soviet intention provided the U.S. with the preconceived notion that the Russians were not to be trusted in the realm of global politics. It is arguable that early U.S.

[59] George F. Kennan, *Memiors 1925-1950* (Boston, MA: Brown and Company, 1967), 296.

interpretations of Soviet postwar intentions like Kennan's piece significantly affected the drafting of international atomic policy.

Kennan further shaped Government opinion of the Soviets through his "Long Telegram" to the State Department on February 22, 1946. This telegram does not mention Russian utilization of atomic technology, but it does argue that the Kremlin is motivated by fear and insecurity of western society in crafting their own international policy. Ignorance of the "economically advanced West, fear of more competent, more powerful more highly organized societies" caused Soviets to rely on brut military and police force to foster better control of their state and the outside world.[60] Therefore to seek a sense of security Russians dedicate themselves to the total destruction of their enemies. Kennan concluded: "We have here a political force committed fanatically to the belief that with *the* US there can be no permanent modus Vivendi, that it is desirable and necessary that the internal harmony of our society de disrupted, our traditional way of life be destroyed, the international authority of our state be broken, if Soviet power is to be secure."[61] This sinister depiction of Soviet intentions undoubtedly influenced U.S. atomic policy, especially in settlements like the Baruch Plan. Kennan's article "The Sources of Soviet Conduct," published in *Foreign Affairs* in July of 1947, carried similar sentiments and further solidified U.S. perspective of the Soviet Union.

In contrasts to Kennan's view, former Vice President Henry Wallace became the main spokesman for sharing all atomic knowledge with the Soviets. This liberal perspective argued that only complete cooperation with Russia in the nuclear arena, and global political affairs would prevent a future war with the Soviet Union. In a speech given on September 12, 1946, Wallace addressed the consequences of relying on an atomic arsenal: "We cannot rest in the assurance that we invented the atom bomb—and therefore that this agent of destruction will work best for us. He who trusts in the atom bomb will sooner or later perish by the atom bomb."[62] Reliance on the bomb as the ultimate weapon in matters of diplomacy was waning against

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[60] George F. Kennan, "The Long Telegram," February 22, 1946, in *Debating the Origins of the Cold War*, 69.

[61] Ibid., 71.

[62] Henry A. Wallace, "Speech in New York City," September 12, 1946 in *Debating the Origins of the Cold War, 78.*

the developing arms race, and deteriorating relationship with Russia. As a result, the need for peace was becoming more apparent to secure a Pax Atomica: "Never have the common people of all lands so longed for peace. Yet, never in a time of comparative peace have they feared war so much."[63] Wallace blamed the rising tensions on both the U.S. and USSR even advocating for a peace treaty stipulating that the Soviet Union stay out of American spheres of influence, and the U.S. remove itself from Eastern European affairs. The former Vice President assessed that the Russians would continue to socialize their part of the world just the U.S. had capitalized theirs, and there was nothing Americans could do to stop them—best option was for the superpowers to learn how to peacefully co-exist. This answer for Pax Atomica proved too liberal for the majority of Americans to accept. Within the Truman administration, both statesmen and military personnel would disagree and fight against negotiating a peace treaty of co-existence with the Soviets.

By the beginning of 1947, David Lilienthal had been appointed chairman of the U.S. AEC, and from this position he tried to the best of his abilities to create domestic atomic policy that would benefit civilian life and public defense. He wrote on New Year's Eve of 1946: "God grant that in the coming year I may by a bit lessen the cloud of dread and fear that hang over the world since Hiroshima. For I am sure that if we have some wisdom and patience, and divine guidance, we will find . . . that the cloud has indeed a lining of silver."[64] Lilienthal was also aware of how government could restrict the potential for atomic power: "Atomic energy development is more important as a stimulus to the imagination, an awakening force, than are any of its foreseeable applications . . . . This is fundamental to my notion of how we will survive our Congressional difficulties; unless the people, the press, the radio, keep the light of atomic energy, it will go the way of a routine Government operation, bogged down, subject to the small potatoes of Congressional piddling."[65] However, the administrator was confident that through scientific investigation atomic power would become more a social benefit than threat. "New knowledge raises questions of its net worth;

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[63] Ibid.

[64] David E. Lilienthal, "New Year's Eve1946," in *The Journals of David E. Lilienthal, Volume II The Atomic Energy Years: 1945-1950* (New York: Harper and Row, 1964), 127.

[65] Lilienthal, "March 15, 1947," 160.

in the case of atomic energy we have such a huge addition to knowledge about our environment, such as an increase in our control . . . over it, and chief of all, such a *stimulus* to more understanding, that the balance of useful or beneficial will almost certainly outweigh the non-beneficial or destructive."[66] With such an outlook, Lilienthal administered the use of atomic power in the United States holding to the ideal that its primary beneficiaries would be civilians.

The humanitarian goals sought by men like Lilienthal, however, were always undermined my military demand for better nuclear weapons. A letter by J. R. Oppenheimer to Truman is an example of this administrative habit. Dated December 31, 1947, the letter was an assessment of the General Advisory Committee's appraisal of atomic progress. Oppenheimer exclaimed, "our atomic armament was inadequate, both quantitatively and qualitatively, and the tempo of progress was throughout dangerously slow. This state of affairs can in large measure be attributed to the long delays in setting up an atomic energy authority, and to the inevitable confusions of policy and of purpose which followed the termination of war."[67] This unsatisfactory report alarmed Truman, who saw this as an immediate threat to the country's right of secrecy. He believed that an insufficient program would allow other countries to surpass the U.S. in atomic technology, jeopardizing American power. Remaining uncompromising in sharing atomic military secrets, Truman stated, "I was firmly committed to the proposition that, as long as international agreements for the control of atomic energy could not be reached, our country had to be ahead of any possible competitors."[68] Yet, the explosion of a Soviet atomic bomb on August 29, 1949 shattered the American atomic monopoly. As a result, the militarized use of nuclear power became the prominent aspect of U.S. atomic policy. The first move by the Truman administration and State department was to investigate the feasibility of building a thermonuclear or hydrogen bomb; the power of such a weapon would be roughly a thousand times more destructive than an atomic bomb.

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[66] Lilienthal, "February 23, 1948," 297.

[67] J. R. Oppenheimer, "General Advisory Committee Letter," December 31, 1947, in *Memoirs Volume II: Years of Trial and Hope*, 299.

[68] Ibid., 306.

Militarized U.S. Nuclear Policy, the "Super" Bomb, and the National Security Council

The establishment of the National War College on July 1, 1946 marked the beginning of implementing atomic policy into military strategy. Utilizing the academic study of diplomacy and politics for the development of military doctrine revealed how much international interaction had changed since the start of the nuclear era. Kennan observed this upon being assigned to the college as deputy for foreign affairs: "A strategic-political doctrine would have to be devised for this country which gave promise not simply of expanding the material and military power of a single nation but of making the strength of that nation a force for pace and stability in international affairs and helping, in particular, to avoid the catastrophe of atomic war."[69] He hoped that through this new government institution a doctrine could be drafted to satisfy this need. Kennan also averred that the complexities of the atomic age would mean simplifying military strategy. "The aim of warfare . . . would have to become limited," he wrote, "If weapons were to be used at all, they would have to temper the ambitions of an adversary, or to make good limited objectives against his will—not to destroy his power, or his government, or to disarm him entirely."[70] Indeed, Truman would use this method of warfare during the Korea conflict to avert an atomic war. A second proponent of atomic doctrine that needed to be added to military strategy, according to Kennan, was nuclear deterrence under the fear of environmental and political consequences upon using atomic weapons. In addition, he also devised a peacetime plan for the armed forces, which "laid emphasis on the maintenance of small, compact, alert forces, capable of delivering at short notice effective blows on limited theaters of operation far from our own shores."[71] This was arguably the start of America's Cold War standing military that would be implemented by the time of the Korean War. Ironically, in the midst of creating international plans to share atomic knowledge, the U.S. was preparing for the possibility of atomic war.

By late 1949, discussion of building a hydrogen bomb, or "Super" bomb as it became to be called, gained prominence in administrative and

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[69] Kennan, 308-309.
[70] Ibid., 310.
[71] Ibid., 311.

State Department correspondence with the detonation of a Soviet atomic weapon. Kennan and a number of other advisors were among the first to write a report to the new Secretary of State Acheson placing the H-bomb in contrast with the effort of crafting international policy for nuclear technology. The diplomat believed that before committing to the development of a new weapon the country should reassess the progress of atomic international diplomacy to conclude whether there was any possibility of arriving at an international agreement, which could "obviate the need to embark on this fateful course."[72] The report began by questioning whether the U.S. really wished to see atomic weapons abolished and had done everything in the government's power to see to the end of that goal. Exposing the blatant hypocrisy of the Truman administration, Kennan said, "our statements to date . . . had been ambiguous and inconsistent on this point. We had done lip service, when we spoke of international forums, to a desire to see atomic weapons abolished."[73]

Kennan further revealed the country's false aspirations to craft a strong Pax Atomica by arguing that there were two possible military reasons for neglecting international cooperation. The first was an undesirable necessity to maintain an atomic arsenal because of the fear that future development and use of nuclear weapons by enemy states could be used against the U.S. Therefore, no intentional strategy of use would be implemented, only a defensive plan based on the presumption of use. The second was use of nuclear first strike, thereby placing the country in a position of advantage during the threat of an atomic war. Keenan settled on the opinion that "first strike" was the primary reason for keeping and advancing American nuclear weaponry and argued that this strategy be abandoned. "Before we decide to proceed with the development of the hydrogen bomb," he pleaded, "thus committing ourselves and the world to an indefinite escalation of the destructiveness and expensive weapons."[74] Unfortunately, the Truman administration and State Department ignored the demands to cease discussions on the feasibility of constructing a thermonuclear weapon, with the President making a public announcement that the U.S. would commit to the development of the bomb on January 31,

[72] Kennan, 471.

[73] Ibid., 473.

[74] Ibid.

1950. With this declaration, Keenan realized that the "first strike" doctrine would characterize the ensuing arms race and bring the world closer to possible nuclear war.

As chairman of the AEC, Lilienthal was able to trace in his private journals the course of action the administration, State Department, and military took to shape U.S. nuclear policy after confirmation that the Soviets possessed an atomic weapon. In an entry dated October 29, 1949, Lilienthal described the mentality shared during a General Advisory Committee meeting on the atomic program: "The conclusion or adding-up I got out of the day with such fine minds and spirits as were there was that the Russian bomb had changed the situation drastically, and that the talk our having anticipated everything and following the same program we had before is the bunk."[75] A couple days later, the chairman recorded the perspective of the military officials during a meeting with the Military Liaison Committee: "The view of some of the military is that war is inevitable. The top, however do not go as far; they believe it's 'likely' in a relatively short time, four or five years. After it comes we must use the atomic bomb, as we can't hold Europe without it."[76] The personnel within the administration and State Department did not generally share these desperate assumptions at first, however security concerns ultimately curbed Truman and his Cabinet's nuclear policy incorporating militarized strategy.

During a meeting with the National Security Council (NSC) on January 30, 1950, Lilienthal was given the order by Truman for the AEC to proceed in determining the possibility of developing a hydrogen bomb.*[77] Secretary Acheson, leading the discussion, also dispensed a pending public statement for Truman about the imperative behind constructing the "super" bomb." It stated: "It is part of my responsibility as Commander-in-Chief of the armed forces to see to it that our country is able to defend itself against any possible aggressor."[78] Addressing the controversial issue of building the "super" bomb as a matter of national security under an "atomic preparedness program" excused any darker military objectives such as the

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[75] Lilienthal, 580.

[76] Ibid.,583.

[77] *The NSC is an organization formed on September of 18, 1947, that advises the President on national security and foreign policy matters.

[78] Ibid., 624.

"first-strike policy" and maintaining technical superiority. Appearing to keep the welfare of the people as his top priority, Truman was able to gain public approval of this new venture in military and scientific research and development.

In the same passage, Lilienthal voiced his own opinion about the decision to create the H-bomb. "The central question seems to me not whether we should build the super bomb or not build it. Rather we should first face up to weaknesses in our present position and not threaten by a decision now what might be the last chance to adopt a less certain course of danger."[79] The weakness Lilienthal had in mind was arguably the failure of organizing a system for the international control of nuclear power; the H-bomb, he believed, would only destabilize any hope of that. The administrator warned, "but unless we face up to them as a principal problem, they would plague our future Secretaries of State and Secretaries of Defense, Chief of Staff, and Presidents and bear them down with perhaps overwhelming problems."[80] Indeed, the chairman of the AEC was correct, complex world situations concerning nuclear weapons are still a significant aspect of modern day society. To conclude this entry, Lilienthal observed a fallacy in Truman's statement to build a "super" bomb; the President placed the feasibility of the hydrogen bomb under a "preparedness program." If that was the case, then why was the rest of the military not preparing for a possible war with Russia?

Throughout 1948, the NSC drafted two documents, which influenced and coincided with U.S. militarized nuclear policy. The first, NSC-7, "The Position of the United States with Respect to Soviet-Directed World Communism," proposed a counteroffensive against communism through universal military training for all able-bodied American men, and the continued production of atomic weapons, but it did not state a workable doctrine for atomic war. NSC-30, "Policy on Atomic Warfare," according to Herken, "recognized that American plans for the defense and even the economic recovery of Europe relied first upon the bomb."[81] Yet, the document did not state if the government should publicly declare its willingness to use the bomb for fear of public disapproval, or when or how

[79] Ibid., 628.
[80] Ibid., 628.
[81] Herken, 268-269.

nuclear weapons should be used. Herken argued that military leaders were left with the responsibility to determine when and how they would be used, and that the "United States would use atomic weapons in the event of a war with Russia—even a war that the United States itself initiated."[82] The incomplete assessments of NSC 7 and 30 were later fulfilled by NSC-68, which assessed the importance of starting an arms race with the Soviets and building better nuclear weapons, and it prescribed strategies and actions for nuclear war.

Secretary of State Acheson, an architect of NSC-68, wrote in his memoirs about the purpose of the document and expressed his own perspective of the role it played in U.S. international and domestic politics. He blatantly stated "The purpose of NSC-68 was to so bludgeon the mass mind of 'top government' that not only could the President make a decision but that the decision could be carried out. Even so, it is doubtful whether anything like what happened in the next few years could have been done had the Russians been stupid enough to have instigated the attack against South Korea, and open the 'hate America' campaign."[83] Acheson's simplistic assessment of NSC-68 reflected the typical attitude of the Cabinet. The primary reason behind the NSC documents was ultimately to expand the powers of the administration, State Department, and military by using or inflating a crisis. The Secretary of State explained that "the conflicting aims and purposes of the two superpowers: the priority given by the Soviet rulers to the Kremlin design, world domination, contrasted with the American aim, and environment in which free societies could exist and flourish," would result in a clash of military and political power.[84] Yet, with the demobilization of the military after World War II, Acheson noted that combating the Russians would be a difficult task.

Therefore NSC-68 proposed the expansion and advancement of the U.S. military and economy to assure control in their spheres of influence. Isolation, according to Acheson, "was not a realistic course of action" because in the past it had proved too costly both politically and

[82] Ibid., 269 & 272.
[83] Acheson, 374.

[84] Ibid., 375.

economically.[85] The Secretary of State also revived a term from the Second World War to define U.S. policy toward the Soviets: "Appeasement of Soviet ambitions was, in fact, only an alternative form of isolation."[86] Using phrases like "appeasing the Soviets" gave postwar diplomacy a wartime attitude that characterized much of early cold war politics. In fact, NSC-68 carried that wartime mentality by asserting the cold war was an actual war, eventually leading to a Soviet and U.S. confrontation. This assessment Acheson disagreed with: "Then as now nothing seemed to me more depressing in the history of our country than the speeches of the 1850s about the 'the irrepressible conflict.' War is not inevitable. But talk of war's inevitability had, in the past, helped to make it occur."[87] The true hardliners of the Truman administration saw NSC-68 as preparation for an inevitable Soviet-U.S. conflict, but realists like Acheson maintained that NSC-68 was a security and power measure for the presidency, State Department, and military, authorizing them to maintain nuclear superiority, a mass military, and political and economic clout over capitalist programs in Europe.

The top secret report NSC-68 advanced U.S. nuclear policy through the consistent emphasis that there was no other military or diplomatic alternatives to combat the expansion of Soviet power into the "free world." Although several other factors were considered by NSC-68 to maintain American dominance in global affairs, atomic technology remained at the crux of the issue as to why U.S. strategy had to be reexamined. The document begins with a presidential directive to review the government domestic and international objectives in light of the "probably fission bomb capability and possible thermonuclear bomb capability of the Soviet Union."[88] In this regard, the report also assessed whether, upon the success of a U.S. H-bomb detonation, such weapons should be stockpiled and how the new weapons should be used in war. Therefore, NSC-68 was primarily concerned with the preservation of U.S. nuclear superiority.

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[85] Ibid., 376.

[86] Ibid.

[87] Ibid., 377.

[88] "A Report to the National Security Council-NSC-68," April 12, 1950 in President's Secretary;s File, Truman papers on https://www.trumanlibrary.org/whistlestop/study_collections/coldwar/documents/pdf/10-1.pdf, 3.

NSC-68 believed the Kremlin would use its newfound atomic capability to continue seeking "absolute authority over the rest of the world."[89] As a result, the U.S. was viewed as the main threat against the future of Soviet global hegemony. Thus, NSC-68 argued, "it is only by developing the moral and material strength of the free world that the Soviet regime will become convinced of the falsity of its assumptions and that the preconditions for workable agreements can be created."[90] Among the moral and material strengths the document referred to was the continuation of capitalist programs through military power. Yet, the apparent increase of Russian armament pointed to a high possibility that the Soviets were preparing for war, making an American objective of stifling communist expansion more difficult. To counteract this, NSC-68 stated that the U.S. must rapidly build-up its weaponry on a massive scale. "If such a source of increasing our military power is adopted now, the United States would have the capability of eliminating the disparity between its military strength and the exigencies of the situation we face; eventually of gaining the initiative in the 'cold' war and of materially delaying if not stopping the Soviet offensives in war itself."[91]

To further this argument, NSC-68 established that diplomatic negotiation with the Soviets to decrease the tension of nuclear war would not succeed. The document exclaimed that international nuclear control would not work because it put both the U.S. and USSR at a disadvantage, making both superpowers reluctant to come to an agreement. American atomic superiority would mean that the U.S. would have to sacrifice a larger stockpile of nuclear weaponry and production capacity than would the Russians. On the other hand, the Soviet Union, in need of a new energy source for its infrastructure, would oppose the dismantling and inspection of its reactors.[92] In addition, the USSR would have to commit to ceasing it expanding military power to facilitate a negotiated peace, which the Kremlin would never agree to according to NSC-68. In the absence of an agreed international control of atomic power, the document concluded that

[89] NSC-68, 4.
[90] Ibid., 10.
[91] Ibid., 32-33.
[92] Ibid., 41.

"we would have no alternative but to increase our atomic capability as rapidly as other considerations make appropriate."[93]

Upon determining the impossibility of international nuclear control between the Soviets and Americans, NSC-68 examined the possibility of going to war as an alternative "course of action." The report argued "that since the Soviet Union is in fact at war with the free world now and that since the failure of the Soviet Union to use all-out military forces is explainable on grounds of expediency, we are at war and should conduct ourselves accordingly."[94] As the U.S. was deemed at war with the USSR, NSC-68 excused the policy of "first-strike" as an acceptable course of action because the idea of defensive war would become obsolete. "It is evident, from an analysis of the past and of the trend of weapon development, that there is now and will be in the future no absolute defense." In accordance with this, the U.S. should adopt an offensive strategy in nuclear warfare—"first-strike."[95] By suggesting this course of action, NSC-68 had intensified U.S. nuclear policy hoping that it would compensate for the loss of its atomic monopoly.

The rise of Soviet nuclear power on the world stage altered the U.S. plan for a Pax Atomica through American atomic superiority. NSC-68 assured the administration and State Department that despite a Russian atomic arsenal, the United States was still the leader of the free world industrially and economically. These two factors gave the country an advantage, which could be used to stop the Kremlin's plan for world domination. "We must organize and enlist the energies and resources of the free world in a positive program for peace which will frustrate the Kremlin design for world domination by creating a situation in the free world to which the Kremlin will be compelled to adjust."[96] NSC-68 utilized the idea of maintaining the peace to disguise the true intention of continued American global dominance. Although NSC-68 was a top secret document, there is no denying the influence it had on U.S. nuclear policy by reestablishing the arrogant self-conceived right that the United States could

[93] Ibid., 38.
[94] Ibid., 52-53.
[95] Ibid., 54.
[96] Ibid., 63.

use its new position of power to manipulate world affairs to an Americanized agenda of freedom, capitalism, and liberal democracy.

Pax Atomica had never been a true objective of United States' atomic policy. International or domestic in its span, nuclear power was used by the U.S. to maintain its postwar power in industry, finance, and military power. The idea of an "atomic peace" in the latter half of the twentieth century was derived from the false hope, created during the violence of the Second World War, that the destructive potential of nuclear technology could facilitate a lasting peace through international control. Many hoped that through such an agreement atomic energy could be used for societal benefit rather than weaponry, but ultimately this proved to be another false hope. The rising hostilities between the U.S. and Soviet Union during the early Cold War made any attempts at crafting a system for international control fail, partly because of the refusal of the two superpowers to cooperate and partly as a result of self-interest. As a result, the illusion of a Pax Atomica was crafted through half-hearted diplomatic negotiation and nuclear policy curbed for the benefit of the individual country. However, it could be argued that a Pax Atomica was established through the mutual fear of using atomic weapons during the Cold War. Examples of this can be seen in the proxy wars of Korea, Vietnam, and Afghanistan, and the aversion of nuclear annihilation during the Cuban Missile Crisis. Yet, examination of the numerous bloody confrontations, the increased number of nuclear armaments, and the mounting mass hysteria over nuclear war would lead most to conclude that Pax Atomica was hardly attained. The horrors of a possible nuclear conflict are still with us today. With that said, the documents discussed in this paper (and others like it) should continue to be studied because remembering past foresight and knowledge gives current statesmen, scientists, and leaders a blueprint of the political and military misuse of atomic weapons and allows them to learn from past mistakes. Thus, historical preservation and interpretation enables the crafting of tomorrow's better or worse world.

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Attitudes Towards e-cigarettes as a Function of Use and Appearance

Biography

Rebecca Sandoval is a fourth-year psychology major. She has grown to love the field of psychology, and as President of the International Honors Society, Psi Chi, she has also had the opportunity to help encourage, stimulate, and advance her peers in the science of psychology.

Rebecca established her passion for neuroscience when she discovered that there was a specific science that studied the biological component of the brain that could aid in explaining behavior. Rebecca is currently working towards her aspiration of attaining a PhD in Neuroscience and Behavior. Once in a program, Rebecca wants to study psychiatric disorders to better understand the complexity of the brain. She is interested in continuing to do research in order to significantly impact the lives of others and those with mental health disorders.

Attitudes Towards e-cigarettes as a Function of Use and Appearance

Abstract

Cigarette smoking is a well-known contributor to harmful diseases. Electronic nicotine devices have recently become an alternative to cigarette smoking. However, controversy in the tobacco field about trendy electronic nicotine devices has been increasing. The claims that e-cigarettes are potentially a harm-reducing product and safer than traditional smoking have made these devices successful. Health advocates, on the other hand, are concerned about the health risks that are linked to the devices. Given that these new forms of consuming tobacco are becoming extremely popular with college students, it is important to have a better understanding of the influence of these nicotine products in order to create possible intervention programs or increase public awareness. In addition, given concerns about the health risks associated with the devices, it is important to understand how people perceive these products. To explore these questions, an ethnically diverse sample of 150 participants from the College of Business at San Jose State University (average age 24.5 years) completed an online survey about electronic nicotine devices. We hypothesized that the users and non-users would differ in their perceptions. We also hypothesized that conventional e-cigarettes would be viewed more negatively than non-conventional e-cigarettes. The surveys revealed some negative attitudes towards e-cigarette use in public, even among smokers, regardless of beliefs about the risks of e-cigarettes. In addition, mechanical-looking e-cigarettes (non-conventional) were viewed more positively than e-cigarettes resembling a tobacco cigarette (conventional).

Background

In less than a decade, a new device has made rapid gains in the market and is claiming to renormalize smoking in the form of "vaping" (Fairchild, Bayer, & Colgrove, 2014).

The electronic cigarette is a device that is promoted as providing the nicotine of conventional cigarettes without the toxins and carcinogens. Because of this, electronic cigarettes are promoted as a smoking-cessation aid to help cigarette smokers beat their addiction to conventional cigarettes.

To increase their appeal, manufacturers have been making the e-cigarettes very modern and appealing. The devices light up, have unique shapes, and have a variety of flavors. Many celebrities promote the new device as an alternative to become healthier and still be cool. Despite its claims to be beneficial by being a healthier alternative to smoking, many health advocates are concerned with that the devices pose potential long-term health risks. It is important to examine perceptions of e-cigarettes to learn how to effectively educate people about this product. By doing so, we could potentially prevent young adult experimentation with e-cigarettes.

Defining e-cigarettes

E-cigarettes are composed of a battery, an airflow sensor, a vaporizer, and a nicotine cartridge (Sutfin, McCoy, Morrell, Hoeppner, & Wolfson, 2013). E-cigarettes were designed to closely resemble the experience of smoking conventional cigarettes. The refillable cartridges can have up to 500 mg of nicotine, measuring up to ten times the lethal dose (Eissenberg, 2010). The e-cigarettes also contain propylene glycol and other chemicals that public advocates are concerned about (Eissenberg, 2010). Research has shown that variability in product design distinguishes the amount of vapor content and may influence the amount of nicotine delivered (Eissenberg, 2010).

Positive Aspects

E-cigarettes have benefited some currently addicted smokers. By delivering nicotine in smaller and slower doses, e-cigarettes have been found to alleviate cravings for conventional cigarettes (Goniewicz, Lingas, & Hajek, 2013). Although they still contain toxic chemicals such as diethylene glycol, polycyclic aromatic hydrocarbons, and aldehydes, the level of the toxins is much lower than in the standard cigarette (Goniewicz et al., 2013). Research shows that e-cigarette users or smokers either substantially reduced their conventional cigarette use or stopped it completely (Kralikova, Kubatova, Truneckova, Kmetova, & Hajek, 2012). Overall, studies have shown that current smokers were better able to handle their withdrawal after smoking e-cigarettes compared to those who did not (Goniewicz et al., 2013).

Negative Aspects

Although many e-cigarette companies portray their products as a healthier alternative to smoking cigarettes, public health advocates suggest they serve as starter products for non-tobacco users (Sutfin et al., 2013). A recent study on adolescent cigarette smoker and non-cigarette smoker use of alternative tobacco products found that non-cigarette smokers who used alternative tobacco products showed dependence symptoms similar to those of cigarette smokers (Saunders, & Geletko, 2012). Electronic cigarette smoking among college students is not linked to the desire to quit smoking cigarettes (Sutfin et al., 2013).

Social media could be a large contributor towards the social acceptance of e-cigarettes. One of the major sources of positive attitudes towards e-cigarettes is social media. Many artists endorse the products with their sleek and unique design. A recent study on Twitter indicated a significantly high prevalence of positive sentiment regarding e-cigarette use (Myslín, Zhu, Chapman, & Conway, 2013). The positive attitude the products receive from the public can be a contributor to the increased use of e-cigarettes in smokers and non-smokers.

E-cigarette smoking has increased significantly among adolescents and college students. It is important to recognize the possible consequences of their attitudes and whether or not they are educated on the health risks to which they are being exposed. Studies therefore suggest that electronic cigarettes should be evaluated, regulated, labeled and packaged in a manner that is identifiable to the consumers (Eissenberg, 2010).

Lack of Research

More scientific research is needed to determine whether the e-cigarette is a healthy alternative to conventional smoking (Zhu et al., 2013). Etter (2012) argues that even though the electronic cigarettes were invented in 1993, there is still little research published on health concerns. The current companies have not done much to research the topic due to the fear of documentation on adverse effects (Etter, 2012). Because data on health concerns is lacking, the Food and Drug Administration has tried to control the sale and marketing of e-cigarettes (Zhu et al., 2013). Even with regulation, the easy access to e-cigarettes through the Internet has made it

difficult to regulate e-cigarette sales. The increased consumption of e-cigarettes could be due to the perception that e-cigarettes are clean nicotine devices (Zhu et al., 2013).

With a lack of information about the toxicity and health implications, it is difficult to educate consumers and the FDA on the impact of smoking e-cigarettes. According to Chen (2013), there has been a substantial increase in unregulated e-cigarette products available in the United States. Consumers are not completely aware of how unregulated e-cigarettes are. This could be a health concern due to the unknown short-term and long-term health risks associated with this popular device. According to an FDA summary of electronic cigarettes, serious adverse events include hospitalization for illnesses like pneumonia, congestive heart failure, hypotension, disorientation, seizure, second-degree burns to the face, chest pain, rapid heartbeat, and loss of vision requiring surgery (Chen, 2013).

Hypotheses

The first portion of the experiment focused on comparing the health perceptions of e-cigarettes held by smokers and non-smokers. Using the Elaboration Likelihood Model (ELM) of persuasion (Cacioppo & Petty, 1984), we hypothesized that students who are not smokers may perceive the alternative nicotine products as less harmful than cigarettes and therefore be more likely to use e-cigarettes. We also hypothesize that the conventional cigarette smokers are less likely to perceive the e-cigarettes as less harmful. The ELM argues that the personal relevance of a message influences whether people are persuaded by it. The more personal relevance a message has, the more familiarity and knowledge the person has with the topic (Cacioppo and Petty, 1984). Students who smoke conventional cigarettes are assumed to know more about a product that claims to help cigarette smokers quit. The students who do not smoke have fewer associations with the product and therefore are not as knowledgeable about the possible health risks.

We also looked into the cognitive dissonance theory. This theory predicts that people will change their attitudes when a conflict between behaviors and attitudes causes them to feel dissonance. Former smokers may have removed the inconsistency of cigarette smoking that caused dissonance and have chosen to smoke alternative tobacco products instead. Former or current cigarette smokers may convince themselves that there is

no proof that alternative tobacco products cause health problems, and thereby restore a state of consonance.

For the second study we hypothesized that conventional e-cigarettes would be viewed more negatively than non-conventional e-cigarettes. The second study entails current attitudes towards e-cigarette smoking and introduces the theory of persuasion. Many non-cigarette smokers and smokers are aware of the harmful effects of cigarette smoking, but many are changing their attitudes towards other tobacco products because they are persuaded by the promotions of the tobacco companies. The attractive and unique styles of unconventional e-cigarettes are likely to persuade students to think more positively of them. We can predict that young adults are processing on the peripheral route to persuasion because their attention is not focused on carefully evaluating the arguments that the producers of tobacco products use. We also examine how unknown health issues contribute to the high social acceptance of these alternative tobacco products.

Methods

Participants

Two online surveys were administered to SJSU students. The SJSU-COB participant pool is diverse and includes people with varying real-life experience. Students needed to be over 18 to be included in the study. No other exclusion criteria were used. Participants were recruited using the SONA on-line participant pool system (http://cobsjsu.sona-systems.com/). Members of the participant pool received emails when the study opportunities were posted. They then logged in to their personal account on SONA to view brief titles and descriptions of available studies and the associated researcher.

Perceptions of e-cigarettes

Participants (N = 191) indicated their use of e-cigarettes and their opinions on e-cigarette safety and social acceptability.

Perceptions of e-cigarette style

Participants (N = 81) indicated their use of e-cigarettes, viewed either an e-cigarette that resembled a tobacco cigarette (Figure 1.1) or a pen-like device (Figure 1.2), and then rated the safety and social acceptability of the devices.

Figure 1.1 This figure portrays the conventional-looking cigarettes that were presented to the participants in the second study.

Figure 1.2 This figure portrays the unconventional-looking e-cigarettes that were presented to the participants in the second study.

Materials

Surveys were administered in English via Qualtrics interface.

Results

Results Study 1: Safety

Most of the sample (N = 124) had never used an e-cigarette. Fifty-four had used one casually (15 or fewer times in their lives), and 12 were habitual users (26–50+ times in their lives). Figure 2.1 shows that there were no significant differences between users and non-users for perceptions of second-hand smoke, levels of carcinogens or nicotine, or addictiveness of e-cigarettes compared to tobacco cigarettes. Estimates were quite low, supporting the hypothesis that e-cigarettes are viewed as safe. Non-users viewed e-cigarettes as more harmful over the long term: $F(1,186) = 1.92$, $p = .17$).

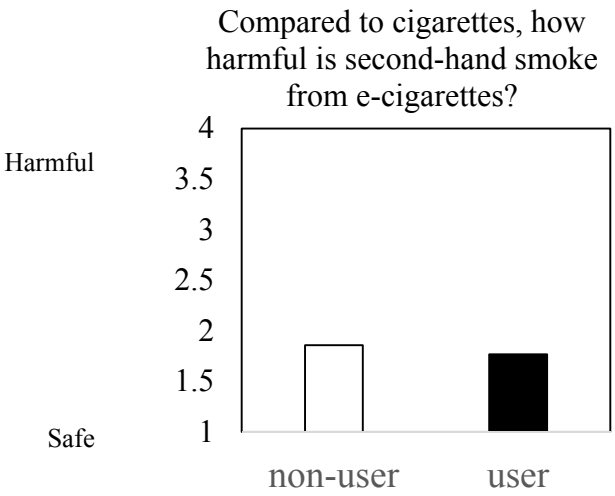

Figure 2.1. Perception of harmfulness of e-cigarette second-hand smoke compared to cigarette smoke.

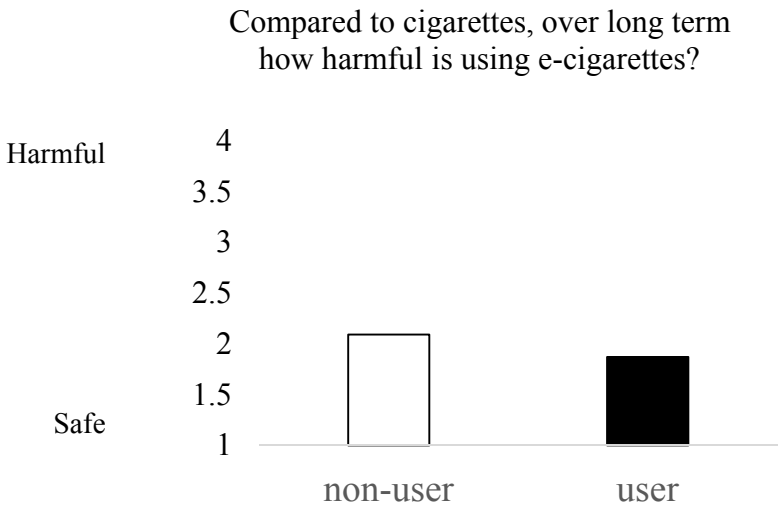

Figure 2.2. Perception of long-term harm of cigarettes and e-cigarettes

Results Study 2: Acceptability

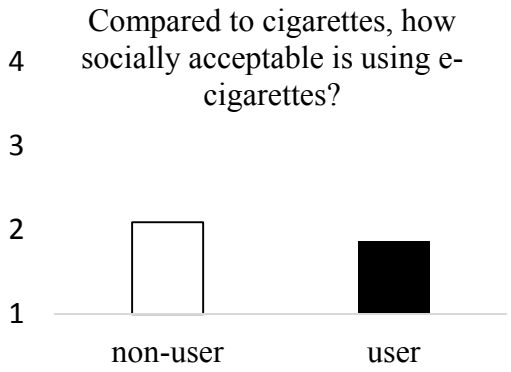

Figure 2.3 shows that non-users viewed e-cigarettes as less socially acceptable, F (1, 185) = 2.04, p = .16) than did users.

As shown in Figure 2.4, participants overwhelmingly believed that e-cigarettes should not be smoked indoors or in class.

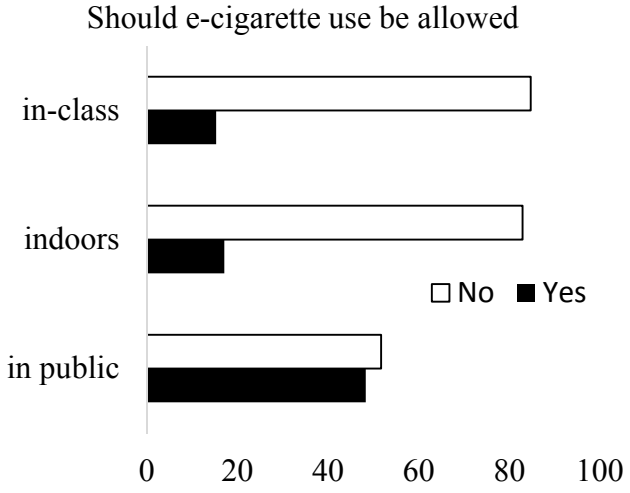

Figure 2.4. Perception of smoking e-cigarettes in class, indoors, and in public.

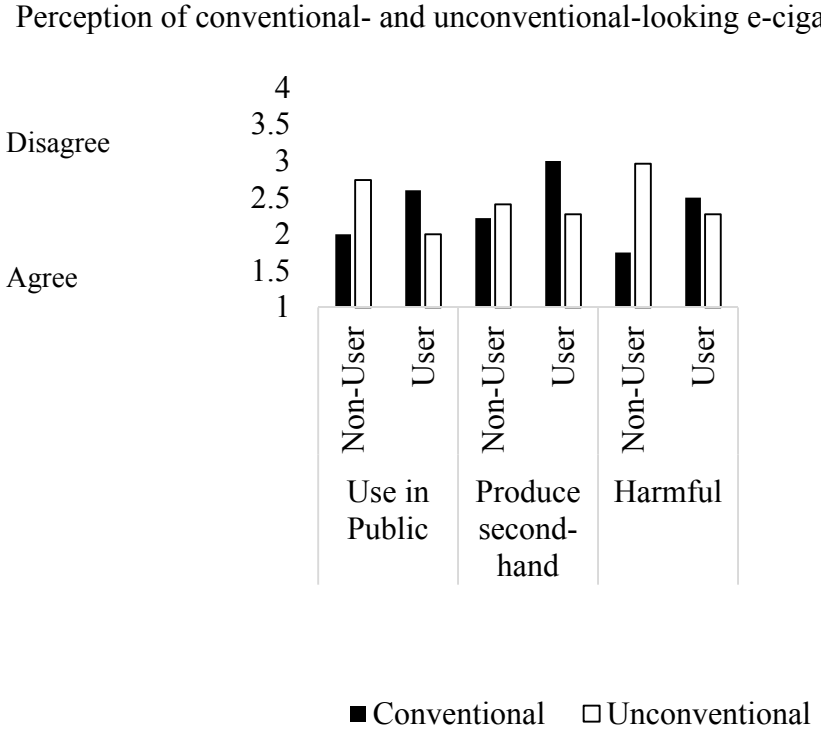

Figure 2.5. User and non-user views of conventional and unconventional e-cigarettes as appropriate for use in public: $F(1,76) = 8.04$, $p = .006$, as producing second-hand smoke, $F(1,76) = 4.23$, $p = .043$, and as harmful, $F(1,76) = 12.25$, $p = .001$

Discussion

As the popularity of smoking e-cigarettes increases, so do the unknowns about the associated health risks. There are numerous studies on the lack of rigorous safety testing and the misunderstood profile of the use of e-cigarettes. The two studies examined here showed differences in perceptions between users and non-users. As expected, non-users did not appear as informed about the effects of e-cigarettes as were users, and users held more positive views about e-cigarettes. In addition, Study 1 revealed that most people view e-cigarettes as less harmful than tobacco cigarettes, as evidenced by the low average rating of harm. Regardless of perceptions of harm and risk, a vast majority of students believed that e-cigarettes should not be used indoors or in class. Study 2 revealed that

perceptions of e-cigarettes also varied by the type of device, such that non-users were more positive towards conventional-appearing e-cigarettes than users were. These results suggest that public knowledge about e-cigarettes is low. What is known may be influenced by company portrayals of e-cigarettes.

Although there is still uncertainty about the health concerns associated with e-cigarettes, there is insufficient authority to enforce regulation of these products. According to the American Journal of Public Health (Paradise, 2014), the 2010 DC Circuit case of *Sottera v. FDA* limited the FDA's authority to regulate e-cigarettes as medical devices or drugs to instances where the company makes health or disease-prevention claims for the merchandise. Companies argue that their products are beneficial because they help conventional smokers quit, but is this product only serving the addicted smokers? Unfortunately, the FDA continues to struggle with how to regulate these products under federal law. Thankfully, despite the claim that e-cigarettes release not smoke, but vapor, 27 states have amended their smoke-free laws to include e-cigarettes (Paradise, 2014). Thirty-four states have also banned the sale of e-cigarettes to minors (Paradise, 2014). E-cigarettes are coming into wider use; therefore, continuing to improve regulation of the appearance and advertisement of these products could alleviate associated health concerns.

Limitations

Certain limitations of the study must be considered for any future research. The sample size that was used was small, which in turn limited the ability to detect effects in the quantitative results. In future studies, data from a larger sample of both conventional cigarette smokers and non-cigarette smokers should be collected. Future studies should look into a population outside the business major as well.

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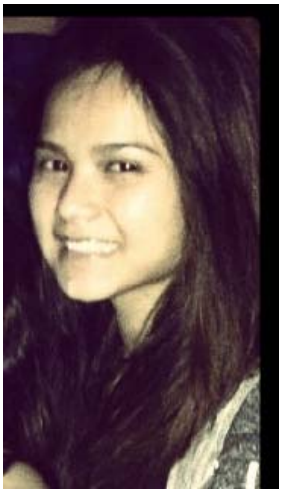

Monita Sieng

Major:
Chemistry, concentration in Biochemistry

Mentor:
Joseph Pesek
Maria Matyska-Pesek

Detection and Separation of Capsaicinoids in Sriracha by HPLC

Biography

Monita Sieng is an undergraduate at San Jose State University majoring in Biochemistry with a minor in Biology. Born in San Jose, California, on November 18, 1992 to Meng Leang Yoa and Thoueth Sieng, she will be the first in her family of ten siblings to receive a Baccalaureate degree. Her passion in the sciences began in her general chemistry course at SJSU under the instruction of Karen Singmaster. It was there that Monita was able to understand the relevance of chemical reactions to everyday life. This sparked an unwavering desire to understand chemistry and apply it to biological systems. Interest in biochemistry was further fueled by the hands-on experience in both chemical and biological laboratories. Participation in the analytical chemistry undergraduate research laboratory has influenced Monita to expand her ambition towards a graduate level education. With a PhD in biochemistry, Monita hopes to research enzymology in relation to cancer pathology and treatment.

Detection and Separation of Capsaicinoids in Sriracha by HPLC

Abstract

A demonstration of the effectiveness of HPLC[97] in determining pungency[98] is provided using Sriracha[99] as the sample. A widely popular hot sauce in San Jose, the signature red bottle, green cap, and rooster can be found in numerous Asian restaurants. Utilized in most Asian cuisines, Sriracha provides a mild source of spicy flavor that suggests the presence of capsaicinoids[100]. Under the guidance of Dr. Pesek and Dr. Matyska at San Jose State University, a fast and effective method of extraction, detection, and separation of four capsaicinoids from Sriracha was developed using HPLC. The capsaicinoids (capsaicin, dihydrocapsaicin, nordihydrocapsaicin, and homodihydrocapsaicin) were extracted from Sriracha by Soxhlet extraction with methanol. Detection and separation of the compounds in the Sriracha sample was performed under reversed phase by HPLC-UV[101] and HPLC-MS[102]. A C18 (4.6 x 75 mm and 2.0 µm 2.1 x 50 mm) column was utilized as the stationary phase for UV and MS detections. UV detection of the compounds was done at 254 nm. The mobile phase consisted of DI water with 0.1% formic acid and acetonitrile with 0.1% formic acid as the organic solvent. A gradient method was applied in the analysis, resulting in clear separation of all capsaicinoids in the sample. Reproducibility and robustness of the separation demonstrate efficiency of the method in less than a 12 minutes of run time.

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[97] High performance liquid chromatography (HPLC): analytical technique to separate, identify, and quantify components in a mixture

[98] Pungency: Spiciness/hotness

[99] Sriracha: Huy Fong's hot sauce made from chili pepper paste, distilled vinegar, garlic, sugar, and salt.

[100] Capsaicinoids: class of compounds of the capsicum family of plants

[101] HPLC-UV: high performance liquid chromatography that uses an ultraviolet detector

[102] HPLC-MS: high performance liquid chromatography that uses a mass spectrophotometer

Introduction

The use of peppers and spice to amplify the taste of food has been a custom throughout time. To characterize levels of pungency from the sweet tasting bell pepper to the dangerously hot habanero pepper, Wilbur Scoville developed a dilution factor in 1912 called the Scoville heat unit (SHU) by having individuals taste diluted samples (1). Due to the inaccuracy of a sensory method of classification, high performance liquid chromatography has been incorporated to provide a more accurate ranking system.

The pungency of peppers and/or sauces is properly defined by the content of capsaicinoids. Capsaicinoids are compounds found in plants belonging to the genus Capsicum and all are similar in structure. However, 90% of capsaicinoids found in hot peppers or sauces are capsaicin and dihydrocapsaicin. The Scoville scale is a function of capsaicinoid concentration, with pure capsaicin measuring in at 16,000,000 Scoville units (2). As it turns out, pure capsaicin is a highly irritant material and must be handled with proper gloves and goggles due to the burning sensation it causes. Therefore, in order to determine the pungency of various peppers and sauces, an efficient method of extraction, detection, and separation of capsaicinoids is required.

Previous research has proposed various methods of capsaicinoid detection. Some methods require the use of fluorescence detection, which can limit the method to those with compatible machinery (3). Another method proposed the use of TLC to separate the various capsaicinoid compounds then subsequently quantify the sample (4). Implementing TLC adds an unnecessary step that can possibly increase the error. An increase in accuracy of capsaicinoid content is achieved through the detection and separation of capsaicinoids by HPLC-MS. One method involves the use of LC-MS with monolithic silica capillaries (2) while another utilized a C18 column under reverse phase conditions (5, 6). HPLC-MS combines physical separation through HPLC and mass analysis through MS that promotes high selectivity of compound identification by the ionized mass of the compound.

The importance of capsaicinoid detection and separation extends beyond pungency classification. As it turns out, many studies have shown capsaicinoids to have beneficial health properties. Early research has experimented with topical treatment of arthritis with capsaicin (7). Other

studies have evaluated capsaicinoids' role as a possible anticancer and chemopreventive agent (8, 9). Due to its vanilloid receptor type 1 (VR1)-independent pathway, capsaicin was thought to induce apoptosis in tumoral cells (10). In a comparative study, capsaicinoids were shown to have a greater effect in killing cancer cells in a culture 100 times more than green tea (11). Capsaicinoids have also been linked to weight loss. Based on 90 trials from a study done by Whiting and associates, capsaicinoid ingestion demonstrated an increase in energy expenditure, increase in lipid oxidation and a reduction in appetite (12). Despite the numerous potential health benefits, research regarding these compounds is limited due to the difficulty of handling pure capsaicin. In order to provide a safe and easy way to quantify and qualify the capsaicinoid content in a sample, HPLC has been applied to develop an efficient and fast method of extraction, detection, and separation of numerous capsaicinoids in Sriracha.

Methodology

The methodology and results of capsaicinoid detection and separation in Sriracha has been developed and analyzed by Monita Sieng with the assistance of Dr. Pesek and Dr. Matyska. The methodology includes choice of materials, instrument parameters, and sample preparation. The corresponding chromatograms were obtained after each run and analyzed accordingly.

Materials

The stationary phases used in this study were Cogent Bidentate C18 material in both a 4.6 x 150 mm column and 2.0 µm, 2.1 x 50 mm column (MicroSolv Technology Corporation, Eatontown, NJ, USA). Both columns were packed with a silica hydride stationary phase, made up of mostly weak hydrophobic Si-H groups. HPLC grade mobile phase solvents and sample preparation solvents were all purchased from Sigma-Aldrich (Milwaukee, WI, USA).

Instrumentation

HPLC-UV. A Hewlett-Packard (Palo Alto, CA, USA) 1050 HPLC system was utilized to detect the sample containing capsaicinoids. This system contained a binary pump, degasser, autosampler, and UV detector set at 254 nm. The mobile phase consisted of a two solvent system with mobile phase A being deionized water (DI H_2O) + 0.1% formic acid (FA), and mobile phase B being acetonitrile (ACN) + 0.1% FA, vacuumed filtered

through a 0.45 μm nylon filter (MicroSolv Technology Corp. Eatontown, NJ, USA). The Sriracha sample was analyzed with a method consisting of a 0.5 mL/min flow rate and 5 μL injection volume. A gradient method was applied to increase retention of the compounds which consisted of 0 min, A 90%, B 10%; 1 min, A 90%, B 10%; 6 min, A 30%, B 70%; 10 min, A 30%, B 70%; 11 min, A 90%, B 10%, with a five-minute equilibration time between injections. The analytical column was 4.6 mm x 150 mm and was packed with the C18 stationary phase (MicroSolv Technology Corporation, Eatontown, NJ, USA).

HPLC-MS. The mass spectroscopy system was an Agilent 6224/6230 TOF LC/MS with ESI. The system was operated under positive ion mode. Two columns were utilized for reproducibility, both Cogent Bidentate C18 material in a 4.6 x 150 mm column and 2.0 μm, 2.1 x 50 mm column (MicroSolv Technology Corporation, Eatontown, NJ, USA). The mobile phase, gradient method applied, and most of the parameters remained the same as the parameters in the HPLC-UV detection of the capsaicinoids. Only the flow rate in the HPLC-MS detection of capsaicinoids in Sriracha was altered to 0.4 mL/min.

Samples

A sample of Sriracha (15.25 g, Huy Fung Foods) obtained from a nearby grocery store was weighed and placed in the oven at 103˚C for three hours to evaporate excess water. The capsaicinoids in the resulting dehydrated Sriracha sample were extracted by a Soxhlet extraction method with 150 mL of methanol as the refluxing solvent. The sample was left refluxing for three days, until the solvent in the thimble was clear. The extracted capsaicinoids in the methanol solvent was gravity filtered and diluted further in a 250 mL volumetric flask with methanol. A 0.45 μm syringe filter (MicroSolv Technology Corp. Eatontown, NJ, USA) was used to transfer 1.0 mL of the stock sample into an HPLC vial for use in all proceeding HPLC-UV and MS runs.

Results and Discussion

Capsaicinoids are the main compounds that contribute to the pungency of hot peppers and sauces. Due to the high irritability these compounds elicit, it is difficult to handle pure capsaicinoids. In order to quantify the concentration of capsaicinoids in samples quickly and efficiently, HPLC was incorporated in the compound detection and

separation. More specifically, a method of HPLC utilizing a UV detector at 254 nm and a C18 column (4.6 x 150 mm) under reverse phase conditions provided an estimation of where these compounds are retained. First isocratic runs were performed on diluted samples with methanol, and then a gradient method was developed. In order to eliminate any error from solvent contribution, a blank was first run on pure methanol under the gradient method as shown in Fig. 1. There were no significant peaks present on the chromatogram.

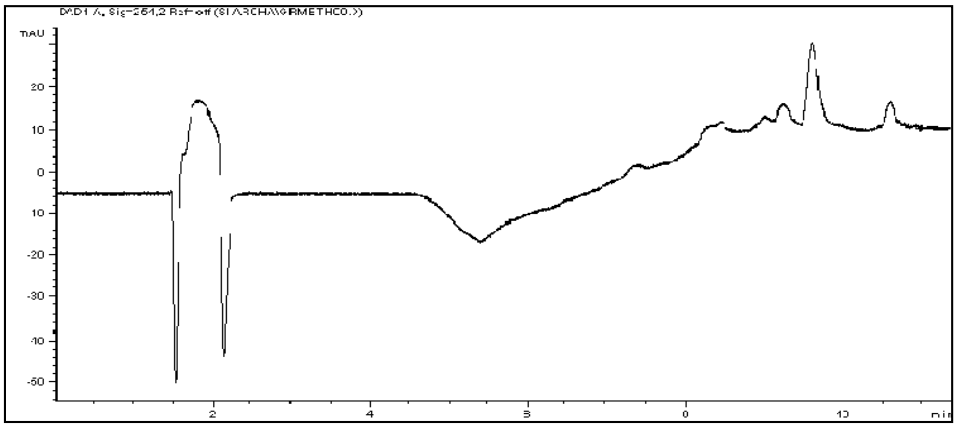

Figure 1: Analysis of solvent: methanol, 1.0 µL injection volume under gradient conditions; 0.5 mL/min flow rate with wavelength 254 nm; Mobile phase composed of DI water + 0.1% Formic Acid and Acetonitrile + 0.1% Formic Acid. 2.1 mm x 50 mm C18 column.

A sample containing the capsaicinoids from Sriracha was obtained through Soxhlet extraction of Sriracha with methanol. After filtration of the extract, the sample was run through the HPLC-UV system at 254 nm. The proposed gradient method was applied to the sample run, resulting in the chromatogram as shown in Fig. 2. There is a large peak retained at approximately 7 min that was not present in the blank run.

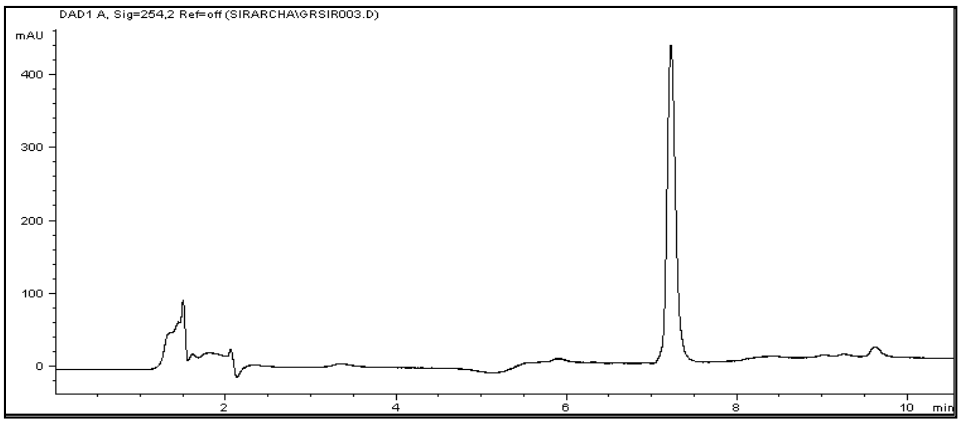

Figure 2: Analysis of Sriracha sample in methanol, 1.0 µL injection volume under gradient conditions; 0.5 mL/min flow rate with wavelength 254 nm; Mobile phase composed of DI water + 0.1% Formic Acid and Acetonitrile + 0.1% Formic Acid. 2.1 mm x 50 mm C18 column.

In order to confirm that the identity of the peak corresponds to the capsaicinoids, the blank was subtracted, as shown in Fig. 3. The large peak approximately at 7 min remained unchanged after the subtraction.

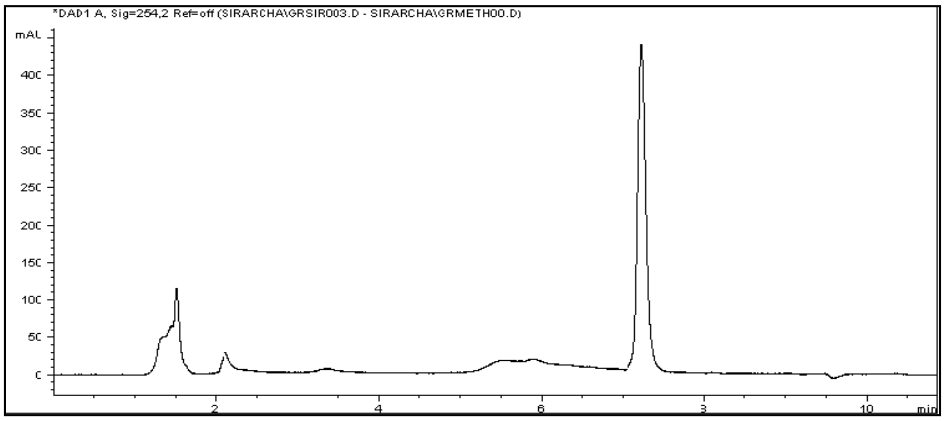

Figure 3: Analysis of Sriracha sample in methanol with subtraction of solvent: methanol,1.0 µL injection volume under same conditions as Figure 1 and 2. There are no major peaks corresponding to the solvent which infers the peaks present are from the capsaicinoids in the Sriracha sample.

Now that the gradient method has resulted in a desired retention time of the capsaicinoids, the sample and method was transferred to the HPLC-MS system in order to promote separation. Using the same C18 column (4.6

x 150 mm), sample, gradient method, and mobile phase as the HPLC-UV runs, the chromatogram resulted in four identifiable separate peaks as shown in Fig. 4A. Each peak was identified based on the specific mass each compound positively ionizes to. To eliminate the possibility of error, the method was repeated on a C18 column with different dimensions (2.0 µm, 2.1 x 50 mm) as shown in Fig. 4B. Despite the change in column, the chromatogram resulted in peaks consistent with the previous chromatogram.

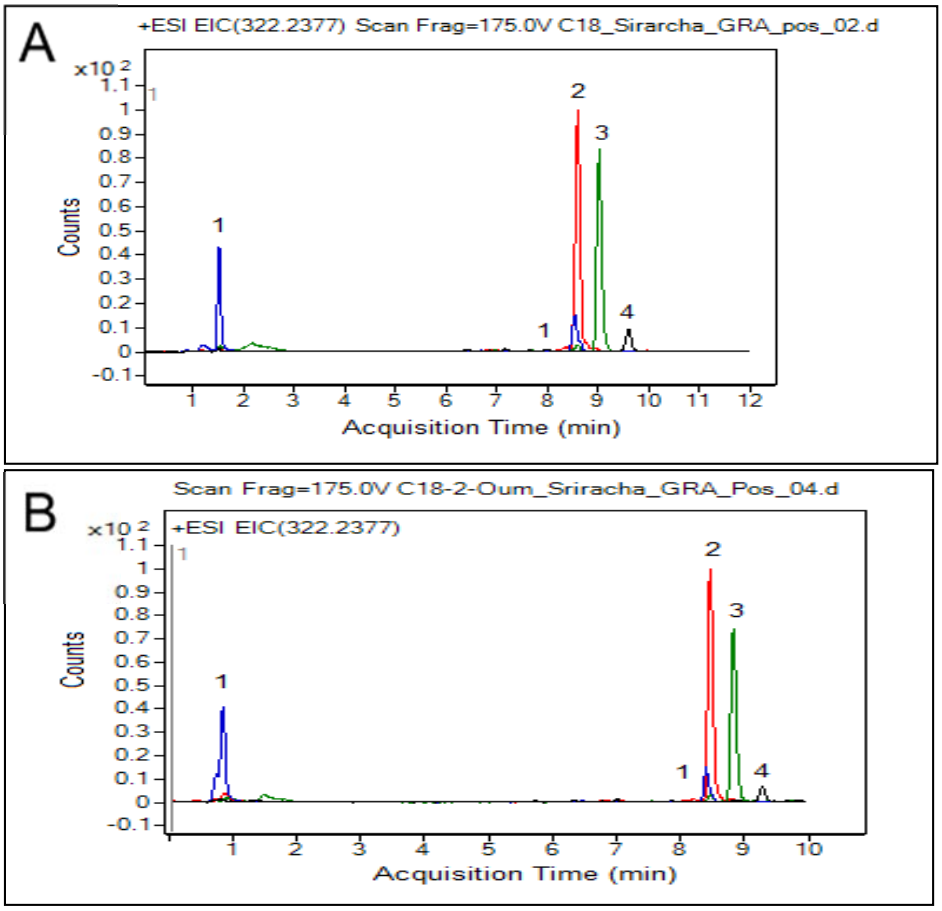

Figure 4: HPLC-MS analysis of Sriracha sample in the positive ion mode. The same gradient condition was applied with 1.0 µL injection volume, and 0.4 mL/min flow rate. Mobile phase composed of DI water + 0.1% Formic Acid and Acetonitrile + 0.1% Formic Acid. The masses corresponded to nordihydrocapsaicin (1), capsaicin (2), dihydrocapsaicin (3), and homodihydrocapsaicin (4). Two different columns were utilized, both presenting similar results. A: BD C18, 4.6 x 150 mm; B: BD C18 2.0 µm, 2.1 x 50 mm

Given these results, it is apparent that the proposed method efficiently and effectively demonstrates detection and separation of four capsaicinoids in Sriracha. This method was easily transferrable from HPLC-UV to HPLC-MS with only a slight alteration of flow rate. As mentioned before, these compounds not only provide the spiciness in many sauces and peppers, but have potential anticancer, weight loss, and anti-inflammatory properties (13). Due to the irritability of handling pure capsaicinoids, working with these compounds is difficult. The overall run time was less than 10 minutes, providing a fast way to quantify the concentration of capsaicinoid in samples. However, there are still many limitations of this method that need further study. To provide a greater measure of capsaicinoid concentration, this method should be applied to actual standards at serial dilutions. By doing so, a calibration curve can be made which can give a better estimate of the capsaicinoid concentration. Other samples can be tested to verify the reproducibility of this method such as different sauces and/or peppers.

Conclusion

The resulting chromatograms suggest effective detection and separation of capsaicinoids in Sriracha. Reproducibility of results in two different columns also provides support for the efficiency of both extraction and separation methods. Soxhlet extraction provides a quick and easy method of extracting capsaicinoids without wasting solvent. This method can be utilized to test peppers and sauces to enable accurate ranking on the Scoville scale of pungency. Capsaicinoids are a main source of pungency and provide many possible health benefits. The ability to detect and separate these compounds is necessary to better understand them. This application of HPLC-MS in the detection and separation of capsaicinoids can therefore be utilized to promote further research and discovery.

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Dejaunique Thomas

Major:

Child and Adolescent Development

Minors:

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Mentor:

Dr. Ruth Wilson

I See the Dark: A Closer Look at Black Female Identity

Biography

Deja Thomas is a graduating senior majoring in Child and Adolescent Development with minors in Psychology and Sociology. Having seen the negative outcomes of the academic achievement gap, Deja plans on better serving Black and Latin students and fighting education inequality. During Deja's tenure at San Jose State University she has been awarded twice as a Dean's Scholar, joined the McNair Scholar's Program, and served as Director of Programming for the Black Scholars Society. On May 23, 2015 she will graduate cum laude from SJSU and go on to pursue a PhD in Educational Policy with a focus on equity and justice for minority and poor students in the United States. This article is dedicated to her mother Debra, her brother Eduardo Jr., and her father Eduardo, may he rest in peace.

I See the Dark: A Closer Look at Black Female Identity

Abstract

The research article examines factors such as school experiences, the media, societal labels, and obstacles based on race and how they affect the development of collegiate Black/African American female identity. The study involved seven San Jose State University (SJSU) students who answered three questionnaires and participated in an interview. Although SJSU is a university known for its diverse student population, only 3% of its students identify as Black/African American. Therefore, some students may struggle with their sense of ethnic identity. The seven participants shared their experiences with coming to terms with their racial identity in order to contribute to existing knowledge about Black female identity.

Keywords: Black identity, female identity, societal labels, family and school experiences.

Background/Introduction

Black/African American female identity development is an important issue for a number of reasons. Being a Black/African American person in the United States is often burdensome because of the constant feeling that one is in a theatre waiting to perform a certain role, positive or negative. Similarly to being a woman, one cannot hide being Black/African American, and this combination has created a complex spectrum of ideas to explore. The study examined how female students break down their identity as Black women in the context of higher education. The main objective was to uncover which factors play a role in how college women identify as Black/African American. The research topic on the identity issues of race and gender will contribute to the field because the information will be coming from an educational setting. What does it mean to be a Black female in today's college setting, and how has that shaped them to be the persons they are today?

I explored some of the common stereotypes in the Black community, particularly how the media portrays Black females, and other topics dating from the 1960s to the present and how they have shaped the social construct of what it means to be African American or Black. The historical construction of race is important to cultural psychology. This

study examines the cultural psychology of Black women and how the university experience along with the media and childhood experiences can shape Black women's development. The goal of the project was to learn from experiences that these collegiate Black women have faced and see how they came to terms with their racial/ethnic identity.

Literature Review

A majority of the existing research in the field of cultural psychology compared Black women with women of other races/ethnicities. For example, one study compared Black women to White women in the workforce and examined how dominating personalities are perceived (Livingston, Rosette, & Washington, 2012). The study showed that White women were perceived more negatively when they displayed more dominating behaviors compared to Black women (Livingston, Rosette, & Washington, 2012). This study will be useful in my research because society does not portray the Black female leader in a positive light. Another significant study by Hesse-Bieber, Livingston, Ramirez, Barko, & Johnson (2010) discussed how Black women came to terms with their racial identity and body weight if they attended a predominantly White university. They explored women's unique experiences when they entered college and how that shaped the persons they became. The women who were interviewed all had different results; however, their outcomes were primarily based on their childhood experiences. For example, some felt more included at White universities if they were raised in White areas; others who were raised in Black areas felt more excluded. Some had a mixture of the two as well, and this had a great impact on their personal body image and how they wore their hair. A similar study looked at Black women who were performing well academically in high school and examined how they "suppressed" their racial identity to avoid being seen as less competent than other students (Marsh, 2013). Questionnaires and interviews were used to determine when and how these women expressed their Black identity both inside and outside of the classroom (Marsh, 2013). The research suggested that although these women suppressed their racial identity in the classroom, outside the classroom, through school clubs and in their neighborhoods, they were more comfortable with their blackness (Marsh, 2013). Lastly, a study that examined ethnicity and dissatisfaction with body image compared collegiate White and Black women (Baugh, Mullis, R., Mullis, A., Hicks, & Peterson, 2010). The researchers used the Multigroup Ethnic Identity Model, the Body Dissatisfaction Subscale of the Eating Disorders

Inventory, and the Contour Drawing Rating scale to measure ethnic identity and body image. No correlation between ethnicity and body image dissatisfaction was found, although White women seemed to be less satisfied with their body types than were Black women (Baugh et al., 2010).

Other research focuses mainly on the perceived stereotypes of Black women and how these affect them in everyday life. Shelton (1997) took a close look at how Black women are portrayed in urban videos. The article described not only negative images of Black women, but also how female rappers are viewed in comparison to male rappers. Another study concentrated on Black women viewing themselves as either invisible or hypervisible (Mowatt, French, & Malebranche, 2013). This study connected Black feminists' theories with the ways that Black women perceive themselves (Mowatt, French, & Malebranche, 2013). In addition, Jones and Osborne-Lampkin (2013) researched the socialization techniques and issues that female Black scholars consider most important when going into the workforce. They found that most of the participants felt creating a community for Black female scholars and building confidence were the key socialization issue to improve on, considering the lack of Black representation in the media (Jones & Osborne-Lampkin, 2013).

Lastly, a few studies have highlighted the development of Black female identity in a school setting. Research done in South Africa found that Black students tended to perform better in predominantly Black schools because they are less likely to fall victim to stereotypes (Toni & Oliver, 2004). The study examined how Black females attending predominantly White universities in South Africa undergo a possible identity change (Toni & Oliver, 2004). Another study examined how African American and Black females evaluated each other's sense of Blackness in academia (Murray-Johnson, 2013). Robinson (2013) focused on Black female tokenism in graduate school. Although tokenism is a concept mostly associated with collegiate Greek organizations, Robinson's work integrated how Black women deal with being a "token" in graduate programs and how they learn when to suppress or combat the internalized oppression they faced every day (Robinson, 2013).

Methodologies

Participants and Study Design

Demographics. The seven participants self-identified as Black or African American females and were between the ages of 18 and 25. Two of

the participants were mixed (identified with another ethnicity/race other than Black), five are graduating seniors, one is in her third year, and the other is in her second year. The participants all attend San Jose State University (SJSU), and some are involved with organizations that serve the Black community at SJSU. Choosing women who are involved with cultural organizations on campus was useful because they already have some pre-existing knowledge of challenges that Black women face, and they would be more likely to discuss the issues further.

Procedure. The participants completed three questionnaires based on ethnic identity and participated in private interviews. They had the opportunity to take the questionnaire home and answer it in an environment in which they were most comfortable. The questionnaire should have taken no longer than 30 minutes to fill out. The questionnaire was modeled on the Likert Scale designed by psychologist Rensis Likert (1932). Two of the participants were interviewed together due to time constraints. The interview portion of the study took no longer than 90 minutes per participant. The participants' responses were recorded by computer. Pseudonyms were used to protect their identities. The total time each participant spent for the entire study was approximately two hours. The study took place between October and December of 2014.

Materials. The first questionnaire used in the study was the Multigroup Ethnic Identity Measure (MEIM) designed by Jean Phinney (1992) of California State University, Los Angeles. This questionnaire assessed ethnic identity search or ethnic identity belonging. The second questionnaire was the Identity Development Model for African Americans developed by William E. Cross Jr. (1971) of the University of Denver. The last questionnaire is the Deja Thomas Identity Measure for Black Women (unpublished). This measure focuses on Black identity and past experiences.

Measures

Identity Development. The four questions on the Cross Identity Development Model for African Americans indicate which identity stage the participant is in. Question 1 refers to Stage 1: Pre-Encounter. Question 2 refers to Stage 2: Encounter. Question 3 refers to Stage 3: Immersion/Emersion. Question 4 refers to Stage 4: Internalization. A score

of 3 or 4 indicates the stage(s) the participant is in, while a score of 1 or 2 indicates that the participant is not in that stage.

Scores between 48 and 37 on the Multigroup Ethnic Identity Development Model indicate that participants have developed a strong sense of pride in being Black and are comfortable with their Blackness. Scores between 36 and 25 indicate that participants understand and accept their Blackness and have a moderate sense of pride about being Black. Scores between 24 and 13 indicate that participants may not have developed a strong sense of pride with their Blackness and may want to distance themselves from it. Scores between 12 and 1 indicate that participants have not developed a strong sense of pride in being Black and they are not comfortable with their Blackness. Note that individuals' responses on the questionnaire may be different than the responses they gave in the interviews.

Family and Schooling Experiences. Scores of 3 and 4 on questions 1, 2, and 3 indicate that family and schooling have an impact on identity. Scores of 1 and 2 on these questions indicate that family and schooling has a weak impact on identity. The scores on these individual questions were averaged to determine impact. Note that individual's responses on the questionnaire may be different than the responses they gave in the interviews.

Society. Scores of 3 and 4 on questions 4–9 and 11 indicate that society has an impact on identity. Scores of 1 and 2 on these questions indicate that society has a weak impact on identity. The scores on these individual questions were averaged to determine impact. Note that individuals' responses to the questionnaire may be different than the responses they gave in the interviews.

Media. Scores of 3 and 4 on question 10 indicate that media has a weak impact on identity. Scores of 1 and 2 indicate that that media has a strong impact on identity. The scores on these individual questions were averaged to determine impact. Note that individuals' responses to the questionnaire may be different than the responses they gave in the interviews.

Quantitative Results

Identity Development Model for African Americans

- Three of the seven participants were in the Pre-Encounter Stage
- Three of the seven participants were in the Immersion Stage
- Five of the seven participants were in the Internalization
- Six of the seven participants were in the Encounter Stage
  (Note that participants can be in more than one stage at a time.)

Multigroup Ethnic Identity Measure

Scores on the MEIM ranged from 48 to 37, indicating that participants had a strong sense of pride in being Black and they are comfortable with their Blackness. The table below shows the individual scores on the MEIM questionnaire.

Francesca	37
Alyssa	39
Elizabeth	39
Scarlet	40
Shamika	41
Ashton	43
Jasmine	45

The Deja Thomas Identity Measure for Black Women

Family and School Experience. Six of the seven participants stated that family and school had a strong impact on identity, while one of the seven stated that family had a weak impact on identity.

Society. Four of the seven participants stated that society had a strong impact on identity; the other three participants stated that society did not have a strong impact on identity

Media. Five of the seven participants stated that the media had a strong impact on identity; two of the seven participants stated that the media had a weak impact on identity.

Qualitative Results

The qualitative results are based on the interview portion of the Deja Thomas Identity Measure. The eleven questions of that measure broadly represented the following three subtopics: school experiences, obstacles due to racial identity, and societal labels. Below are a few of the responses related to each subtopic.

School Experiences

Question 3 asked participants whether or not their experiences in K–12 schooling helped shape their identity.

Case 1, Elizabeth: "No, in K–12 I was more confused than anything because I felt there was a distinction between [Black and White]. I had to fit into one of the two, but post high school I got out of the notion that I had to fit in one of those categories."

Case 2, Alyssa. "No, I don't think they helped shaped my identity because even though I grew up with a lot of White kids, I never felt like the odd one out. No one saw me as 'less than' because of my color; it was obvious that it was but it wasn't ever a big deal."

Case 3, Ashton. "Yes. I didn't know that I was trying to be White until I got to high school and other Black kids started telling me that I was trying to be White; I was too White for the Black kids, and too Black for the White kids."

Societal Labels

Question 1 asked participants whether or not they believed there was a difference in the terms African American and Black.

Case 4, Scarlet: "Yes, I think people use them interchangeably; I go back and forth myself. Black is seen as more negative. For myself, Black is almost the new age and African American is what has been in the country

for years."

Case 5, Alyssa: "Yes, I would classify a Black person as being from America or their parents or their grandparents. But I think African American is for people whose parents or grandparents are from Africa, but that is as far back as they should go. I think that Black Latinas should also be recognized as Black, [for example] Dominicans, Cubans, Panamanians."

Case 6, Shamika: "No, there is no difference. They have always been grouped together, so I have been taught that there is no difference between the two."

Obstacles due to Racial Identity

Question 5 asked participants whether or not they believed that Black women must work harder in the workforce compared to women of other ethnic and/or racial backgrounds.

Case 7, Jasmine: "Yes, I feel like people view us in a bad way. We kind of have to go the extra mile to do what we need to do because the media portrays us to be 'ratchet' or violent."

Case 8, Elizabeth: "Yes, I think you have to work harder because historically we are put in situations that are not to our advantage and we have to work against stereotypes."

Case 9, Francesca: "Yes, because a lot of people, even those who claim to be intellectuals, hold on to stereotypes and want to prove you to be ghetto or uneducated. While other minorities may experience that as well, I can't say if it is better or worse than them. As a Black person you have to deal with people who are surprised that you are intelligent or shocked when you speak English properly."

Analysis

Quantitative

Based on the Identity Development Model for African Americans, six of the seven participants were in the Encounter Stage. The Encounter Stage is when one notices that they are ethnically different. This typically occurs when an individual is placed in a majority White setting and begins to challenge the cultural perspectives of the dominant majority and begins

to accept and reclaim their control from the dominant group. Because the participants of this study attend San Jose State University, a school known for its diversity, it is interesting that the participants were in the Encounter Stage. Although SJSU is not a White majority school, it is also not a majority Black school (the Black population comprises roughly 3% of the overall student population). The participants may feel that Black culture is lacking at the university, thus they began to reclaim their ethnic identity by challenging the non-White norm. An example of this may be simply thinking more critically about the environment around them and how they are affected by it. The Encounter Stage differs from the Immersion Stage, which only three of the seven participants were in. In the Immersion Stage, one becomes more integrated in the Black community, and by doing so, increases the sense of pride in one's Blackness. All of the participants had a score between 48 and 37 on the Multigroup Ethnic Identity Measure, which indicated that the women did have a strong sense of pride and were comfortable with their Blackness. According to the Deja Thomas Identity Measure for Black Women, a majority of the participants felt that family and schooling experiences had the largest impact on identity versus society and the media. These findings correlate with the Encounter Stage because if the participants were raised in Black families or previously attended schools that had large Black populations they may not have realized that they were different ethnically.

Qualitative

Schooling experiences are described as memories of events that occurred while the participant was in school (in this instance K–12). Schooling experiences provide one avenue where people make sense of their ethnic and/or racial identity. Question 3 asked participants whether or not K–12 schooling affected how they identify themselves racially. Alyssa and Elizabeth both stated that their K–12 experiences did not affect them racially, although both noticed that they were racially different than their peers. Elizabeth even expressed the notion that she had to fit into only one racial category and did not have the option of identifying as both. Ashton's experience is one that is commonly felt by Black youth in America: "acting White." Many define "acting White" as pursuing activities that are considered only done by White people. A common example of "acting White" is pursuing higher education. This can be seen as a White activity because historically Blacks did not have equal access to education like their White peers did.

Societal labels in this study are defined as the associations and names given by society, formally or informally, to classify Black/African American women. The majority of the participants do not feel as if they have a choice to identify as Black; it is an identity established by society dependent on physical characteristics. Question 1 asked the women if they felt there was a difference between the terms Black and African American. Scarlet and Shamika focused on society's definition of the terms and only Alyssa addressed the issue of ethnicity. It is not surprising that Scarlet's and Shamika's beliefs stemmed from the definitions set out by society and the media because that is what is highly visible. Lastly, it is common for people to consider race and ethnicity as the same thing, so it is natural for these women to believe there is no distinction between the two terms.

Obstacles due to racial identity are negative issues people might have to overcome because of their racial identification. These obstacles are challenges that may be faced by the individual, or individuals can perceive them as challenges faced by the group as a whole. Three of the participants expressed a belief that Black women do have to work hard to attain success in the workforce. In response to question 5, all participants agreed that a major reason for this is that many employers hold stereotyped views. Having to disprove certain stereotypes can be draining, as one must work hard just to be seen as competent. Only Francesca acknowledged that other minorities may experience this situation as well, but she stated that since she did not belong to those groups she could not comment on their experiences.

Limitations

There were several limitations that must be considered in this study. First the number of participants was relatively small, although this was primarily a qualitative study and it did not seek to answer any particular question, having more participants would have helped diversify the results. Secondly, five of the seven participants were graduating seniors who may have been more familiar with themes relating to the study than the younger participants were. Lastly, all participants attend SJSU, which is not a Predominately White Institution (PWI), the results might had been different if conducted at a (PWI) or a Historically Black College or University (HBCU). Despite these limitations, the overall purpose of having participants share their experiences with Black female identity was met.

Conclusions/Future Research

The findings of this study indicate that there are several factors that contribute to Black collegiate female identity development. According to the quantitative findings, the main factor that influenced Black female identity development was family/school experiences. The qualitative findings were subjective across the board for all participants in all three areas of school, obstacles due to race, and societal labels. In the future, there should be more rigid definitions for the terms Black and African American, as this might yield more precise results. The purpose of the study was to learn from the experiences these women shared about how they came to identify themselves racially. For future research I plan to find possible correlations between identity development, educational attainment, and stereotype threat as they relate to Black women. In order for more effective research to take place, the sample size must be larger and include women from different ethnic groups (for example Afro-Latinos).

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Ada Truong

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California Oil and Gas Well Depth, Productivity, and Water Use

Biography

Ada Truong is a graduating senior majoring in Environmental Studies with a concentration in Environmental Impact Assessment. Ada firmly believes that humans have the right to live in a safe and clean environment, and in order to accomplish this, humans must protect the environment through policy, education, and activism. Her research focuses on various aspects of hydraulic fracturing in California, such as chemical usage, water resources and policy, and environmental health. Ada is an activist for environmental justice and education. She does this through activities such as her work as the Director of the Environmental Resource Center as well as being involved in various student organizations. Ada also works with on- and off-campus organizations such as CommUniverCity, Restore Coyote Creek, Transportation Solutions at SJSU, and many more. Ada will graduate in May of 2015. Her goal is to continue her research in hydraulic fracturing and water resources and to become more experienced in the environmental field.

California Oil and Gas Well Depth, Productivity, and Water Use

Literature Review

Energy Resources, Extraction, and Production

Fossil fuels are primary energy resources and comprise oil, coal, and natural gas. Humans first began to utilize fossil fuels for energy, such as small quantities of coal, in the 1300s, and other fossil fuels, such as oil and natural gas, became more prevalent during the mid-nineteenth century (Bamberger and Oswald 2013, 7). In the 1850s, fossil fuels were first widely used as an energy source for many purposes, such as fueling vehicles and heating the interior of homes (Bamberger and Oswald 2013, 7). Horizontal drilling and hydraulic fracturing was introduced in the 1940s in order to increase the production of natural gas in areas where natural gas and oil were trapped in rocks, but these practices did not become prominent until the 2000s (Bamberger and Oswald 2013, 7). The use of hydraulic fracturing, also known as "fracking," has increased since 2007 (Korfmacher et al. 2013, 15).

In the U.S, "the productivity of oil and natural gas wells is steadily increasing in many basins" due to "increasing precision and efficiency of horizontal drilling and hydraulic fracturing in oil and natural gas extraction" (Krohn and Ford 2014, 1). Domestic natural gas and oil-producing basins include the Bakken Formation, Marcellus Shale, Eagle Ford Shale, and more. Currently, "shale is leading in increased production of natural gas per rig" and has contributed to increasing the country's overall production of oil and natural gas (Krohn and Ford 2014, 1). According to the U.S Energy Information Administration (EIA), the gross withdrawals from shale gas in the U.S in 2007 were 1,990,145 million cubic feet (mcf), whereas there were 11,896,204 mcf of shale gas in 2014, showing a growth in withdrawals (U.S. Energy Information Association 2015a, 1).The number of natural gas wells located in the U.S has also increased over time (Steinzor, Subra, and Sumi 2013, 8). By 2012, there were approximately 490,000 natural gas producing wells, which is 60,000 more wells than in 2005. Natural gas production from shale is projected to increase threefold as well as account for approximately half of all natural gas produced in the U.S by the year 2035 (Entrekin et al. 2011, 503). Domestic production of tight oil, including shale oil, has "increased from less than 1,000,000 barrels per day in 2010 to more than 3,000,000 barrels

in the second half of 2013" (Institute for Energy Research 2014, 1). Oil production is projected to "remain or above 7,500,000 million barrels a day from 2019 to 2040 (U.S. Energy Information Association 2015a, 1).

Process of Hydraulic Frackturing

Hydraulic fracturing is the process of injecting fluids, water, and solids into wells that are drilled into the surface of the earth in order to enhance the amount of natural gas and oil that are extracted from the deep rock formations, such as shale (Korfmacher et al. 2013, 15). Shale is a type of sedimentary rock that mostly comprises clay particles (Arthur et al. 2008, 3). These clay particles are found in areas known as low energy depositional environments, which is where the clay particles fall out of suspension in the water (Arthur et al. 2013). The clay particles were mud deposits that existed in deep water basins or tidal flats along with organic matter, such as animal debris, plants, and algae (Arthur et al. 2013, 15). Natural gas produced from shale formations are composed mostly of methane gas, but it also contains more complex and valuable hydrocarbons (Arthur et al. 2008). Hydraulic fracturing requires injecting large quantities of water, sand, as well as chemicals under high pressure to fracture the shale rock (Bamberger and Oswald 2013, 7). The sand acts as a proppant, which is used to keep the fractures in rock open (Bamberger and Oswald 2013, 7). Proppants are defined as "size-graded, rounded, and nearly spherical white sand, ceramic, or man-made particles which are suspended in pressurized fluid" (Maule et al., 2013, 168). Many different chemicals are used in the process including anti-corrosives, gel-inhibitors, carrier fluids, and biocides, which may contain safe and/or highly toxic chemicals (Bamberger and Oswald 2013, 7). This process requires a drill that first moves downward and then horizontally in order to extract more gas or oil (Bamberger and Oswald 2013, 7). Hydraulic fracturing processes require drilling a vertical well that is approximately 5,000 to 9,000 feet in depth into a shale formation. The drill then extends perpendicular to the base of the well in a horizontal direction as much as 10,000 feet. Once the drilling of the wells is completed, they are lined by steel pipes and are put into place using cement. Once placed, the base of the well is perforated both through the steel and cement. The holes allow the highly pressurized fluid and proppant mixture to leave the pipes, which will create fractures to the shale surrounding the area. Those fractures release the natural gas and oil that were previously trapped in the shale back into the well and to be captured at the surface level (Maule et al., 2013, 168).

Environmental Risks

Environmental risks from hydraulic fracturing processes include potential impacts to water supplies, water quality, air quality, land use, biodiversity, and global climate change (Entrekin et al. 2011, 504). There is a lack of data regarding hydraulic fracturing practices (Thompson 2012, 556). Environmental risks are associated with the fracking fluids used in the extraction process that consist of mostly water, sand, and chemical additives (Thompson 2012, 556). The chemical additives are present in order to prevent corrosion of transport pipes as well as the growth of harmful bacteria (Mooney 2011, 82). Subsequently, wastewater or flow-back water is produced after the injection occurs and the initial fracking fluid and groundwater have mixed and flow back to the surface level, where the wastewater contains radioactive elements (Thompson 2012, 557). This wastewater is stored in pits on the surface level and transported in trucks to be treated, but it poses a public health risk due to the contaminants in the water and its potential for leaking (Thompson 2012, 557).

Water quality is largely impacted by hydraulic fracturing due to water contamination from the chemicals that are used (Entrekin et al. 2011, 504). The chemicals used in hydraulic fracturing can affect the entire surface water ecosystem in which the well is located, which could lead to other environmental and health-related issues (Entrekin et al. 2011, 504). Approximately 25% to 100% of all the fluids used in the hydraulic fracturing process could potentially return to the surface, which would then be considered as produced fluids that contain chemicals such "heavy metals, salts, and naturally occurring radioactive material from below ground" (Korfmacher et al. 2013, 16). Improper well casing can also allow natural gas to contaminate underground aquifers and wells, which poses a public health risk because ground water is a drinking water resource (Argetsinger 2011, 331).

Hydraulic fracturing also has a negative impact on air quality (Argetsinger 2011, 336). The process can require thousands of trucks to transport and deliver hundreds of thousands to millions of gallons of water as well as other materials, such as sand and a variety of chemicals (Argetsinger 2011, 336). There are also many trucks that transport hundreds of thousands of pounds of sand that is used as a proppant. Crystalline silica is one of the main types of sand used in hydraulic fracturing, and it has been identified as a carcinogen (Korfmacher et al. 2013, 19). The entire process of hydraulic fracturing requires a substantial amount of energy from the

initial drilling of the well to the final stage of gas production (Argetsinger 2011, 336). Energy is provided by "generators, compressors, high powered mobile diesel engines, and condensate tanks, as well as flaring, and venting techniques," all of which produce greenhouse gases, volatile organic compounds, and particulate matter that can cause respiratory illnesses (Argetsinger 2011, 336). Extracting natural gas from shale formations is also thought to produce more methane gas, which could result in a large greenhouse gas footprint, further contributing to global climate change (Entrekin et al. 2011, 504).

Water and Fossil Fuel Extraction

Water is essential for sustaining life and is also interconnected with energy (Scown, Horvath, and McKone 2011, 2541). Due to its high specific heat capacity, water is very versatile and "useful for transporting heat in power generation, industrial, domestic, and commercial applications" (Scown, Horvath, and McKone 2011, 2541). In the U.S, 49% of freshwater withdrawals are used for thermoelectric power generation (Scown, Horvath, and McKone 2011, 12386). In a study conducted on hydraulic fracturing for oil in the Bakken Formation and Eagle Ford shale, oil extracted from both areas accounted "for two-thirds of U.S unconventional oil production in 2013" (Scanlon, Reedy, and Nicot 2014, 12386). Unconventional sources require more materials and energy to extract (King and Webber 2008, 7866). In terms of water use for fossil fuel extraction, "about twice as much is used per unit of energy (water-to-oil ratio) in oil" when compared to water used for gas extraction (Scanlon, Reedy, and Nicot 2014, 12386). The study suggests that more water is used because hydraulic fracturing processes have increased oil production rather than the processes using more water for each unit of oil produced (Scanlon, Reedy, and Nicot 2014, 12386).

California Natural Gas and Oil Wells and Production

According to the U.S Energy Information Administration, the number of producing gas wells in recent years, also shown in Figure 1, resulted in 1,645 wells in 2008, 1,643 wells in 2009, 1,580 wells in 2010, 1,308 wells in 2011, 1,423 wells in 2012, and 1,346 wells in 2013 (U.S. Energy Information Association 2015b, 1).

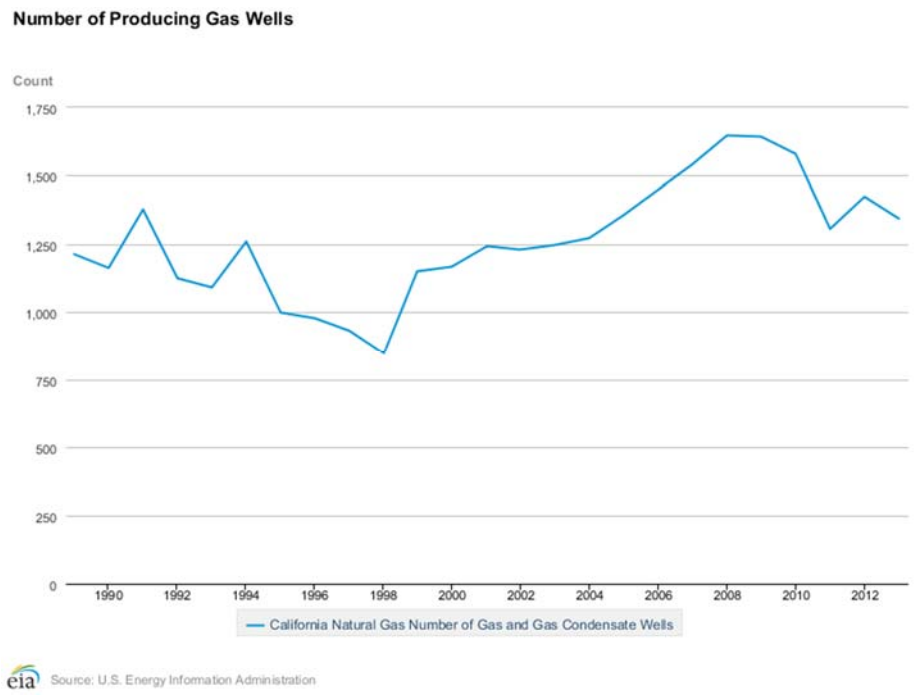

Figure 1: Number of producing gas wells in California from 1989 to 2013.

In terms of the natural gas production of California wells, from 2007 to 2014 there was an upward growth trend for natural gas withdrawals, also shown in Figure 2 (U.S. Energy Information Association 2015a, 1).

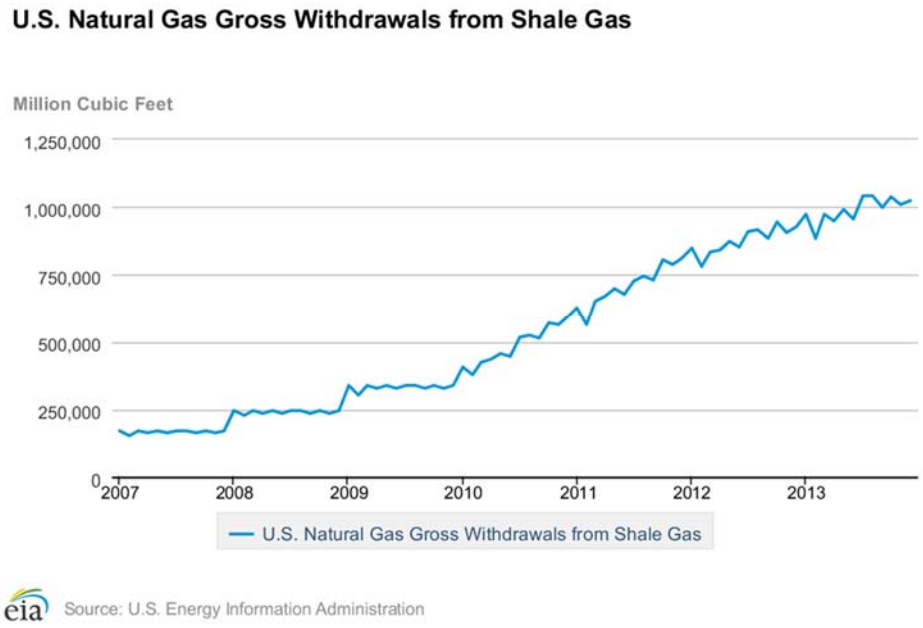

Figure 2: U.S Natural gas gross withdrawals from shale gas.

The gross withdrawals for shale gas from 2007 to 2013 are shown in Figure 3. In 2007, the total withdrawal of 2007 was approximately 1,990,147 mcf, whereas the withdrawal was approximately 11,896, 204 mcf by 2013 (U.S. Energy Information Association 2015a, 1).

U.S. Natural Gas Gross Withdrawals from Shale Gas (Million Cubic Feet)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2007	169,026	152,669	169,026	163,574	169,026	163,574	169,026	169,026	163,574	169,026	163,574	169,026
2008	243,084	227,401	243,084	235,243	243,084	235,243	243,084	243,084	235,243	243,084	235,243	243,084
2009	336,186	303,652	336,186	325,341	336,186	325,341	336,186	336,186	325,341	336,186	325,341	336,186
2010	406,673	375,550	423,948	433,217	454,828	444,215	516,703	522,784	513,320	572,200	562,774	590,909
2011	626,998	562,261	652,767	669,549	700,130	679,587	729,338	744,380	731,041	806,763	787,075	811,094
2012	850,081	779,826	836,494	842,792	875,482	851,601	911,084	918,391	886,755	944,911	907,216	928,226
2013	976,547	884,078	975,987	950,399	992,309	957,216	1,042,301	1,041,523	1,001,068	1,040,841	1,009,186	1,024,749
2014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	

Figure 3: U.S Natural gas gross withdrawals from shale gas monthly from 2007 to 2014.

California Drought and Natural Gas Generation

In 2014, California governor Jerry Brown declared that the state was in a period of drought, signifying the severity of California's water resource issues. As of September 30, 2014, approximately 58% of California was experiencing exceptional drought, which is the most severe category of drought. As a result of diminishing water resources in California, the dependency of hydropower for electricity generation

shifted towards other energy resources, such as solar power and natural gas (Bowman 2014, 1).

Well-depth and Water Use

The depth of wells that are fracked can be up to 9,000 feet (Maule et al., 2013, 168). The depth of crude oil, natural gas, and dry exploratory wells that have been drilled in the U.S from 1949 to 2008 have varied and is shown in Figure 4. The average well depths for this time period have ranged from 3,842 feet to 7,110 feet (U.S. Energy Information Association 2014c, 1). Although there are many data on the depth of wells, there is little information on its relationship to water consumption.

U.S. Average Depth of Crude Oil, Natural Gas, and Dry Exploratory Wells Drilled (Feet per Well)

Decade	Year-0	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9
1940's										3,842
1950's	3,898	4,197	4,476	4,557	4,550	4,632	4,587	4,702	4,658	4,795
1960's	4,770	4,953	4,966	5,016	5,174	5,198	5,402	5,388	5,739	5,924
1970's	5,885	5,915	6,015	5,955	5,777	5,842	5,825	5,798	5,978	5,916
1980's	5,733	5,793	5,597	5,035	5,369	5,544	5,680	5,563	5,917	5,769
1990's	6,076	6,015	5,930	6,037	6,190	6,141	6,520	6,790	7,110	6,814
2000's	7,056	6,836	6,792	6,744	6,579	6,272	6,187	6,247	6,322	

Figure 4: U.S average depth of crude oil, natural gas, and dry exploratory wells drilled from 1949 to 2008.

Methodology

Problem Statement

As fracking moves towards tapping into new oil reserves, there is little information regarding the amount of water used per unit of energy that is produced. As fracking moves deeper into oil reserves, there is also little information about whether deeper oil wells use more water in the extraction process.

Research Questions

The purpose of this research is to determine the relationships between various factors regarding the extraction process and the variables of production. Do deeper oil wells require more water? Do more productive wells use more water? Is the productivity of the well, in terms of the amount of water required to frack per unit of energy, affected by the well depth?

Data Collected

The data collected for this research were primarily focused on water in order to better understand water use for fracking for oil per unit of energy. The chemical usage data of the hydraulic fracturing wells were collected

from publicly disclosed online sources. FracFocus Chemical Disclosure Database provides data in which gas and energy companies voluntarily disclose the chemical usage data of wells; however, disclosing chemical usage for wells on this database is not required by law and is also unregulated. The FracFocus database discloses information about each well in regards to its name, API number, location, true vertical depth, total water usage in gallons, as well as the percentages or weight of every chemical used. From the FracFocus database, information was collected for 1,625 hydraulic fracturing wells located in California, mostly consisting of vertical wells, which were active during the period of January 30, 2011 to April 4, 2014 (Figure 5). Data were also collected from the Department of Conservation's Division of Oil, Gas, and Geothermal Resources database, which provides government regulated data for the production output of each well in terms of the amounts of oil, water, and natural gas. This database was used to cross-reference the same wells disclosed in the FracFocus database in order to compare the well information and resource inputs and well outputs.

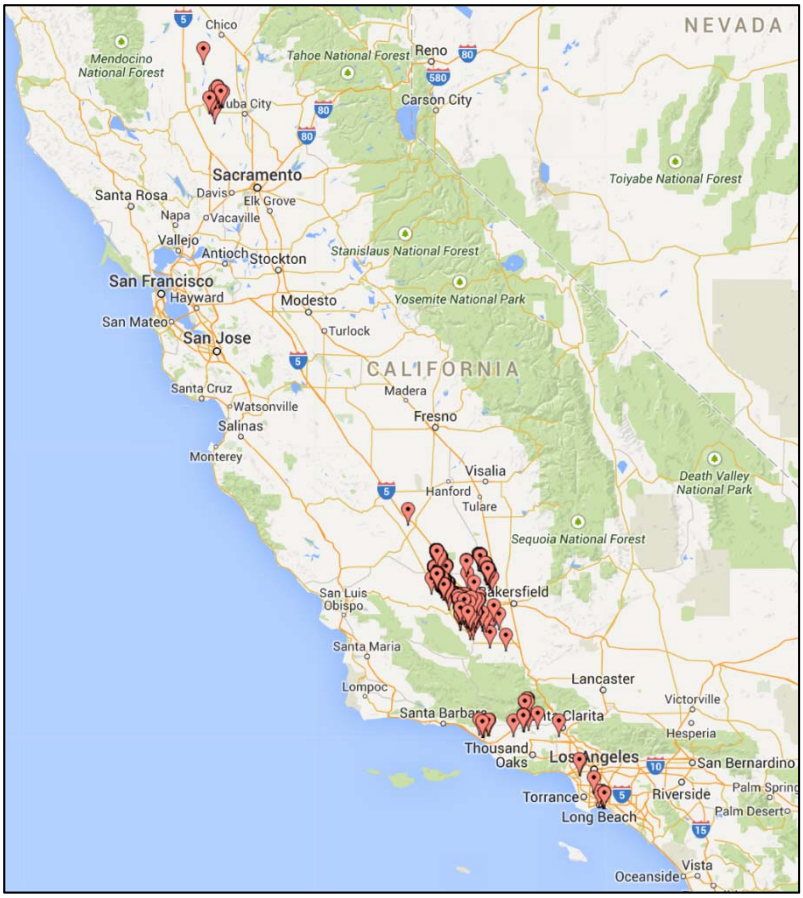

Figure 5: Map of California hydraulic fracturing wells where data were collected, generated by Batch Geo.

Results

Well Data

Of the 1,625 hydraulic fracturing wells for which data were collected, varying numbers of wells were statistically analyzed according to data availability for all variables. Data analyzed include true vertical depth (feet), total water volume (gallons), and energy produced (barrels of oil).

True Vertical Depth and Water Usage

The true vertical depth (feet) indicates how deep the hydraulic fracturing well is being drilled. The total water volume (gallons) indicates the total usage of water for the resource extraction process. When the true vertical depth and total water volume of the 1,540 wells were analyzed, p-

value = 3.40072 $\times 10^{-75}$, where $\alpha = 0.05$, resulting in a statistically significant correlation where $R^2 = 0.19665$.

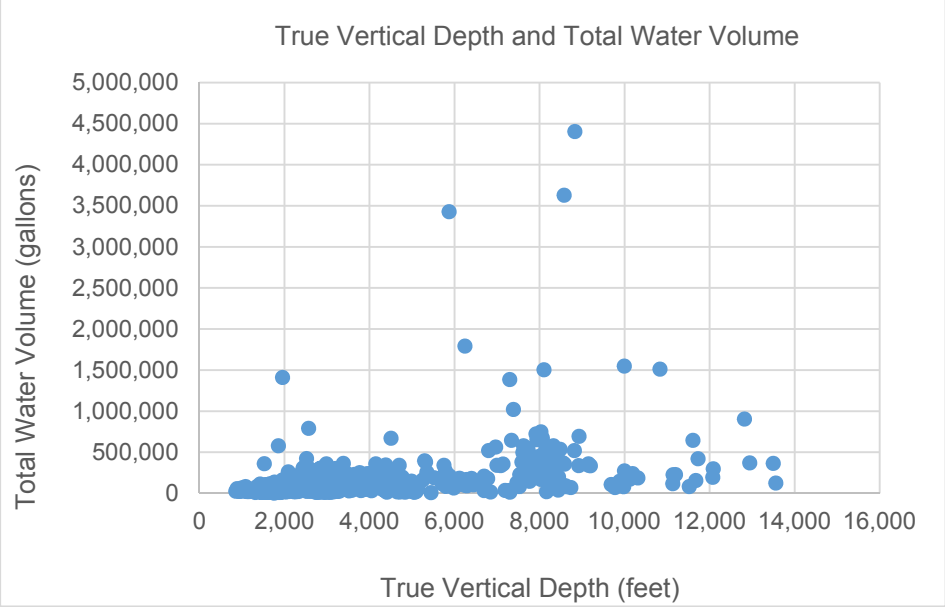

Figure 6: True vertical depth and total water volume.

Well Productivity and Water Usage

Well productivity is measured by the amount of oil (barrels) that are extracted from the fracking process. In comparison with total water usage (gallons) for 1,150 wells, p-value = 0.28071, where $\alpha = 0.05$, showing a statistically significant result and where $R^2 = 0.14162$.

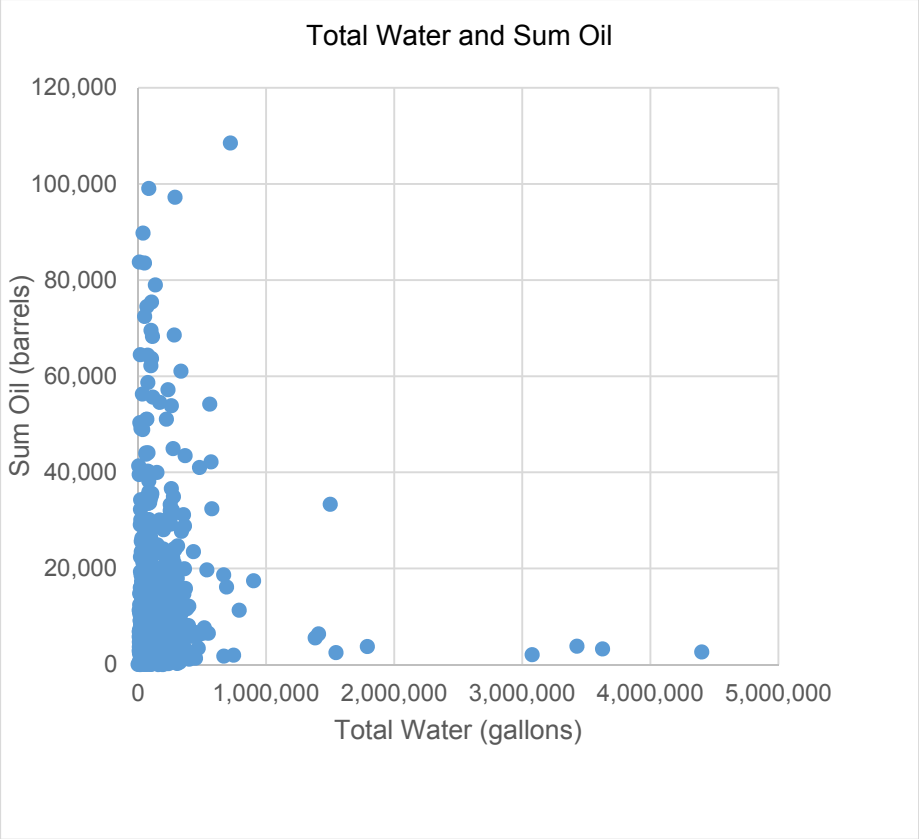

Figure 7: Total water usage (gallons) and sum oil (barrels).

Water Use, Energy Production, and True Vertical Depth

With total energy production (barrels of oil) and true vertical depth (feet) as independent variables and total water usage (gallons) as the dependent variable, a multiple regression was used to analyze the data and is shown in Figure 8. Of the 1,149 wells analyzed, p-value = 1.07704×10^{-38}, where $\alpha = 0.05$, showing no significance and $R^2 = 0.00101$ (Figure 7).

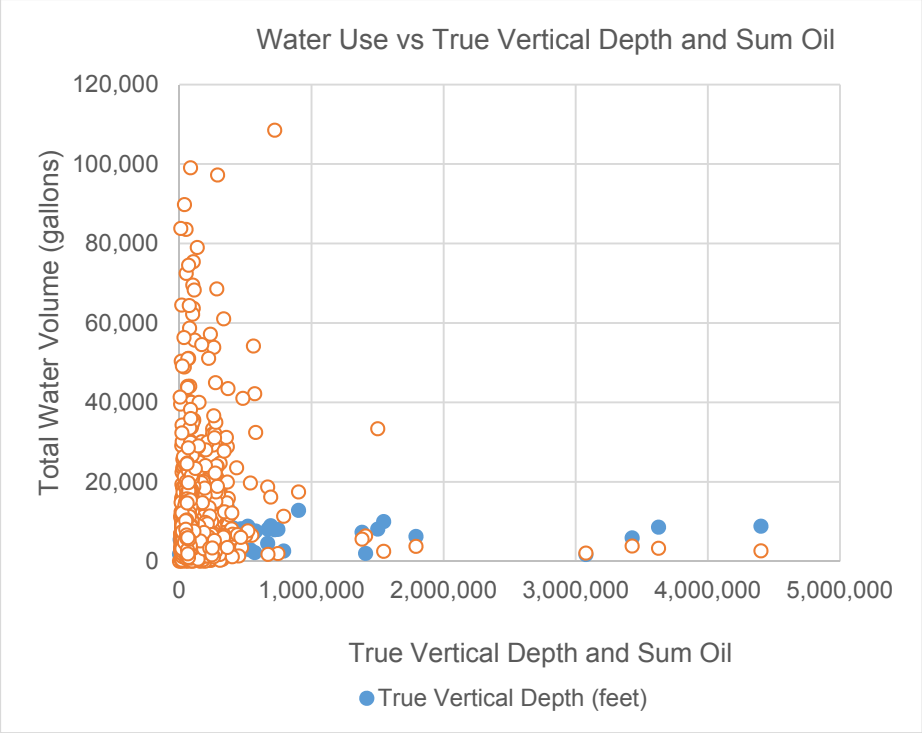

Figure 8: Total water volume vs. true vertical depth and sum oil.

True Vertical Depth and Water Usage per Energy Unit

A total of 1,156 hydraulic fracturing wells, measuring true vertical depth (feet) and water usage per energy unit (barrels of oil), are shown in Figure 10. Of the wells analyzed, p-value = 0.32795, where $\alpha = 0.05$, showing no significance and $R^2 = 0.00083$.

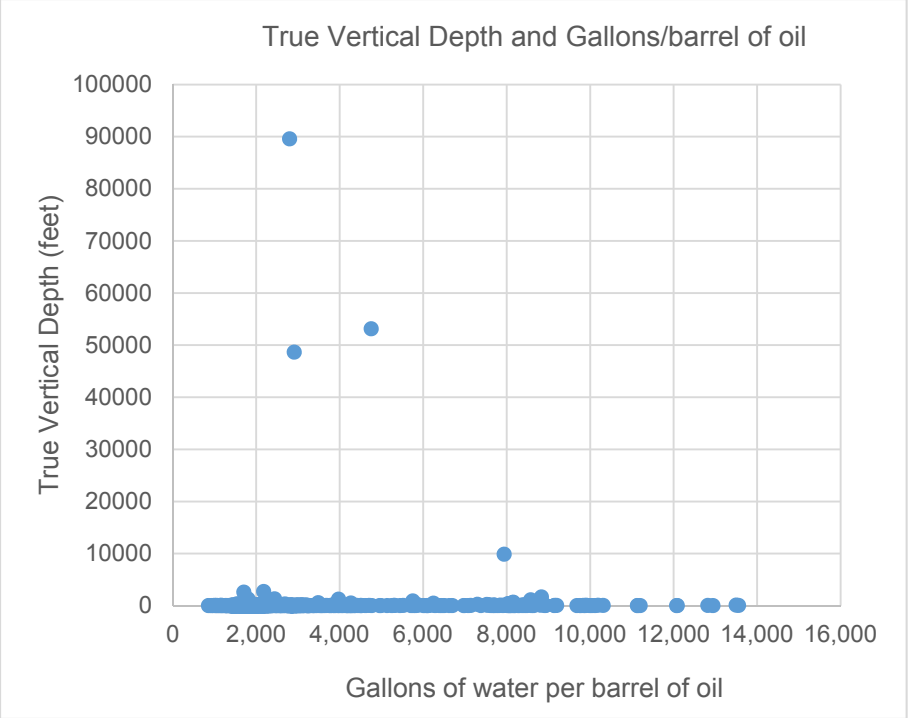

Figure 10: True vertical depth (feet) and gallons of water per barrel of oil.

Conclusion

The results of this study suggest that there is a potential relationship between the total gallons of water used in the hydraulic fracturing process and the depth of the well. Also, there does not appear to be a significant relationship between the true vertical depth of the well and the total gallons of water used per barrel of oil produced. Of the 1,171 wells where these variables were analyzed, there were outliers where the wells were shallow, but very productive, whereas the majority of the wells were not as productive. The results also indicate that there does not appear to be a statistically significant relationship the amount of water to frack per unit of energy and well depth. This study was limited by the availability and reliability of the data.

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Early-Age Strain Effects of Cement-Based Grout with Various Mineral Admixtures

Biography

Yvette Valadez-Carranza is pursuing a degree in civil engineering with an emphasis in structural design. Her particular interests revolve around sustainable construction materials. Specifically, she is intrigued by topics such as sustainable concrete. She aspires to study this area of research in graduate school and beyond. Yvette hopes to become a research engineer. Most importantly, she plans to use her findings to help empower other aspiring female engineers to continue contributing to the world of academia.

Early-Age Strain Effects of Cement-Based Grout with Various Mineral Admixtures

Abstract

The objective of this study is to investigate early-age shrinkage strain of cement-based grout with mineral admixtures using a new shrinkage-testing device developed by Professor Akthem Al-Manaseer at San José State University. The device determines strain-reading measurements immediately after mixing. Fresh grout paste was placed into a steel frustum cone mold and a laser device was placed on the top surface of the specimen to record displacement changes. The vertical displacement data was recorded during the first 36 hours after placement. Tests were performed on sealed and unsealed specimens. Shrinkage strain measurements were calculated from the vertical displacement readings. A cement paste mix with water to cementitious material (W/CM) ratio of 0.40 was investigated. Three mineral admixtures were utilized including class F fly ash (FA), silica fume (SF), and metakaolin (MK). The admixtures were replaced by weight of cementitious materials at 10%. Mixes containing metakaolin exhibited the lowest early age shrinkage followed by silica fume and then fly ash.

Introduction

Durability of a concrete structure is largely due to the properly designed and produced concrete mix. To ensure that a concrete mix design yields a durable concrete structure, materials selection and proportioning need to resist foreseen failure factors. A failure mechanism tends to result when tensile stresses—triggered by moisture losses, chemical reactions, and temperature fluctuations—cause geometric changes of the concrete element. When concrete does deform due to the loss of moisture or the drying environment, concrete shrinks and visible cracking develops, jeopardizing the durability of the concrete structure. The use of supplementary cementitious materials (SCMs) and other key elements mitigate strain effects on shrinkage and other undesirable failure mechanisms. However, early-age shrinkage is limited to small-scale laboratory specimens and testing devices that do not always reproduce actual concrete structures' early age shrinkage. By studying commonly used mineral admixtures such as FA, MK, and SF, concrete mix designs may adequately provide resistance during the service life of a concrete structure. By developing new shrinkage testing devices, researchers can gain further

insight into SCMs properties that advance the durability of concrete structures.

Background

According to the Portland Cement Association, cement grout is the mixture of cementitious material with or without aggregate or admixtures to which sufficient water is added to produce a pouring or pumping consistency without segregation of constituent materials [1]. Cement grout properties vary depending on the physical state of the cement grout mix. In the plastic state, cement grout is a freshly mixed paste that tends to be molded or shaped easily. In the hardened state, the cement grout paste is solid since materials in the mix have uniformly distributed throughout the mixture. Volume reduction, known as shrinkage, occurs during the phase changes. Various types of shrinkage can result from effecting component factors in each phase change. Due to the breadth of this study, volumetric shrinkage is solely discussed in this experiment.

Mechanisms of Shrinkage

Portland cement paste has a porous microstructure. The total pore volume of the cement paste is reliant on the w/cm of the mixture rather than the degree of hydration [1]. Pores saturated with liquid water are formed on the paste microstructure when the paste is freshly mixed. Water chemically reacts with other mixture components—also known as hydration—or evaporates into the atmosphere. When paste begins hydration or evaporation, the pores are emptied. The volume of the paste macrostructure changes as pore walls contract due to the liquid volume loss, which results in capillary stresses. The inward forces of the pore walls cause the contraction that strains the material. Volume reduction—that is shrinkage—results as pore walls contract and strain material.

Shrinkage related to the chemical reaction of cement grout hydration is known as chemical shrinkage. Specifically, chemical shrinkage is the net volume change that includes internal and external volume changes. Chemical shrinkage can be the result of vertical and horizontal directional deformation. In the plastic state, autogenous shrinkage results as cement hydration yields visible dimensional changes to the cement element. As water to cementitious material ratio decreases below 0.42, autogenous shrinkage is more notable [2]. However, when the water to cementitious ratio is higher than 0.42, during the hardened state, drying shrinkage occurs as moisture evaporates [2]. Drying shrinkage occurs unless absolute humidity is maintained [3].

Autogenous shrinkage is inversely proportional to the water-to-cement ratio. Overall, shrinkage is the sum of drying and autogenous shrinkages and the shrinkage along the depth from the drying surface to the inside of concrete—which tends to not be uniformly distributed.

Effects of Mineral Admixtures on Shrinkage

When cement grout hydration occurs, new compounds are formed that include chemical products of calcium hydroxide, water, and mineral admixture [1]. Generally, mineral admixtures are known as pozzolans, pozzolanic, and cementitious materials. Fly ash, silica fume, calcine clay—also known as metakaolin—are considered pozzolans. Each of the pozzolans yield improved cementitious properties that mitigate volume reductions effects. However, the volume reduction varies with the dosages and combined composition of materials.

Fly Ash

Fly ash is a byproduct of the combustion of pulverized coal in electric power generating plants. Fly ash is classified into two types: Class F and Class C. Class F fly ash was produced from burning anthracite or bituminous coal. From the results obtained by Tangtermsikikul, it was noted that particle shape of fly ash correlates to water retention of the specimen [4]. According to S. Tangtermsirikul, the length changes of paste specimens containing 30% and 50% of fly ash exhibit smaller autogenous shrinkage than the cement paste [4]. Moreover, Class F fly ash may not significant affect to shrinkage mitigation.

Silica Fume

Silica fume is the non-crystalline silica produced in electric-arc furnaces as an industrial byproduct of the production of silicon metals and ferrosilicon alloys [1]. Brooks, Cabrera, and Johari investigated the factors affecting the autogenous shrinkage of silica fume in high strength concrete. The results obtained from comparing specimens under varied sealing conditions suggest that autogenous shrinkage increases as silica fume content increases [5]. In addition, the inclusion of silica fume has been reported to refine the pore size distribution in the concrete [5].

Metakaolin

Guzzetta also studied the effects of partial cement replacement with fly ash, metakaolin, and silica fume and concluded that paste mixtures with

10% silica fume showed insignificant differences in volumetric strain at 36 hours when compared to a 100% cement composition [2]. However, paste mixtures with a 0.30 w/cm had lower 36-hour volumetric strain when 10% of the cement was replaced with metakaolin [2].

Materials Investigated

The grout used in this study contained Portland cement Type II/V Fly ash class F, silica fume, and metakaolin. Table 1 details the grout paste composition. The replacement of cementitious materials was made at 10% by weight. Type II/V cement was in compliance with ASTM C 150: Standard Specifications for portland cement [6] while the FA was compliant with ASTM C 618: Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete [7]. The silica fume was in compliance with ASTM C 1240: Standard Specification for Silica Fume Used in Cementitious Mixtures [8]. Metakaolin was classified as a Class N Pozzolan under ASTM C-618: Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete [7].

Equipment and Procedure

Equipment

A Hobart mixer was used to mix the grout pastes. Testing equipment consisted of a cone frustum shaped stainless steel mold, a laser device, and specialized computer software. A top plexiglass fixture was bolted on top of the mold in case the specimen was sealed with oil to prevent drying.

Procedure

Each grout paste mix was mixed for the duration of 8 minutes. The batching sequence was performed in accordance to ASTM C 305: Standard Practice for Mechanical Mixing of Hydraulic Cement Pastes and Mortars of Plastic Consistency [9]. The grout was placed in the stainless steel cone-testing device. Depending on sealing condition, the plexiglass fixture was attached to the steel mold. Test specimens were then either layered with hydraulic oil or exposed to ambient conditions. A laser device was positioned over the top of the oil layer, in the case of sealed and directly on the paste in the case of unsealed. The laser captured vertical displacement of the drying grout and data was transmitted to a computer. Readings were taken for 36 hours.

Mixes Investigated

A total of eight mixes were investigated in this study. The water cementitious materials ratio (W/CM) was kept at 0.40 for all mixes. Each specimen was given an identification key to distinguish the grout paste mix tested, mineral admixture the specimen contained (i.e. “M” for metakaolin, “F” for fly ash, “S” for silica fume, and “C” for cement paste), percentage of cementitious replacement, and assigned testing device (i.e., M10-2). A description of the paste mix composition is given in Table 1.

Table 1 Paste Mix Composition

Mix No.	Mix Name	%C*	%F*	%M*	%S*	W/CM
1	Mix C10-1	100	-	-	-	0.40
2	Mix C10-2	100	-	-	-	0.40
3	Mix F10-1	90	10	-	-	0.40
4	Mix F10-2	90	10	-	-	0.40
5	Mix M10-1	90	-	10	-	0.40
6	Mix M10-2	90	-	10	-	0.40
7	Mix S10-1	90	-	-	10	0.40
8	Mix S10-2	90	-	-	10	0.40

*C = Cement, F = Fly Ash, M = Metakaolin, S = Silica Fume
Total Mix Batch = 1,400g.

Discussion of Results

Figure 1 shows the volumetric strain curves for sealed and unsealed specimens containing metakaolin, silica fume, and fly ash over a testing period of 36 hours. Each graph represents an average of three-repeated test. The figure shows that the sealed condition specimens yield higher volumetric shrinkage strain in comparison to the unsealed specimens. For unsealed specimen, the volumetric shrinkage reached a constant value approximately at eight hours wile for the sealed conditions continued to shrink.

Figure 1 Volumetric Strain Averages vs Age for Sealed and Unsealed Grout Paste with Different Admixtures

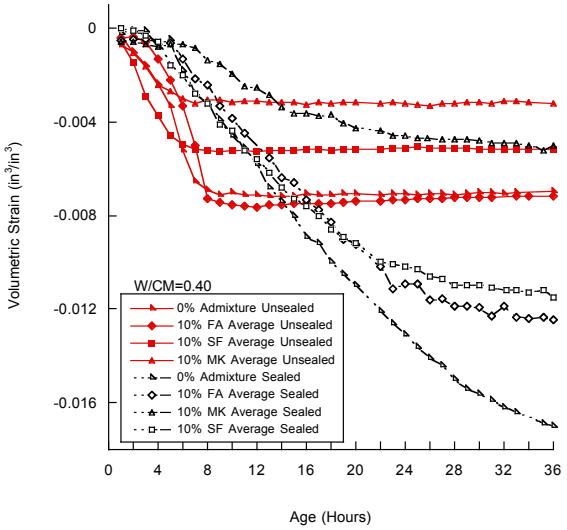

Table 2 show percentage reduction in volumetric shrinkage strain at 36 hours when compared to the reference specimens with no admixtures.

Table 2 Percentage reduction in volumetric strain when compared to reference mix with no admixtures at 36 Hours

Specimen Condition	10% FA	10% MK	10% SF
Sealed	24	70	32
Unsealed	3	53	25

It can be observed from the Table that metakaolin was the most effective mineral admixture in reducing the early volumetric shrinkage strain followed by silica fume, then fly ash, respectively. Overall, the replacement of 10% cementitious material resulted in a reduction of early volumetric shrinkage of up to 70% in comparison to specimens with 0% admixture under unsealed and sealed conditions.

Conclusions

The inclusion of mineral admixtures in cement paste grout can reduce early drying shrinkage in sealed and unsealed specimens. Metakaolin was the most effective mineral admixture to reduce early volumetric shrinkage

strain followed by silica fume then fly ash. Sealed grout specimens with mineral admixtures showed less volumetric shrinkage strain when compared to the unsealed specimens.

Acknowledgements

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