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Student Opportunities

1

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Acknowledgements

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The FAURJ is student-run by the Council for Scholarship and Inquiry (CSI), a registered student organization at FAU. The organization promotes and fosters a culture of research at the university across all disciplines. CSI strives to enhance scholarship, creativity, critical thinking and academic excellence of undergraduate students at FAU. Opportunities sponsored by CSI include publication in the FAURJ, student workshops, promotion of faculty-student interaction and peer mentoring. Undergraduate research provides students the ability to create and pursue innovative ideas under the mentorship of faculty members, which distinguishes FAU as a prestigious institution and shapes the young minds of the future.

We would like to thank all of the students who have submitted their work for the 2018-2019 publication. You all have shown immense dedication to your research and we wish you the best in your future endeavors. We hope you enjoy this edition of FAURJ, and encourage you to stay curious!

Makenzie Rynn & Mikaela Jonsson
"Art and science have so much in common - the process of trial and error, finding something new and innovative, and to experiment and succeed in a breakthrough." - Peter M Brant

As a Fine Art student I often see the world by form and color where a mathematician may see it through numbers and a scientist through experimentation and results. However, even these fields of study must be shown visually to create understanding. I believe that these diagrams, charts and equations become an art form in themselves. This idea and the research done by the undergraduates featured in this journal inspired my cover design by featuring abstracted scientific drawings. The beautiful location we find ourselves in everyday also inspired my color choice by choosing an Art Deco color scheme, which is synonymous of South Florida’s Architecture. Art Deco movement reached its peak in the early 1920s and 1930s and it’s architecture is a modern take on the neoclassical, in the ways that it is equally historic, retro and fabulous. The style is known for its bright colors, from pastel blues and pinks, to bright oranges, vibrant yellows and greens.

Mikaela Jonsson
Dorothy F. Schmidt College of Arts and Letters
Graphic Design Major
LET ME TELL YOU A STORY:

EXPLORING VIGNETTES TO STUDY BULLYING

Christopher Demezier & Joy Longo

Christine E. Lynn College of Nursing

Background

Bullying is defined as actions and behaviors that threaten interpersonal connections (McNamara, 2012). Examples of bullying include verbal abuse, sexual harassment, and physical altercations (McNamara, 2012). As a result of bullying, a nurse may have gastrointestinal complications, cardiovascular irregularities, and even suicidal ideations (McNamara, 2012; Thompson, 2013). As a result, nurses are not able to deliver optimal nursing care (Christie & Jones, 2014). Nurses who are unable to perform their job due to bullying place patients at risk for negative outcomes.

Workplace bullying exists as a reality in nursing. Nurses get bullied by physicians, fellow healthcare professionals, patients, and even other nurses (McNamara, 2012). An area of focus in research has been the effect of bullying on victims, and correlational studies have shown a relationship between bullying and negative physical and emotional outcomes (Merecz, Drabek, & Moscicka, 2009; Thompson, 2013). Research has been limited to understanding correlational relationships; causal relationships are ethically difficult to study as bullying cannot be deliberately introduced into a patient situation. A method of simulating bullying acts must be developed in order to allow researchers to design and execute experiments to study this causal relationship.

Significance

Though there is a perceived link between nurses’ exposure to bullying and patient outcomes (Rosenstein & O’Daniel, 2005; Rosenstein & O’Daniel, 2008), a direct link has not been made. This is due to the inability to perform experimental studies in which bullying is intentionally carried out. Therefore, one can only infer how the impact of bullying on nurses will affect the care. Correlational studies rely on the participant’s recollection of past experiences of bullying. A potential solution to understanding the impact of bullying on patient outcomes is through narrative transportation via vignettes. Finch (1987) argued that vignettes are short stories about hypothetical characters in specified circumstances, to whose situation the interviewee is invited to respond. Utilizing Finch’s definition, this study will use vignettes as the vehicle of simulating bullying without psychologically subjecting the participants to harm. Moreover, the use of vignettes allows researchers to highlight a single incident of bullying. Rather than reading a paragraph listing bullying behaviors such as name calling or physical violence, the reader can read each vignette as an example of workplace bullying.

Therefore, this study will explore the use of vignettes as possible media through which bullying can be studied and correlated with emotional responses.

When attempting to induce an emotional response from a reader, there needs to be assurance that the reader is drawn into the narrative. Transportedness is the level of immersion and engagement a reader has with a narrative (Green & Brock, 2000). Transported readers are immersed into a narrative such that the reader can feel the emotions within a narrative and emerge from their journey changed (Green & Brock, 2000). One important aspect of transportation is the emotional connection. The stronger the emotional connection to the story, the greater level of transportedness one has to said story (Green & Clark, 2012). The narrative allows researchers to replicate experiences like workplace bullying without physically harming participants. However, it is unknown how different narrative types, like vignettes, may be experienced and whether readers are transported into the short narrative style. Also, the link between emotional response and the level of transportedness within the vignettes is unknown.

Theoretical Framework

This study was grounded in two theoretical frameworks: The Transportation Theory (Green & Brock, 2000) and Nursing as Caring (Boykin & Schoenhofer, 2001). A response to reading a bullying scenario is dependent upon the level of engagement in a story. The Transportation Theory (Green & Brock, 2000) offers a way to understand how readers become immersed in a story through cognition, emotion, and attention (Green & Brock, 2000). According to the Transportation Theory, the transported individual may experience strong feelings, even if the story is fictitious (Green & Brock, 2000). Narrative transportation is a valuable tool that can be used in a variety of capacities. Originally created as a method for persuasion, the Transportation Theory uses psychological principles to capture readers into a story (Green & Brock, 2000). Green and Brock (2000) further comment that individuals who have returned from their transported state can experience changes in their temperament, moods, and attitudes. The Transportation Theory, however, requires the narrative to have a distinct beginning, middle, and ending (Green & Clark, 2012). Though vignettes are not designed in this manner, this study will offer the opportunity to determine if transportation is possible for other forms of narrative.
Boykin and Schoenhofer (2001), define caring as “the intentional and authentic presence of the nurse with another who is recognized as living caring and growing in caring” (Boykin & Schoenhofer, 2001, p. 13). Nurses who operate in this paradigm seize the opportunity to build a relationship between the nurse and the patient where the nurse and the patient both care for each other in a mutualistic partnership. The theories of Nursing as Caring and the Transportation Theory are linked via the concept of personhood. The idea of personhood is rooted in the concept that each person experiences universal events regardless of background, socioeconomic status, and beliefs. In a caring context, personhood aims to connect individuals on the basis of universality. While bullying is not expressly a universal experience, through transportation, it can become shared.

Study Purpose

This study has two purposes: 1) to determine the level of transportedness after reading a series of bullying vignettes, and 2) to assess the relationship between transportedness and emotional response. The first hypothesis is that participants will experience a high score of transportedness after reading the bullying vignettes. The second hypothesis is that there will be a direct relationship between transportation and negative emotional response.

Design

A nonexperimental research design was used to explore the relationship between narrative transportation and the subsequent emotional response when reading bullying vignettes. A correlational study was performed to determine the relationship between an emotional response and transportation. Data collection will be discussed under measures.

Sampling/Recruitment/Setting

The sample was assembled via convenience sampling. The only inclusion criterion was that the participants were a minimum of 18 years old, as there were no exclusion criteria. The participants were undergraduate and graduate nursing students studying at a university in the Southeastern United States. They were recruited via an online flier which offered compensation via a Starbucks gift card instead of course credit. Each participant was debriefed virtually upon completion of each vignette. The participants were given the measure after reading all the vignettes provided. A total score for the scale was computed. The higher the score, the more a reader was transported.

Procedure

Participants read eleven vignettes where each vignette was a different type of workplace bullying. After reading each vignette, the participants completed items from the Negative Affect Scale (NAS). Upon completion of the final NAS survey, each participant answered the Transportation Scale. Finally, the participants answered demographic questions.

Bullying Vignettes

The bullying vignettes were created by the research team using a systematic approach (Longo and DeDonno, 2018). The vignettes were created from reported examples of workplace bullying. The two principle investigators created a series of vignettes of a variety of lengths. Every vignette featured a bully named Betsy and the victim as the reader. Therefore, the stories were written in the second person point of view. Each vignette focused on a single example of bullying such as eye rolling or physical violence. The vignettes were arranged in order of increasing severity. The vignettes were tested for content validity by a panel of experts. Based on their evaluation, the vignettes were arranged in order of increasing severity.

Measures

Three methods of data collection were used: demographics, the Transportation Scale, and the Negative Affect Scale. Each measure will be described and explained.

Demographic information included gender, age, culture, race, educational level, major, and employment status. The items were measured on a nominal scale.

To measure transportedness, the Transportation Scale was used. The Transportation Scale is an 11-item scale that highlights the major themes of transportation put forth by Green and Brock (2000) such as “I was mentally involved in the scene of the events described in the narrative.” Each item in the scale was distinct and directly related to transportedness. The Transportation Scale is a summative measure and so the higher the sum of all the transportation items, the higher the extent of transportedness. A Cronbach’s alpha of 0.76 has been reported (Green & Brock, 2000). Participants rated how they felt about an item on a Likert scale of one to seven, where one is “I strongly disagree with this statement” and seven was “I strongly agree with this statement”. The participants are given the measure after reading all the vignettes provided. A total score for the scale was computed. The higher the score, the more a reader was transported.

To measure the negative emotions after reading the bullying vignettes, the Negative Affect Scale (NAS) was used. Watson, Clark, and Tellegen (1998) studied mood and developed both a positive and negative affect scale based on relevancy. After testing the reliability and validity of a reduced sample of 14 items, the final NAS is composed of 10 items: distressed, upset (distressed), hostile, irritable (angry), afraid, ashamed, guilty, nervous, and jittery (Watson, Clark, & Tellegen, 1998). Participants respond on a Likert scale of one to five where one is “very slightly/not at all” and five is “extremely”. The reader has a more negative affect the higher the score. The participants are given the measure after each vignette. The NAS had a reliability of 0.87 on Cronbach’s alpha (Watson, Clark, & Tellegen, 1998).
Data Analysis

The transportation scores will be averaged to determine the degree of transportedness. The results of the NAS will be correlated with the results of the Transportation Scale via a bivariate correlation analysis. The first variable is the level of transportedness that participants experience when reading bullying vignettes. The second variable is the emotional response that students exhibit in response to the bullying vignettes. A correlation coefficient will be determined which will illustrate the relationship emotion and transportation. The demographic data and the transportation score will be computed in the descriptive analysis.

Results

SPSS version 19.0 software was used to perform descriptive and inferential statistics.

There were 51 participants total (Table 1). The mean age of participants was 27 years old (SD=10.10) with the majority being females (n=50, 98%). There were more undergraduate participants (n=29) compared to graduate participants (n=22). Of the participants, 74.5% of them were employed (n=38) with 45.1% (n=23) employed as nurses. Most of the participants were white (n=39, 76.5%).

In hypothesis one, it was stated that the participants will have a high score of transportedness after reading the bullying vignettes. In this study, the scale had a Cronbach’s alpha of .716. The average score for all of the participants was 54.67 (SD=10.5). The average score of 54.67 suggests that the participants were transported significantly into the vignettes.

Hypothesis two is that a greater level of transportedness will lead to a greater negative affect. A Pearson correlation test was performed to evaluate the relationship between transportation and negative affect (Table 2). The Negative Affect scale had a Cronbach’s alpha of .977. For each vignette, each question from the NAS scale were added together. For each vignette, the average score was 24.2 (SD=6.2). The relationship between negative affect and transportation was statistically significant (r=.339, p<.05). The relationship is positive which suggests that as transportedness increases, so does negative affect. This supports the hypothesis that a higher score of transportedness is related to a greater negative affect.

A linear regression was also performed to determine if one can predict emotional response based on transportedness. A significant regression was uncovered F(1,50)=6.168, p<.05, with an R2 of .112. The R2 value means that transportation accounts for 11.2% of the variation in the emotional response. The analysis illustrates that transportation does occur as a result of reading bullying vignettes and there is a subsequent negative affect to transportation.

Discussion

The primary purpose of the study was to determine if transportation occurred when reading bullying vignettes (Green & Brock, 2000). The results showed that vignettes can be used as a medium of transportation. The hypothesis stating that the participants will experience a high score of transportation was supported. The secondary purpose of the study was to explore the relationship between transportedness and negative affect in response to reading the bullying vignettes. The results illustrate a positive relationship between transportedness and negative affect, where an increase in transportedness is linked with an increase in the negative emotions. The corresponding hypothesis that a higher level of transportedness will lead to a greater negative affect was supported.

Transportation of the participants into the bullying vignettes was an expected result due to the fact that vignettes are still a form of narrative. Each vignette portrayed a single example of bullying, such as eye rolling, written from the second-person perspective. Therefore, as the participant read each vignette, they were involved in the story. The story had a central theme of workplace bullying; each vignette had the same bully who was the perpetrator of each example of bullying. Solja, Liljander, and Söderlund (2018) used short stories in the packaging of muesli (a type of oat product used in breakfast and brunch) and found that transportation occurred despite the story being short enough to fit on packaging. Their findings support the concept that shortened forms of narratives can transport readers.

The correlation between transportation and negative affect was an expected outcome. The more transported a reader is, the more they experience negative feelings related to reading bullying vignettes. Bullying is associated with an abundance of negative physical and psychological effects and may generate negative emotions. In this study, the self-report of negative emotions increased as the participants read more vignettes. One possible explanation is that as the participant read each vignette, with the victim being the reader and the bully being the same character, the negative emotions built up in conjunction with the transportedness that the participants experienced. Gordon, Ciorciari, and Laer (2018) found through the use of electroencephalograms when viewing visual narratives, working memory was increased during the opening segment of a video, decreased during the actual viewing of the narrative segment, and later increased at the end of the viewing. They postulated that the viewer reflected on the narrative (Gordon, Ciorciari, & Laer, 2018) which suggests that the participants reflect on their own experiences of workplace bullying as they read the vignettes.
The relationship between transportation and negative emotions also created another unexpected finding. Narratives can cause readers to empathize the emotions caused by workplace bullying without the necessity of bullying in real life. Mar, Oatley, Dijkic, and Mullin (2011) found that emotions generated from narratives impact one's cognitive performance. Reading vignettes about workplace bullying creates negative emotions which can translate into negative patient outcomes due to an impaired performance.

Implications for PRAXIS (Practice, Research, and Education)

Vignettes, as the medium of transportation, effectively give researchers the opportunity to use the phenomenon of bullying as an independent variable in a study about performance. In understanding how bullying can cause alterations in one's emotional state, further research is needed to create a link on the causal relationship between bullying and alterations in cognition that can lead to deficits in performance.

Regarding education, narrative transportation can be used to reinforce learning. Nursing situations, which are stories of specific examples of nursing concepts in the clinical setting, have been used to support student's instruction. Vignettes can be used by nursing faculty to demonstrate pointed examples of how to care for patients.

Limitations

One limitation of the study is the absence of a scoring criteria for the Transportation Scale. In searching the original work and subsequent recreations, there was no consensus on how to evaluate the results of the Transportation Scale. In lieu of a scoring algorithm, the researcher postulated that the midway point (44) between the highest possible score (77) and the lowest possible score (11) represents a level of transportation that is equivalent to regular reading and lacks evidence of transportation. The average of the participants (54.67) is greater than the midway point which suggests that transportation occurred in response to reading the vignettes. Future research will look to establish a standard of evaluation.

Another limitation of the study is the lack of a control over confounding variables. The study was completed via an online survey. The researcher was unable to account for distractions, like television or cellphone use, that may take attention away from the bullying vignettes. If the participant's attention was affected, then their subsequent score may be affected; the actual score of transportedness for each participant may be slightly different.

Gender is a limitation of the study as well. 98% (n=50) of the participants are female which presents gender bias in the results. There is an inability of viewing the intersection between gender and age, gender and occupational status, or gender and race/ethnicity. This population further limits the control over confounding variables that may ultimately alter the results.

Conclusion

Narrative transportation opens up a world where we can use text to engage readers and tie them to a situation via their emotions. Readers experience emotions that are directly attributable to a stimulus that is physically and psychologically safe in the form of vignettes. Vignettes allow us to ethically manipulate emotions and thereby simulate bullying and its direct impact on mood. We were able to demonstrate that short vignettes on bullying engaged readers but more importantly that vignettes have the potential for future research in understanding the impact of bullying on victims.
References


Appendix A: Table 1

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Appendix B: Table 2

Correlations of Average Sum of All NAS Scores and Sum of Transportation

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*Correlation is significant at the 0.05 level (2-tailed).
REYITA AS A SYMBOL OF CUBA:  
THE ROLE OF AFRO-CUBAN WOMEN IN  
DAISY RUBIERA CASTILLO’S TESTIMONIAL NOVEL

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Abstract

The purpose of this research is to explore the role of Reyita as a symbol of Cuba in Daisy Rubiera Castillo's testimonial novel "Reyita: The Life of a Black Cuban Woman in the Twentieth Century" (1997) as a literary figure. Although the protagonist undergoes several hardships as an Afro-Cuban woman of low socioeconomic status, her struggles represent far more than just herself. They are indicative of the living conditions in pre-Revolutionary Cuban society and mirror the daily struggles faced by several individuals, and provide insight into what it was like to be an individual “triply marginalized” by gender, race, and class. However, these three “setbacks” never stopped Reyita from always serving the greater good. She always put others before herself, as demonstrated from her relationship with her family. These actions were not just limited to her family, but could also be expanded to the entire population of Cuba. Such selfless efforts helped Reyita increase her independence, and by the end of the book, Reyita's dependence on her husband becomes almost nonexistent. The testimony was written by her daughter, a well-known historian and anthropologist, who brings the validity of the work into question, though it also makes us question how much of it is faithful to Reyita's experiences, and how much of it was influenced by her daughter, since Daisy Rubiera experienced discrimination for many of the same reasons as Reyita. The theories and perspectives of other Afro-Cuban writers, such as Maya Anderson, Roberto Zurbano, and Ernesto Pérez Castillo, will also be analyzed and discussed to investigate the following question: In Reyita: The Life of a Black Cuban Woman in the Twentieth Century by Daisy Rubiera Castillo, in what way does Reyita, a female, Afro-Cuban descendant of slaves, represent the entire Cuban nation?

Reyita: The Life of a Black Cuban Woman in the Twentieth Century by Daisy Rubiera Castillo (1997) is a testimonial novel that narrates the life of an Afro-Cuban woman of low socioeconomic status in pre-Revolutionary Cuba. The protagonist of the novel, María de los Reyes Castillo Bueno (1902 – 1997), known as Reyita, is “triply marginalized” through race, gender, and social class. As a result, she suffers immensely, even though these aspects are not in her control, as she was born with them. Her own mother, Isabel, rejected her because she was the only child born with a darker skin color. Reyita, an underprivileged, Afro-Cuban woman was not the only one to suffer, however. In fact, her difficulties represent far more than just herself. These issues of racism, sexism,
Racial barriers both from today and Reyita's time stem from generations of bigotry towards Afro-Cubans. They are instilled in the minds of Cubans and considered standard ideologies to live by. To move past this would require much more than the abolition of a law. Rubiera Castillo depicts the suppression faced by her mother due to these societal standards, but also demonstrates how she overcame such standards and created a new paradigm for Afro-Cuban women. She structures the testimony in a manner which initially describes all the adversities Reyita underwent, only to negate them with instances in which she proves her true strength. Rubiera Castillo provides several examples of how Reyita experienced prejudice, but does not leave it at that. Every example is immediately followed up with Reyita going against the social norm and acting on what she believes. This juxtaposition of contrary events serves to emphasize the nobleness of Reyita's character.

The text describes how during Reyita's childhood, shortly after slavery was abolished in 1886, the most immediate source of oppression came from her mother, who did not accept her as her own daughter because she was only one with dark skin. Reyita herself admits that "Deep down Isabel wasn't really bad. For a long time [she] never understood her, but when [she] got old, [she] realized that [her] poor mother was a victim of the misfortune we blacks all suffered, as much in previous centuries as in this one" (32). Rubiera Castillo recounts a story of when Reyita's sister dressed up Reyita to go to a neighborhood party, but their mother refused to let her attend because she would be the only "negrita." Family is typically the first place where we learn what morals to live by and values to incorporate into our lifestyle. In the beginning of the novel, Reyita had no choice but to obey her mother's rules, even though she did not agree with them and they hurt her profoundly. Though she genuinely wanted to, Reyita ended up not attending the neighborhood party only because she was following her mother's orders.

As the novel progresses however, Reyita begins to find her voice and gain the courage she needs to discover what she truly believes in and live by it. To oppose the beliefs of one's own family takes an immense amount of confidence and bravery. At another instance in the testimony, Reyita is living with her cousin, Carmen Duharte, and her daughter, Emelina. This was significantly before Batista came into power, when he was about the same age as Reyita, as implied by the text. Emelina was working with a tutor in order to prepare for an entrance exam for her bachelor's degree. Reyita would always pretend to be ironing clothes so that she could be in a position where she could eavesdrop on their lessons without being seen. Eventually, the tutor realized this and gave Reyita the exam, which she passed. He completed all the necessary formalities needed for her to attend the university. Unfortunately, Reyita did not have enough money to purchase the uniform, and could not attend as a result. She asked all her relatives if they could lend her enough money, but they refused, thinking she was not intelligent enough to attend a university and had gone

insane. The idea of someone like Reyita, with her dark complexion, attending college seemed so unrealistic to her family that they thought she was being extremely irrational. For Reyita, the answer "no" was not a barrier. In fact, it was one step closer to her goal. She describes her feelings during this situation, explaining "I didn't feel crushed, no. I had succeeded! It was wonderful knowing I could do it, even if it didn't work out. I was very sad, but I soon recovered: I was young, I could take another route" (58). At the young age of 18, Reyita demonstrates the maturity and wisdom of someone much older. Knowing that she had the ability to achieve her goals was sufficient for her, even if it would not actually come into fruition. Everyone she knew was against her desire to obtain an education, but the opinions of others did not hold her back. Instead, she used this as motivation to overcome their expectations of her. Reyita's ability to overcome any obstacle she is faced with, without ever losing her positive outlook, is what enables Reyita to be observed as a symbol of Cuba. She maintains this mentality throughout the entire novel. Reyita is a leader by example, demonstrating to others how any barrier they may be faced with is actually a stepping-stone bringing them closer to their goals.

Reyita's ability to disregard the opinions of others can be expanded to include everyone around her, besides just her family. When Reyita was working as a maid in the houses of others, she questioned why she was not called "doña," or "madam," when this is what all other married women were called. After observing other maids, specifically the ones who were called "doña," she realized this was because of her low socioeconomic status. She was troubled by this at first, but quickly overcame all feelings of negativity when she recognized the value of other forms of wealth. She began to take pride in the accomplishments of her children, and understood that “Now I have lots of riches, not material but spiritual ones: my children and my grandchildren, how wonderful! They are teachers, doctors, engineers, professors, technicians and workers… I feel rich, but even with such wealth I don't want anyone calling me Doña, I'd rather be Reyita, simply Reyita” (63).

This instance depicts a very significant side of her. Her self-naming depicts her ability to rise above any labels society might give her. In addition, money is a necessity to function in society. To possess the ability to look beyond material possessions and understand the worth of intangible objects, such as intelligence, was not a common trait of the prerevolutionary society Reyita grew up in. Although she was in a difficult financial situation and needed to clean others' houses despite her intelligence, she did not lament over what she did not have. Instead, she adapted to the situation and appreciated what she did have. To her, the success of her children was much more valuable than something as superficial as money. In the same way, she recognizes the color of her skin with the same understanding of its ultimate superficiality. However, the Cuban nation also needs to understand the superficiality of skin color in order to view it as a hindrance and
surmount it, but for everyone else to realize this, it has to start with one person. In this text, that person is Reyita. She demonstrates how to live with respect for others and value what is worth valuing, which to her is her children and their accomplishments. Because of this, she serves as a representation of Cuba, being able to see what matters in others and providing a prime example for others to live by.

Reyita’s generosity was not just focused on her family, but was also extended toward her entire community. She looked after the children of prostitutes without asking for a single penny in return. She explained that she did this to prevent others from enduring the same hardships she experienced during her childhood. Additionally, she cared for children of all races, not just black children. The majority of the time, the white children she cared for came from impoverished families. This indicates that Cuban society did not only discriminate against Afro-Cubans, but also against individuals of lower social class. Reyita represents both of these socioeconomic categories, and for this, she represents the entirety of Cuba. She symbolizes multiple ways in which underrepresented individuals were marginalized, and also demonstrates how to act in order to claim agency, despite possessing traits that cannot be changed. Reyita could have used this situation to make money and live more comfortably, or could have only cared for black children and refused those of white families, but for her, everyone is equal, despite what society claims, as indicated by her desire to help all children regardless of their skin color. Not only does Reyita claim agency by deciding what to call herself and caring deeply for her family as well as the people of the community, but she goes on to further demonstrate her compassion toward the community by opening her own school called “La escuelita,” which eventually had 62 students. Many times, the parents of her students could not afford the monthly fee, but as one can assume, this was unimportant to Reyita. What mattered to her was that her students maintained their eagerness to learn. She helped everyone in need without thinking twice.

Towards the end of the novel, during the late 1940s and early 1950s, a definite change in tone of the narration indicates that Reyita has gained a true sense of independence. Rubiera Castillo transitions from writing very passively to using more dynamic wording. This helps demonstrate how Reyita’s controlling husband, Rubiera, begins to play a smaller and smaller role in her life. She used to behave in a manner that only he would approve of, submitting to every one of his miniscule needs. However, she learns how to fend for herself and earn what she works hard for. She explains to her daughter “Your dad didn’t allow me to develop myself the way I wanted, to struggle to fulfill the ambitions you all had. I couldn’t do it, Rubiera wouldn’t let me… he never shared the same aspirations I had” (141). Thus, she begins to distance herself from him while still respecting him as a person. She discovers her own unique methods of making money, such as teaching, cleaning, and taking care of children, knowing that it would decrease her dependence on Rubiera. Reyita is eventually able to have electricity installed in her house and purchase a radio and refrigerator, all the while paying no attention to Rubiera’s opposition. The radio in this scenario represents much more than a piece of technology. It connects Reyita to Cuban culture in a way that her husband cannot be connected. The refrigerator serves as a contradiction to the traditional role of a woman preparing food in the kitchen. The fact that Reyita bought the refrigerator with her own hard-earned money completely subverts this concept. She is even able to indulge in what she considers luxuries, and buy her daughter a satin dress for her wedding. Such instances portray the ultimate manifestation of independence in Reyita’s life. She requires nothing from her husband and can obtain anything completely from her own doing.

Feminist scholar Maya Anderson, in an article focusing on the depiction of Afro-Cuban women in literature, discusses how the author’s choice of wording affects the portrayal of Afro-Cuban women in her paper. As the daughter of Reyita, Rubiera shares many of the same characteristics, including skin color and gender. She has written the work through an approach that heightens the positive traits possessed by Reyita. Thus, it can be observed that Rubiera Castillo has structured the text around an authorial voice taking its cue from the strong self-identity established by Reyita herself. Through Rubiera’s decision to write a novel about her mother, she creates an identity for women who previously had no identity in other testimonial works. Rubiera’s ability to exemplify traits that were once completely neglected creates feelings of solidarity and unity which ultimately convey one, universal message: to portray the Afro-Cuban woman as someone who is valued and serves as a leader. Rubiera was one of the first writers to create such an image, enabling her to further strengthen Reyita’s depiction as a woman of power. Roberto Zurbano explains in an essay that changes for Afro-Cubans were not apparent in Cuba even after independence was gained in 1902, nor even after half a century of revolution until 1959. Prohibitions such as sleeping in a hotel or selling a house were eliminated, but in reality, these are not rights. He states that society has considered these to be luxuries for the Afro-Cuban population, but these are actually basic rights that all human beings should be entitled to. Thus, the elimination of such prohibitions does not add anything to the lives of Afro-Cubans, but simply acknowledges their existence. This implies that individuals with white skin color are more superior to individuals with darker skin color, which Reyita strives to disprove throughout the testimony.
Zurbano argues that although discrimination was discussed much more infrequently following the official abolition of slavery in 1886, this did not mean that it had officially ended. In fact, he argues it also became more and more accepted, and still is. He bluntly states that “Racism in Cuba has been concealed and reinforced in part because it isn't talked about. The government hasn't allowed racial prejudice to be debated or confronted politically or culturally, often pretending instead as though it didn't exist” (70). He further explains how one of the most significant reasons why racism is still present even after it was abolished is because it “… is disguised and renews itself when not debated or not openly confronted politically and culturally” (71). Thus, it is through individuals like Reyita that the topic of slavery is continually alluded to and confronted. Her leadership on this subject matter provides an example for others to follow, which can be observed as a result of Rubiera Castillo's remarkable ability to portray Reyita as an influential literary figure.

Ernesto Pérez Castillo makes a significant point in his discussion reflecting on Zurbano's essay and providing clarification. He discusses how it seems as if black and white Cubans are equal, but in reality, it is more as if blacks have the right to be white. What no one ever discusses is how blacks do not have the right to be black. They are allowed to adapt the rights of whites but are hindered from bringing their own sociocultural practices. Pérez Castillo thus provides another viewpoint on equality and emphasizes that simply because black and white Cubans are able to participate in the same activities does not mean that they both receive the same amount of respect. Reyita's testimony supports Pérez Castillo's basic argument, but also brings into perspective her strong character. It is true that Reyita was not treated in the same manner as white women who were more affluent, but she does not need the respect of others to understand her own worth. She has respect for herself and that is all she needs. Her value is determined by her own opinions and not those of others.

As the testimonial Reyita shows us, Reyita, the historical woman, faced considerable suppression throughout her childhood from both her family as well as the society she grew up in. Nonetheless, she never permitted herself to be restricted by such suppressions, and considered them minor impediments which she readily surpassed. Even then, Reyita not only recognized her own worth despite the opinions of others, but also recognized the value of others through her desire to constantly serve the greater good, whether it be her family or members of her community. By the end of the novel, she is no longer governed by Rubiera and refuses to let her skin color or gender be worth any more than the superficiality they possess. She becomes the independent Afro-Cuban woman she always envisioned herself to be. Her remarkable ability to overcome society's expectations of her make her a symbol of Revolutionary Cuba, and her remarkable literary portrayal through Castillo's testimonial offers us a deeper critique of our received notions of “equality” in the Cuban historical context.

Works Cited


Abstract

Florida's beaches are highly dynamic coastal features. They are vulnerable to accretion and erosion over time due in part to human interaction and climate change stressors such as storm activity. This study used the USGS Digital Shoreline Analysis System (DSAS) to calculate a long-term change rate from 1875 to 2000 and a short-term change rate from 1950 to 2000 of Florida's coastline from the NOAA Historical Surveys data set. The results show that Florida's coastline has not retreated in the past 50 years with overall long and short-term change rates of 0.014 m/yr and 0.110 m/yr of accretion respectively. Although the overall rates imply minimal change, coastline variability at a local level is prevalent. The data set of mapped historical change rates created during this research provides quantitative data that can be used to make local decisions to improve beach stability.

Keywords: Florida's coastline, historical changes, NOAA Historical Surveys, DSAS

I Introduction

Florida's beaches are highly dynamic coastal features that are subjected to erosion, accretion, or inundation due to natural processes and human activity. Both short-term and long-term natural processes such as tidal currents and sea level rise have affected Florida's coastline. Short term effects on the coastline are, in part, due to an increase in the population of coastal counties. The recent influx of human activity, such as coastal development and beach nourishment, has exacerbated beach erosion and accretion. Erosion of Florida's beaches poses a growing threat to coastal infrastructure and the increasing population of coastal counties (Ruggiero et al., 2013).

Florida’s coastal counties are sought-after for their beaches and are home to sixty-six percent of Florida’s population. However, they only account for thirty-seven percent of Florida’s total land area. This high population density is quantified as seventy-eight percent denser than the state average (Esteves et al., 1998). The popularity of these areas' beaches has led to a public demand for a better understanding of the accurate positions and movement of Florida's coastline throughout history. This research responds to this problem by calculating change rate statistics that represent coastline movement relative to time. Change rates were calculated from digitized historical shorelines provided by the U.S. Geological Survey (USGS). The shorelines were then overlaid onto georeferenced original scans of historical land surveys supplied by the National Oceanic and Atmospheric Administration (NOAA). Long-term change rates for coastline movement were calculated using coastline positions established from land surveys that dated from 1875 to 2000, while short-term change rates were based on coastline positions that dated from 1950 to 2000. Net movement was also calculated between the following dates: 1875, 1930, 1950, 1970, and 2000. The results were then used to assess the effects that natural processes and human activity may have had on Florida's coastal environments.

A few studies have mapped historical coastlines to provide data that could be used to improve efforts that seek to maintain the position of coastlines. One such study, the Texas Shoreline Change Project, determined shoreline change rates to assist in the effort to combat beach erosion along the Texas coast. Historical aerial photographs were used to extract accurate shoreline positions. More recent data were collected using airborne lidar. Long-term net movement of the 590 km coast was calculated by measuring 11,749 transects, spaced at 50 m intervals, that crossed the shorelines. It was found that the coastline experienced an average erosion rate of 1.26 m/yr; consequently, nearly eighty percent of the Texas Gulf shoreline experienced a net retreat (Paine et al., 2014). A similar study conducted by the USGS included a national assessment of shoreline change. One region that was assessed in this series was the Pacific Northwest. The coast was mapped to determine long and short-term shoreline change rates. The positions of the shorelines throughout history were determined using aerial photographs and scans of historical land surveys. The long-term shoreline change rate for Oregon and Washington's coasts were calculated by measuring 8,823 transects. These coastlines experienced 0.9 m/yr of progradation; thirty-six percent of the transects measured were determined to display erosion (Ruggiero et al., 2013). These studies were used as a reference to develop a methodology to map the historical changes in Florida's coastline from 1875 to 2000.

I Methodology

Accurate positions of Florida's coastline throughout history are needed to understand its movement relative to time. Information about coastal movement serves as the basis to assess the condition of the state's beaches. A relationship can then be established between the effects that coastal development that coastal that coastal development and natural processes may have
that coastal development and natural processes may have had and the areas that have undergone a large amount of coastal movement. NOAA has created a data set composed of historical surveys (topographic sheets) that is accessible to the public for shoreline change analysis. Numerous historical surveys, 7,800 in total dating back to 1841, have been directed by NOAA to obtain coverage of the shoreline in the United States. The resulting data set has been made available for access in Google Earth. Each conducted survey is displayed in the viewer with links to download the shoreline data, original scans of the surveys, and metadata about the accuracy of each survey. The spatial reference used for these surveys was a geographic coordinate system and the North American Datum of 1983 (“NOAA Historical Surveys (T-Sheets)”, 2016).

These historical surveys have been used to digitize features, such as the coastline and adjacent waterways, along the coast of Florida. A geographic information system (GIS) was used to clean up the data by extracting the coastline from the digitized coastal areas. The process was repeated to digitize a single coastline for specified years. The digitized coastlines represent different positions of Florida’s coastline throughout history. The coastline was defined as the mean high-water line. This is the line where the land and the water at an elevation of mean high-water meet (Ruggiero et al., 2013). The digitized lines were overlaid onto georeferenced scans of land surveys to visualize the positions of the coastline over time. The historical positions of the coastline were identified for the following periods: pre-1900, 1920 – 1939, 1940 – 1959, 1960 – 1980, and 1998 – 2001.

The digitized coastline positions are only as accurate as the original scans of the historical land survey maps. This was due to the process of using the original scans to derive the digital data of coastline positions. Each land survey was conducted separately from the others, so each survey has its own accuracy report. The accuracy reports are included in the metadata of each scan, along with other important data about the survey. For example, a survey conducted in Delray Beach, Florida in 1945 includes digital positional data and a positional accuracy report. This survey had a root mean square error for x-coordinates of 0.346 m and 0.430 m for y-coordinates. One can expect accurate positional data for each historical survey conducted by NOAA. In figure 1, the extracted coastline position in Delray Beach in 1945 has been overlaid onto the corresponding original scan to illustrate the typical positional accuracy found in NOAA Historical Surveys (“NOAA Historical Surveys (T-Sheets)”, 2016).

Long-term, short-term, and net movements were calculated. Long-term movement was found by calculating the movement of the coastline between the years 1875 and 2000 (125 years), while short-term movement was assessed between the years 1950 and 2000 (50 years). Net movement represents the distance between the most landward and seaward positions of the coastline that took place independent of the year. In all three measurements, the digitized coastlines were overlaid onto the original scans of land surveys from corresponding years. The USGS Digital Shoreline Analysis System (DSAS), a software extension to Esri ArcGIS, was used to calculate change rate statistics (Thieler et al., 2009). The DSAS workflow as described in the DSAS instruction manual is shown in figure 2.
Coastline position data for the desired years were stored as polyline feature classes in ArcGIS. A baseline was created parallel to the coastline to use with the DSAS toolbar. Transects were cast perpendicular from the offshore baseline and crossed the digitized coastlines. Transects extended 2,000 m from the baseline to cross all the coastlines and were spaced at 50 m intervals as shown in figure 3.
The original transects were clipped to include only the parts of the transects that were completely within the coastlines. The length of the clipped transects represents the distance between the coastlines. The clipped transects are shown in figure 4.

Figure 4. Clipped transects
Coastline movement relative to time in meters per year was found by editing the symbology of the transects’ length and using the number of years between the earliest and latest coastline as a normalization for the data. Further analysis aimed to locate beaches with large amounts of coastline movement to determine the beaches at greatest risk for erosion caused by human activity and natural processes.

III Results and Discussion

Net movement rates show the high activity of change that occurred in Florida’s coastline. Coastline positions were defined for the following periods: pre-1900, 1920 – 1939, 1940 – 1959, 1960 – 1980, and 1998 – 2001. Net change rates represented the distance between the most seaward and most landward coastline positions that occurred between the years 1875 and 2000. In this representation of change, movement is independent of the year of the coastlines’ position. These change rates are useful for determining coastlines with trends of high variability. This movement was calculated at 25,403 sites along the coast of Florida. These areas experienced a median movement of 63.56 meters. The net change, in this case, does not consider whether seaward advance or landward retreat of the coastline occurred. With the time and direction of movement independent of the distance moved, identification of beaches experiencing high variability is simplified. This is due to the resulting data displaying a simple and single variable, net distance moved. Variability can then be related to the effects that coastal processes and human activity may have had on the coast. Results displaying the net movement that occurred are shown in figure 5.

Figure 5. Net movement from 1875 to 2000

Long-term rates of change in Florida’s coastline between the years 1875 and 2000 averaged 0.014 m/yr of seaward advance. Rates were calculated at 20,975 sites along the coast of Florida spaced at 50 m intervals. Net advance occurred at 10,875 of these sites (51.85 percent). These areas experienced a mean seaward advance of 0.69 m/yr during the 125-year period. Net landward retreat occurred at 10,100 of the sites (48.15 percent). These areas retreated at a rate of 0.72 m/yr. The average rate of seaward advance was greater than that of retreat, so the 50-year period saw an overall advance of the coastline despite a higher rate. This long-term rate reflects change over a large amount of time. Factors that may have brought about large change in short amounts of time such as increasing population, development, and storm activity are normalized by the large number of years observed. Observing change rates for the past 125 years will help to establish trends in the movement of the coast. Ultimately, this will provide a basis to model future changes in Florida’s coastline. The long-term change rate results are shown in figure 6.

Figure 6. Long-term change rate from 1875 to 2000

Short-term rates of change were calculated between the years 1950 and 2000. This 50-year period experienced an average seaward advance of 0.110 m/yr. Rates were calculated at 20,098 sites spaced at 50 m intervals along the coast of Florida. Net advance occurred at 9,888 sites (49.20 percent) and changed at a rate of 1.00 m/yr. Net landward retreat occurred at 10,210 of the sites (50.80 percent). These areas retreated at a rate of 0.75 m/yr. The average rate of seaward advance was greater than that of retreat, so the 50-year period saw an overall advance of the coastline despite a
higher percentage of sites experiencing a net retreat. Human presence in coastal counties has increased in recent history and has likely affected the beaches in Florida. Short-term change rates better represent change that is, in part, due to increases in population and coastal development that have occurred in recent history. Results of the short-term change rates are shown in figure 7.

Figure 7. Short-term change rate from 1950 to 2000

Changes in Florida's coastline are best represented using historical positions of the coastline spanning periods greater than 100 years to eliminate any bias introduced by short-term influxes of movement (Galgano et al., 1998). However, short-term change rates are useful to represent the increase in population and development that has occurred in recent history and the beach nourishment projects that have been conducted by coastal communities. Many beaches have lost land due to erosion; consequently, coastal counties have made efforts to replace the lost land on the beaches with sand from other locations. Land is lost to the constant impact from waves, wind, and sea-level rise (Finkl, 1996). Coastal counties often depend on the technique of beach nourishment to maintain their beaches and to provide a buffer to protect the surrounding areas from storm activity. This solution is often viewed as only a short-term fix to the problem of retreating coastlines (Leatherman, 2003).

IV Conclusion

Coastline change analysis is dependent on reliable data for the positions of the coastline throughout history. NOAA Historical Surveys were used to calculate net movement, long-term, and short-term change rates in Florida's coastline. Net movement of the coastline provides a better understanding of areas that experienced high variability, which can be related to beaches that may have been affected by human activity and natural processes. Long and short-term change rates provide insight for the changes that have occurred in Florida's coastline throughout history. While the overall long and short-term change rates averaged 0.014 m/yr and 0.110 m/yr of accretion respectively, the results show high variability of accretion and erosion at a local scale. For example, seven counties located between Franklin and Escambia County on the north coast of Florida have experienced a rate of erosion of 0.31 m/yr. This is a significantly higher rate of change than the average short-term change rate of the entire state. Averaged change rates at a state-wide level are less relevant than those at a county level, which provide more meaningful insight to the variability of Florida's coastline. The data set created during this research provides quantitative coastline change data that can be utilized to make local decisions to improve beach stability. This quantitative data could also be used to conduct a cost-benefit analysis to identify areas that require significant beach nourishment or that are particularly vulnerable to sea level rise.

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References


DISCOVERY OF SOIL BACTERIA WHICH DISPLAY BROAD-SPECTRUM ANTIBIOTIC ACTIVITY

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Abstract

Antibiotic-resistant ESKAPE pathogens (Enterococcus faecium, Staphylococcus aureus, Klebsiella pneumoniae, Acinetobacter baumannii, Pseudomonas aeruginosa and Enterobacter species) are the leading cause of hospital-acquired infections, and thus, the discovery of novel antibiotics that kill them is crucial. Soil collected from Palm Beach County by undergraduates in Life Science Lab (RI:BSC1005L) contained multiple bacterial isolates with broad spectrum antibiotic activity. Soil bacteria that kill the safe relatives of the ESKAPE pathogens and safe models (Erwinia carotovora, Bacillus subtilis and Mycobacterium smegmatis) were characterized by microbiology assays and bioinformatics to determine their identities. Antibiotic compounds were extracted from four bacteria that kill both Gram-negative and -positive safe relatives; these bacteria were determined to be Gram-negative and 83-97% homologous to various Pseudomonas species.

Introduction

Antibiotic resistance is recognized as one of the most significant health threats to the human population; two million Americans suffer from bacterial infections acquired from hospitals every year (Infectious Diseases Society of America). Patients infected with multi-drug resistant (MDR) bacteria are subjected to more harmful, last-resort drugs and the cost of curing these patients amounts to over $30 billion annually (Davis et al., 2017; Infectious Diseases Society of America). Pharmaceutical companies have eluded funding new antibiotic research because antibiotics are less lucrative than long-term use drugs (Davis et al., 2017). Studies have shown the direct relationship between inappropriate antibiotic usage and new resistant bacteria (Ventola, 2015a). The overuse of antibiotics is the main cause of antibiotic resistance because treatment only kills a majority of the harmful bacterial cells and leaves the stronger cells to reproduce (Ventola, 2015a). MDR bacteria have been plaguing US healthcare and US citizens since penicillin was introduced in 1943 (Davies & Davies, 2010; Ventola, 2015a); it has become imperative that not only patients, but also doctors, understand the importance of the correct use of the appropriate antibiotics (Ventola, 2015).

New classes of antibiotics with new mechanisms of action need to be discovered to replace the current drugs that are ineffective (Sautter & Halstead, 2018). The urgency to find new antibiotics has led to the investigation into soil bacteria that produce secondary metabolites capable of killing neighboring bacteria. Soil is considered a microbe “hot spot” to find antibiotic producing isolates (Lau, van Engelen, Gordon, Renaud, & Topp, 2017; Rafiq et al., 2018). Additionally, the lack of chemical diversity of known antibiotics may be due to the limits of the microbes currently being utilized for their antibiotic compounds (Rafiq et al., 2018). While different antibiotics (e.g. erythromycin and vancomycin) are isolated from the same genus of bacteria (e.g. Streptomyces), soil can be seen as an infinite source of novel antibiotic producing microbial genera (Rafiq et al., 2018).

At Florida Atlantic University (FAU), the Biological Sciences Department has recently integrated Tiny Earth (TE) into its curriculum. TE “studentsources” the discovery of new antibiotics through research experience-based courses for undergraduates (Tiny Earth, 2018). At FAU, students with non-STEM (science, technology, engineering and mathematics) majors conduct TE lab experiments in an Intellectual Foundations Program course, Life Science Labs (RI:BSC 1005L). Students are given a soil collection kit and collect soil, reporting the GPS coordinates and the location description (i.e. light exposure, type of soil, etc.). Students isolate the bacteria from the soil by step-wise diluting soil in water and putting dilutions onto plates of bacterial food (media). Each student chooses one of sixteen growth conditions (including variations in food, temperature and light exposure) for their bacteria. Different growth conditions affect the bacterial biodiversity that can be cultured in the lab and the secondary metabolites (e.g. antibiotics) that the bacteria produce. Students perform antibiotic assays against the safe relatives/models. Traditional microbiology assays are performed on antibiotic-producing bacteria to classify them based on common structures, physiology and biochemistry. DNA analysis is done to determine phylogenetic relationships. The students preserve their bacteria at -80°C for future experimentation.
TE was started at Yale University in 2012 by Dr. Jo Handelsman in an effort to inspire upcoming scientists, as well as address the dwindling number of effective antibiotics by exploring her passion, soil microbes (Tiny Earth, 2018). TE was implemented to change the way students participate in science. Now, TE is comprised of over 275 different schools across 40 states and fourteen countries (Tiny Earth, 2018). Hand-on experiments with relevant work, such as the global antibiotic crisis, help shape a new appreciation for non-STEM students of research conducted in academia. Through the use of citizen science, TE has been able to attain bacterial isolates from all over the world in an effort to discover new antibiotics from its participants’ own backyards. There is plenty of opportunity to discover a new antibiotic in the soil; over two thirds of known antibiotics originate from soil bacteria (Hernandez, Tsang, Bascom-Slack, & Handelsman, 2016a).

During the first four semesters of TE at FAU, hundreds of antibiotic-producing bacteria were isolated and preserved by undergraduates. For the current study, the bacteria found in the 2016-2017 school year were revived from -80°C and all of the students’ experiments were repeated. Antibiotic activity assays were also repeated and each bacteria was assigned an “antibiotic activity score” based on the number of safe relatives/models (0 – 9) that they kill. One hundred bacterial isolates with the highest antibiotic activity scores were then passed to the microbiology teaching lab students to perform additional microbiology assays. Four of these bacterial isolates, CJB7, KTG3, TMV16 and TMV21, with antibiotic activity scores of 8 or 9, were selected for additional analyses, including performing organic extractions, assaying the antibiotic activities of the different extraction layers and farther purification/structure elucidation of antibiotic compounds.

**Methods**

**Overview:** At FAU, each TE-Life Science lab student retrieves a soil sample from Palm Beach County and isolates bacteria. These bacteria are then tested against the six safe relatives of the ESKAPE pathogens (see Table 1).

The students perform microbiology assays and DNA analysis to identify the genus of antibiotic-producing bacteria. In this study, frozen stocks of all antibiotic-producing bacteria found in the 2016-2017 school year were revived and grown on conditions (chosen by the Life Science students) to verify their data. Experiments by the FAU-TE research lab validated results for: antibiotic production (assigning antibiotic scores, see the introduction), Gram staining, MacConkey agar assays, catalase production, sulfide production, indole production and motility. One hundred bacterial isolates with the highest antibiotic activity scores were given to the undergraduate microbiology teaching lab students enrolled in MCB 3020L to perform the phenylethanol plate, Litmus milk and phenol red broth assays. The FAU-TE research lab chose four bacteria, the CJB7, KTG3, TMV16 and TMV21 bacteria, with the highest antibiotic activity scores, to perform ethyl acetate/water extractions to learn more about the bacterial compounds with antibiotic activity. All media and reagents were purchased from Fisher Scientific except where noted. Protocols were performed and/or modified as previously described (Hernandez, Tsang, Bascom-Slack, & Handelsman, 2016b; Scheurle, 2016).

**Growing Bacteria:** The CJB7, KTG3, TMV16 and TMV21 bacteria were assigned the highest antibiotic activity scores (8 or 9) and were considered the most important to study. The growth conditions that were originally chosen by the Life Science lab students were used to duplicate bacterial growth and production of the same secondary metabolites. The CJB7 and KTG3 bacteria were grown on Potato Dextrose Agar (PDA) and incubated under continuous light exposure at 25°C. The TMV16 and TMV21 bacteria were grown on Luria Broth (LB) agar and incubated in the dark at 30°C.

**Antibiotic Assay:** Antibiotic activity scores were assigned conservatively based only on the activity that could be confirmed. The CJB7, KTG3, TMV16 and TMV21 bacteria were assayed against nine safe relatives/models to verify their antibiotic killing scores. On their respective media plates, 100μl of individual safe relative stationary cultures were spread using a sterile hockey stick and allowed to dry. Using a sterile toothpick, each bacterial isolate was patched onto their respective plates with dried safe relative culture. Killing of the safe relative was observed by a “zone of inhibition”, an area surrounding the bacterial patch where the safe relative was killed by a compound secreted by the bacterial patch.

Dried extractions were also assayed by “zone of inhibition” detection; extraction layers were resuspended in 80μl methanol before patching 30μl onto one spot on an agar plate. Once the patch of resuspended extract was dry, top agar with safe relative was poured on the plate. Extraction antibiotic activity scores could be affected by the types of solvents used and the polarity of the extracted compounds.

<table>
<thead>
<tr>
<th>ESKAPE Pathogen</th>
<th>Safe Relative/Safe Model</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Enterococcus faecalis</em></td>
<td><em>Enterococcus raffinosus</em> (&lt;i&gt;E. raff&lt;/i&gt;)</td>
</tr>
<tr>
<td><em>Staphylococcus aureus</em></td>
<td><em>Staphylococcus epidermidis</em> (&lt;i&gt;S. epid&lt;/i&gt;)</td>
</tr>
<tr>
<td><em>Klebsiella pneumoniae</em></td>
<td><em>Klebsiella oxytoca</em> (&lt;i&gt;K. oxyt&lt;/i&gt;)</td>
</tr>
<tr>
<td><em>Enterobacter cloacae</em></td>
<td><em>Enterobacter hormaechei</em> (&lt;i&gt;E. horm&lt;/i&gt;)</td>
</tr>
<tr>
<td><em>Pseudomonas aeruginosa</em></td>
<td><em>Pseudomonas putida</em> (&lt;i&gt;P. put&lt;/i&gt;)</td>
</tr>
<tr>
<td><em>Klebsiella species</em></td>
<td><em>Enterobacter aerogenes</em> (&lt;i&gt;E. aer&lt;/i&gt;)</td>
</tr>
<tr>
<td>Safe Model Organism</td>
<td><em>Erwinia carotovora</em> (&lt;i&gt;E. car&lt;/i&gt;)</td>
</tr>
<tr>
<td>Safe Model Organism</td>
<td><em>Rivusue adriatica</em> (&lt;i&gt;R. adri&lt;/i&gt;)</td>
</tr>
<tr>
<td>Safe Model Organism</td>
<td><em>Mycobacterium smegmatis</em> (&lt;i&gt;M. smeg&lt;/i&gt;)</td>
</tr>
</tbody>
</table>
**Gram Stain:** Gram staining is a differential method of characterizing bacterial cell walls based on composition. Bacterial cell walls contain highly cross-linked amino acids and sugars called peptidoglycans that protect cells and give cells their shape. The cell wall structure is determined with two dyes, crystal violet and safranin, which are retained according to the amount of peptidoglycan in the cell wall. A Gram-negative bacterial cell wall contains little peptidoglycan, cannot retain the crystal violet dye and stains pink by the safranin. A Gram-positive bacterial cell wall with a large amount of peptidoglycan can retain the crystal violet dye and stains purple. Bacteria were patched onto 5μl of sterile deionized water atop a microscope slide. Bacteria were fixed by heating to evaporate the water leaving a smear of bacterial cells. The bacteria were flooded with crystal violet, rinsed gently with deionized water, then soaked in Gram’s iodine. After a series of rinses, the bacteria were soaked in safranin, rinsed again, allowed to dry and finally examined under a compound microscope (magnification of 40x). The bacteria were Gram (-) if the cells stained pink or Gram (+) if the cells stained purple. Results were verified by MacConkey and phenylethanol plate assays described below.

**MacConkey Agar Assay:** MacConkey agar is a selective media that inhibits the growth of Gram (+) bacteria by disrupting the cell wall with crystal violet and bile salts. Bacteria are Gram (-) if they grow. MacConkey agar also reveals the ability of bacteria to ferment lactose by the presence of a pH indicator. Bacteria fermenting lactose release acid by-products that turn the bacterial colonies acidic. Each bacterial isolate was streaked onto a MacConkey agar plate and incubated for 24 hours in 30°C.

**Phenylethanol (PE) Plate Assay:** PE plates contain selective media that allows Gram (+) bacterial growth. Phenylethanol inhibits Gram (-) bacterial growth by blocking DNA synthesis. Bacteria were streaked onto PE plates and incubated for 24 hours in their respective conditions (chosen by the Life Science lab students originally).

**Litmus Milk Assay:** Litmus milk is a complex media used to differentiate bacterial species by characterizing the ways in which they break down various components of the media and the subsequent by-products. Litmus milk is composed of milk, lactose, casein and litmus (pH and oxidation-reduction indicator). Each bacterial isolate was inoculated into separate litmus milk broths and incubated at their respective temperatures for 24 hours. If a bacterial species can break down the various components, a multitude of outcomes are possible (acidic, alkaline, gas formation, etc.) or no reaction if the species is incapable.

**Phenol Red Broth (PRB) Method:** A bacterial species that can ferment lactose, glucose and/or sucrose can break down these sugars in the absence of oxygen. As end-products, the sugar is partially oxidized and acid and gas are produced. Fermentation of these sugars is detected by a differential technique. A Durham tube was inserted in an inverted position within the PRB broth to collect any gas that is produced.

Each isolate was inoculated into each of three PRB tubes containing lactose, sucrose or glucose and incubated for 24 hours in their respective temperatures. Phenol red is a pH indicator that is red/pink at a neutral pH of 7 and yellow in acidic conditions.

**Catalase Assay:** Hydrogen peroxide (H2O2) is typically used as an antiseptic for cuts and wounds. Some bacteria have evolved to produce catalase (which breaks H2O2 into water and oxygen) as a defense mechanism against H2O2 (Hernandez et al., 2016b). Bacteria were inoculated with 3% H2O2 solution and catalase production was detected by the production of oxygen bubbles.

**Sulphide, Indole and Motility (SIM) Assay:** SIM is a differential semisolid medium that allows for the visualization of sulphide production, indole production and bacterial motility. Bacteria that can metabolize amino acids containing sulfur or inorganic sulfur compounds from the environment produce hydrogen sulphide (H2S). The hydrogen that is released reacts with compounds in the SIM medium (iron, lead or bismuth) and turns black. Bacteria that metabolize tryptophan produce indole that is detected by adding Kovac’s reagent. If indole is present, the top of the medium turns cherry red. Motility of bacteria is seen by growth extending from the bacterial inoculation line. Colonies of bacteria were inoculated into a tube with SIM media using a sterile needle and incubated for 24 hours at 30°C.

**Extraction and Isolation of Organic Compounds:** To determine which compounds had antibiotic activity in the bacteria, their organic compounds were extracted. Twelve plates of each isolate, CJB7, KTG3, TMV16 and TMV21 bacteria, were grown in their respective conditions for three days. Next, the plates were chopped and placed into four bottles that were frozen in an ethanol/dry ice bath to lyse bacterial cells and release their contents. Ethyl acetate/water (3:2) was added to the bottles and the bottles were shaken overnight. Upon separation, the **organic layer** (upper layer) was removed and the ethyl acetate was evaporated over three to four days under a ducted fume hood. The water was evaporated from the **aqueous layer** (lower layer) for three days under reduced pressure.

**Colony PCR:** To obtain a DNA sample of the 16S ribosomal RNA (rRNA), the DNA sequence was amplified using polymerase chain reaction (PCR). Sequencing the 16S rRNA gene has become a widely used technique for identifying microbial organisms (Gao, Lin, Revanna, & Dong, 2017) Colony PCR was conducted with degenerate TE-27F forward (5’ AGR TTT TGA TYM TGG CTC AG 3’) and TE-1492R reverse (5’ GGY TAC CTT TGG ACG ACT T 3’) primers (Integrated DNA Technologies) and Taq polymerase-PCR reagents/master mix (New England Biolabs). PCR cycling conditions were: 94o 10 min; three cycles of 94o 30 sec, 53o 30 sec and 72o 110 sec; twenty-seven cycles of 94o 30 sec, 58o 30 sec and 72o 110 sec; 72o 10 min. PCR products were visualized by 1% agarose gel electrophoresis using SyBr Safe on a 1% agarose gel electrophoresis using SyBr Safe on a
Syngene G:Box EF2 imager. Clean 1.4 kb PCR products were treated with Exo-SAP-IT (Affymetrix) to remove the residual primers; TE-27F primer (1.7 μM) was re-added and the reactions were sent to DNA Analysis Facility on Science Hill at Yale University for DNA sequencing. Homologous DNA sequences were found using the National Institutes of Health’s Basic Local Alignment Search Tool (BLAST) (https://blast.ncbi.nlm.nih.gov/Blast.cgi).

**Results**

**Antibiotic Activity of CJB7, KTG3, TMV16 and TMV21 Bacteria, Organic and Aqueous Layers:** Table 2 displays the antibiotic activity results of the organic and aqueous layers of the CJB7, KTG3, TMV16 and TMV21 bacterial extractions against nine safe relatives/models. Organic and aqueous layers were collected as described in Methods. The antibiotic activity of the aqueous extracts from the CJB7 and KTG3 bacteria could not be determined due to contamination/degradation during the drying process.
**Bacterial Isolate CJB7:** The CJB7 bacteria killed all nine safe relatives (Table 2). An example of killing by the CJB7 bacteria can be seen in Figure 1. Organic compounds responsible for killing four of the nine safe relatives were successfully extracted and an example of killing by the organic extraction layer can be seen in Figure 2. The CJB7 bacterial 16S rRNA gene has a 97% homology to that of *Pseudomonas plecoglossicida* (Table 3) and are a Gram (-) species as indicated by three assays (Table 4). The CJB7 bacteria do not ferment lactose or sucrose, glucose has not been determined (ND), metabolize casein, are motile, and produce catalase, but not sulfide or indole (Table 4).

<table>
<thead>
<tr>
<th>Isolate</th>
<th>CJB7 Bacteria</th>
<th>Organic</th>
<th>KTG3 Bacteria</th>
<th>Organic</th>
<th>TMV16 Bacteria</th>
<th>Organic</th>
<th>TMV21 Bacteria</th>
<th>Organic</th>
<th>TMV21 16S</th>
<th>Organism</th>
<th>TMV21 16S</th>
<th>Organism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kills E. coli</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>ND</td>
<td>ND</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Kills E. aer</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Kills A. bay</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>ND</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Kills P. sa</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Kills M. sa</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>ND</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Antibiotic Activity Score</td>
<td>9</td>
<td>4</td>
<td>9</td>
<td>7</td>
<td>9</td>
<td>8</td>
<td>5</td>
<td>8</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

**Figure 1 and 2:** CJB Bacterial and Organic Extract Antibiotic Activity Against *P. putida*. Figure 1 (left) is the antibiotic assay showing a zone of inhibition around the CJB7 bacteria (patched as an “X”) and Figure 2 (right) is the antibiotic assay of the organic extract (patched on the right black dot). Left black spot on the plate represents the methanol (solvent) negative control.

**Table 3. Bacterial Identity Based on BLAST of 16S Ribosomal RNA Gene Sequence**

<table>
<thead>
<tr>
<th>ISOLATE</th>
<th>CJB7</th>
<th>KTG3</th>
<th>TMV16</th>
<th>TMV21</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Identity</td>
<td>97%</td>
<td>83%</td>
<td>97%</td>
<td>95%</td>
</tr>
<tr>
<td>Closest Match to DNA Sequence</td>
<td><em>Pseudomonas plecoglossicida</em></td>
<td><em>Pseudomonas plecoglossicida</em></td>
<td><em>Pseudomonas plecoglossicida</em></td>
<td><em>Pseudomonas plecoglossicida</em></td>
</tr>
<tr>
<td>GenBank accession number</td>
<td>AM711588</td>
<td>CP011566</td>
<td>KY817593</td>
<td>HM439960</td>
</tr>
</tbody>
</table>
Table 4. Results of Microbiology Assays. “ND” denotes not determined due to various discrepancies.

<table>
<thead>
<tr>
<th>ISOLATE</th>
<th>CJB7</th>
<th>KTG3</th>
<th>TMV16</th>
<th>TMV21</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gram Stain</td>
<td>Gram negative</td>
<td>Gram positive</td>
<td>Gram negative</td>
<td>Gram negative</td>
</tr>
<tr>
<td>MacConkey Agar Growth</td>
<td>Gram negative</td>
<td>Gram negative</td>
<td>Gram negative</td>
<td>Gram negative</td>
</tr>
<tr>
<td>PE Plate</td>
<td>Gram negative</td>
<td>Gram negative</td>
<td>Gram negative</td>
<td>Gram negative</td>
</tr>
<tr>
<td>Lactose Fermentation (on MacConkey agar)</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Lactose Fermentation (on PRB)</td>
<td>NO</td>
<td>ND</td>
<td>NO</td>
<td>ND</td>
</tr>
<tr>
<td>Glucose Fermentation (on PRB)</td>
<td>ND</td>
<td>ND</td>
<td>NO</td>
<td>Yes</td>
</tr>
<tr>
<td>Sucrose Fermentation (on PRB)</td>
<td>NO</td>
<td>ND</td>
<td>NO</td>
<td>ND</td>
</tr>
<tr>
<td>Litmus Milk</td>
<td>Casein Metabolism</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Motility</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Sulfide Production</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Indole Production</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Catalase</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>
Bacterial Isolate KTG3: The KTG3 bacteria killed nine safe relatives and the active compounds for killing seven safe relatives were successfully extracted in the organic layer (Table 2, Figures 3 and 4). The KTG3 bacterial 16S rRNA gene is 83% homologous to a *Pseudomonas sp.* (Table 3) and KTG3 bacteria are a Gram (-) species although Gram staining did not confirm this finding (Table 4). The KTG3 bacteria do not ferment lactose, sucrose and glucose, are motile, and do not produce sulfide, indole or catalase (Table 4). The extractions of the KTG3 bacteria were sent to Dr. Lyndon West’s laboratory in FAU’s Chemistry and Biochemistry Department for spectroscopic analysis. Interestingly, they found a new cyclic depsipeptide (unpublished data) related to the newly discovered bananamides isolated from *Pseudomonas fluorescens* (D. Nguyen et al., 2016).

Bacterial Isolate TMV16: The TMV16 bacteria kill nine safe relatives and its active compounds are found in both the organic and aqueous extraction layers (Table 2). The organic extract killed eight of the safe relatives; killing of *E. coli* was not determined because the safe relative did not grow. Killing of *B. subtilis* by the organic extract is shown in Figure 5. The aqueous extract was able to kill five of the safe relatives, while the killing of three was not determined due to the irregular growth patterns of the safe relatives (Table 2). Killing of *E. aerogenes* by the aqueous extract was not determined due to safe relative growth irregularities (Table 2). The killing of *B. subtilis* by the organic extract from TMV16 is shown in Figure 5. The aqueous extract killed three safe relatives, including *A. baylyi*, which could not be killed with the organic extract and killing of *E. coli* by the aqueous extract was not determined (Table 2). The killing of *B. subtilis* by the aqueous extract is shown in Figure 6. The TMV16 bacterial 16S rRNA gene is 95% homologous to that of *Pseudomonas plecoglossicida* (Table 3). The TMV16 bacteria are a Gram (-) species, cannot ferment lactose according to MacConkey and Litmus, or sucrose, but can ferment glucose, are not motile, and do not produce sulfide or indole, but produce catalase (Table 4). Through extensive spectroscopic analysis, the TMV16 bacteria was found to produce xantholysin, a known antibiotic (unpublished data).

Bacterial Isolate TMV21: The TMV21 bacteria kills nine safe relatives and the organic extract successfully killed five; activity against *E. aerogenes* was not determined due to safe relative growth irregularities (Table 2). The killing of *B. subtilis* by the organic extract from TMV21 is shown in Figure 7. The aqueous extract killed three safe relatives, including *A. baylyi*, which could not be killed with the organic extract and killing of *E. coli* by the aqueous extract was not determined (Table 2). The killing of *B. subtilis* by the aqueous extract is shown in Figure 8. The TMV21 bacterial 16S rRNA gene is 95% homologous to that of *Pseudomonas plecoglossicida* (Table 3). The TMV21 bacteria are a Gram (-) species, cannot ferment lactose according to MacConkey and Litmus, or sucrose, but can ferment glucose, are not motile, and do not produce sulfide or indole, but produce catalase (Table 4).

Figures 3 and 4. KTG3 Bacterial and Organic Extract Antibiotic Activity Against *A. baylyi*. Figure 3 (left) is the antibiotic assay showing a zone of inhibition around the KTG3 bacteria patched as an “X”. Figure 4 (right) is the antibiotic assay showing the zone of inhibition of the organic extract (patched on the black dot).

Figures 7 and 8. Antibiotic Activity of the TMV21 Organic and Aqueous Extracts Against *B. subtilis*. Figure 7 (left) is the antibiotic assay showing a zone of inhibition around the organic extract isolated from the TMV21 bacteria on the right black spot. Figure 8 (right) shows a zone of inhibition around the aqueous extract isolated from TMV21 bacteria on the right black spot. Left black spots on both plates represent the methanol (solvent) negative controls.
Discussion

Organic extracts from the CJB7 and KTG3 bacteria only killed four and seven safe relatives, respectively (Table 2), suggesting that the compounds necessary for killing the remaining safe relatives may be in the aqueous layers which could not be analyzed. The TMV16 bacteria produced the most successful results for the organic extraction; the TMV16 organic layer killed eight safe relatives (Table 2). The aqueous layer of the TMV16 bacteria killed the same five safe relatives as the organic layer (Table 2). The compound(s) necessary for killing the nine safe relatives may be found in both the organic and aqueous layers and contain polar and nonpolar components.

The organic layer of the TMV21 bacteria killed five safe relatives, while the aqueous layer killed only three; killing of A. bay was specific to the aqueous layer (Table 2). Even though the TMV16 and TMV21 bacteria were found in soil from the same location by one undergraduate student, they are different species based on having different antibiotic activity profiles and 16S rRNA DNA sequences (Tables 2 and 3).

Sequence analysis of the 16S rRNA genes of the CJB7, KTG3, TMV16 and TMV21 bacteria show that all had high homologies to the genus, Pseudomonas (Table 3). This is consistent with the varied antibiotic activities and microbiology assays in Tables 2 and 4. Pseudomonas species have species-specific behaviors including the metabolites they produce which explains the varied killing between bacterial extractions (D. Nguyen et al., 2016; Otton, Campos, Meneghetti, & Corcao, 2017). The diversity of Pseudomonas species makes them good candidates for the production of useful, novel molecules (Vásquez-Ponce, Higuera-Llantén, Pavlov, Marshall, & Olivares-Pacheco, 2018). Additionally, the CJB7, KTG3 and TMV16 bacteria are motile (Table 3). Pseudomonas species tend to have one flagellum and multiple pili as structures for motility (Otton et al., 2017). The Gram-negative results of the Gram stains, MacConkey plates and PE plates (with the exception of the KTG3 bacterial Gram stain) were consistent with the Gram-negative characteristic of the Pseudomonas genus (Table 3) (Otton et al., 2017). Species in the Pseudomonas genus utilize sugar but usually not by fermentation; this was true for the CJB7, KTG3 and TMV16 bacteria by the negative results on MacConkey plates, Litmus milk and PRB assays (Table 4) (Siegrist, 2007 ). The TMV21 bacteria, however, fermentglucose as indicated by the positive result on the glucose PRB assay (Table 4). None of the four bacteria metabolize tryptophan (as indicated by negative results on indole production, Table 4) but it has been shown that Pseudomonas species can utilize tryptophan through other pathways which result in end-products other than indole (Bortolotti et al., 2016). For example, the bacteria studied here may metabolize tryptophan to make anthranolite, a chemical responsible for the quorum-sensing system, or communicating system, of certain Pseudomonas species (Bortolotti et al., 2016). Catalase production, typical of aerobic bacteria, is observed for the CJB7, TMV16 and TMV21 bacteria, also supporting their identification as species in the Pseudomonas genus, which is aerobic (Iglewski, 1996). The KTG3 bacteria, on the other hand, do not produce catalase and future studies are warranted on this anomaly.

Conclusion

Results of this study demonstrate the importance of citizen science by the immense amount of data accumulated by undergraduate non-STEM students and FAU’s TE research lab. Bacteria are being successfully characterized using a variety of techniques that may lead to new potential antibiotics. Four bacterial isolates that were originally isolated and characterized by undergraduate non-STEM students were selected for further characterization in this study by FAU’s TE research lab. The CJB7, KTG3, TMV16 and TMV21 bacteria have broad-spectrum antibiotic activity profiles, strong 16S rRNA gene homology to the Pseudomonas genus and similar taxonomic characteristics of the Pseudomonas genus according to classic microbiology assays. Secondary metabolites responsible for the antibiotic activities of the KTG3 and TMV16 bacteria were successfully extracted and structure elucidation is complete for the KTG3 depsipeptide and the TMV16 xantholysin (unpublished data). Future studies will explore the antibiotic activity of the pure KTG3 peptide, including its mechanism of action. Additionally, extensive spectroscopic analysis to characterize the cyclic framework of the KTG3 peptide, sequencing of KTG3 bacterial genomic DNA and cytotoxicity studies are underway in hopes of characterizing and reporting a novel antibiotic. Extraction protocols of compounds with antibiotic activity from the TMV16 and TMV21 bacteria are ongoing (data not shown). Future directions involve structure elucidation of the compounds and genomic sequencing of the CJB7, TMV16 and TMV21 bacteria. Finding new antibiotics to kill MDR bacteria is vital. The findings in this study are the beginning steps toward critical discoveries as Tiny Earth at FAU continues to isolate hundreds of potential antibiotic producers.

Acknowledgements

We thank FAU’s Departments of Biological Sciences and Chemistry & Biochemistry for their support. Special thanks to Dr. Rod Murphey for continuous and unconditional support, the 2018 TE team including Noah Kaplan and Jayson Burkhardt for technical help and Dr. Daniela Scheurle for allowing expansion into the microbiology teaching labs. Thanks to the undergraduate students who performed the TE experiments: Christina J. Berberich and Daniel Albrecht (CJB7), Kyle Galinat and Sharon Cuevas (KTG3), Tiana Velez and Kamyr Alizadegan (TMV16), and Molly McCarthy and Victoria Carroll (TMV21). Finally, thanks to Genevieve Liddle (TE TA) for collecting the soil that contained the KTG3 bacteria.
References


WHERE ARE ALL THE INTROVERTS HIDING?

AN ANALYSIS OF INTROVERSION IN RESEARCH

Courtney Noya & Laura Vernon

Harriet L. Wilkes Honors College

Abstract

Since their origin, extraversion and introversion have become staples in both research terminology and colloquial language. In 2012, Susan Cain released a New York Times Best-Seller, Quiet: The Power of Introverts in a World That Can't Stop Talking, which discussed the role of introverts in a society that values extraversion. This paper analyzes the Five-Factor Model as well as case studies of various articles displaying bias against introversion. These articles are used to discuss how the bias against introversion has become part of psychological research and the need to reverse trends of stereotyping and misinformation. Other articles are also discussed, which present a more well-rounded presentation of introversion and extraversion.

In 1921, Carl Jung first used the terms “extraversion” and “introversion” to describe psychological types of personality. Since their origin, these terms have become staples in both research terminology and colloquial language. Extraversion is part of the Five-Factor personality model (McCrae & John, 1992) and internet media companies create online quizzes for entertainment, some based on the pretense of identifying the degree of introversion or extraversion based on favorite foods or colors (e.g., Buzzfeed, PopSugar). Introvers and extraversion have often been presented as a dichotomy rather than existing on a spectrum. As a result, in some research and media reports introversion is portrayed as a failure to achieve the desirable trait of extraversion or as a lesser option. However, despite this, interest in introversion, and the desire for fair representation of introverts, has become popularized relatively recently.

Susan Cain wrote Quiet: The Power of Introverts in a World That Can't Stop Talking in 2012 and it quickly garnered popularity as it rose to the top of the New York Times’ Best Seller list. Introverts around the world flocked to the book for its theme of celebrating introverted qualities in a world where extraversion has become the expected ideal. Cain (2012) establishes the thesis at hand: anywhere between one-third to one-half of the world’s population are introverts, yet research is primarily skewed towards extraversion in both abundance and content. The popularity of Cain's book suggests that not only are there a large number of introverts out in the world, but also that many of them identify with themes of feeling undervalued, misunderstood, or as a weak link in a culture where extraversion is celebrated. Six years following the publication of Cain's bestseller, the culture of extraversion as the ideal is still prevalent in society. Though this is a problem in culture and research, the role of bias against introverts in the field of research remains largely unexamined. This paper will explore how cultural bias may have influenced the research field, while arguing for more comprehensive and neutral research through the use of unbiased language, critical literature reviews, and unbiased research agendas.

Defining Extraversion and Introversion

Since bias against introversion is closely tied to the cultural expectations of western society, it is essential to consider the usage of the terms “introversion” and “extraversion” as they have developed over time. Extraversion, as Carl Jung (1921) described it, is an outward turning of libido or a transfer of energy from an individual, out into an “object”. On the other hand, introversion is “a mechanism in which the libido concentrates itself wholly on the complexes, and seeks to detach and isolate the personality from external reality” (Jung, 1921, p. 501). Though libido is often used today to describe one's sexual drive, in the sense that Jung used the term it is also inclusive of one's innate instinct or drive.

Jung states that extraverts outwardly express their energy, whereas introverts spend more energy internally (1921). This definition is not far off from how the general populace define introversion and extraversion today. Cain (2012) emphasizes that the main differences between introverts and extraverts are how they mentally process their surroundings, how they prefer to interact with those around them, and how their energy levels are either depleted or restored. Both the exertion and storing of energy appears to be a common theme in the differentiation between extraverts and introverts despite misconceptions that the difference centers on being shy or outgoing.

The Five-Factor Model Presentation of Introversion

The Five-Factor Model of personality is commonly used to assess what are touted as core aspects of personality: conscientiousness, agreeableness, neuroticism, openness, and extraversion (Costa & McCrae, 2009). This model has been and continues to be used by many researchers and through its structure automatically sets up extraversion as the standard. Only people who score as having a “lack” of extraversion then qualify as introverts. In the Five Factor Model, an individual could rank high or low on agreeableness, extraversion, openness, etc. (Costa & McCrae, 2009).

In this way, the model primes readers to interpret lower levels of extraversion as a lacking of the positive quality of extraversion, as they would also assume that someone with low levels of agreeableness is disagreeable.
and someone with low levels of openness is closed off. This trend to recognize introversion as the absence of the valued trait of extraversion (when it is recognized at all; often it is overlooked completely) has permeated personality research to this day.

The usage of terminology related to introversion and extraversion frequently lacks generalizability and furthers cultural stereotypes. McCrae and John (1992) sought to better understand popular conceptions of personality traits by comparing how people sorted different adjectives into categories based on the Five Factor Model of personality. Regardless of the method, conceptions of extraversion seemed relatively consistent, including overlapping descriptors such as “talkative.” Interestingly, the categorizing sometimes appeared to accurately describe extraversion, such as “energetic,” “gregarious,” or “excitement-seeking,” but others may be more open to interpretation and debate and would seem to depend on the context, such as “talkative” or “skilled in play, humor.” For example, if an introvert is given the opportunity to speak about a subject that they are extremely passionate about in the right kind of setting, they may be very talkative. Furthermore, humor is particularly subjective. While an extravert may work a room and get a barrel of laughs, an introvert may have subtle, quiet, or quick-witted humor. If subjective topics such as humor were considered from the perspective of introverts in an empirical or research setting, there might be evidence to support claims that introverts possess qualities such as humor or being talkative. At the present time, these areas remain unexplored, further emphasizing the need to fill gaps in the literature toward a more well-rounded perspective.

Furthermore, though many present extraversion and introversion as opposites, they exist on a spectrum. For example, in the Five-Factor model, one could score somewhere in the middle of the spectrum (Costa & McCrae, 2009). People who fall in between introversion and extraversion are most often labeled as “ambiverts” (Cain, 2012). However, regardless of how far to one side of the spectrum a person may fall, individuals can express qualities that are in opposition to their typical behavior. Cain (2012) calls this the “rubber-band theory” wherein people can “stretch” themselves to behave in a way that best suits the current situation, but that following the need to stretch, they return to their resting potential. Many studies fail to take the rubber-band theory into consideration, rather they imply that introverts should act more like extraverts for long periods of time, if not always.

The Current State of Personlality Research: What is Research Saying, or Not Saying, About Introversion?

A commonly used search engine for peer-reviewed full-text articles in psychology is the American Psychological Association’s database, PsycNet. This database gives users the opportunity to do general searches, such as by topic, as well as more specific searches of author or title. To date, when one searches “extraversion” as a general search in PsycNet, the program finds 10,540 results. “Introversion” as a search term, on the other hand, only brings up 3,359 results. In more specific searches requiring “extraversion” and “introversion” in journal article titles, the results come back as 1,167 extraversion titles and 357 introversion titles.

Therefore, in this particular database, representation of introversion in research is slightly less than one-third that of extraversion. Although this is only a single database, it is commonly used in educational and research settings when searching for research articles. The popularity and availability of this database means that these articles are easily and frequently accessible to the future generation of researchers, professors, and psychologists. Research on extraversion, at least what has been published, is more accessible and numerous. The relative numbers alone are discouraging to a researcher hoping for parity and equal representation between the constructs. Additionally, the content of some of the articles themselves make the research appear particularly problematic.

Research Article Titles Reflect Prevailing Attitudes

The titles of many research articles reflect the culturally-influenced desire for introverts to behave in more extraverted ways. For example, Zelenski, Santoro, and Whelan (2012) published a study entitled “Would Introverts Be Better Off if They Acted More Like Extraverts? Exploring Emotional and Cognitive Consequences of Counterdispositional Behavior.” Similarly-titled articles include, “The Failure of Introverts to Emerge as Leaders: The Role of Forecasted Affect” by Sparks, Stanmore, and O’Connor (2018) and “Why Extraverts are Happier Than Introverts: The Role of Mood Regulation” by Lischetzke and Eid (2006).

Below we will examine the content of these articles, but for the present it is important to note how they offer a negative perspective of introversion. Their titles and premises are grounded in the extravert ideal and ignores the other side of the coin: there are many positive qualities introverts have that benefit themselves, and that may benefit extraverts. For instance, introverts tend to take longer to process information and therefore spend a lot of time thinking before speaking, whereas extraverts are more likely to act first and process later. While taking the risk to speak first, extraverts may receive benefits, yet they also run the risk of misspeaking, making bigger mistakes, or talking over quality ideas from others (Cain, 2012). If one of the goals of psychological research is to help make people’s lives better, then it is important to see what is working well from both sides of the spectrum.

Literature Reviews and Hypothesis Formation

As is the standard for research articles, the literature review sections directly inform the hypothesis and what the study will be evaluating. In this step of the research process a problematic theme begins to emerge. Before research is undertaken, it is standard practice
to conduct a literature review first, in order to determine what others have done and what they found. Many authors use the literature reviews as a way to set the stage for their current hypotheses.

Lischetzke & Eid, 2006; Zelenski et al., 2012; Sparks, Stanmore & O’Connor, 2018). In many ways, this approach is beneficial, as it prevents researchers from unnecessarily repeating the same study and allows researchers to find gaps in the literature that need to be filled. However, it also sets researchers up to incorporate old biases and findings into their new hypotheses and methods. The uninformed or biased information within the literature from the past acts as a reference point to begin a study, can influence the development of new hypotheses, and can lead to confirmation bias later in the process.

Sparks et al. (2018) cite research regarding the prevalence of extraverts as emergent leaders, which they define as individuals who take on leadership roles when a situation presents without a formal leader present. As with the prior studies, the previous literature becomes the basis for their study, as there was no new theory for why introverts do not become emergent leaders. As new research continues to cite older literature, a self-perpetuating cycle occurs which continues to promote misconceptions and stereotypes about introversion first introduced into the literature long ago and unquestioningly repeated by more recent research. For example, Sparks et al. (2018) references a Zelenski et al. study (2013) as part of their literature review. Zelenski et al. (2012, 2013) present introversion as a negative and undesirable personality trait, often with relatively little empirical support for their negative assertions, and when these articles are referenced by researchers, like Sparks et al. (2018), the cycle continues.

Do extraverts have more positive emotions because the conditions in the lab are unintentionally biased in their favor? Is it because introverts have internalized cultural messages that they cannot be as happy as extraverts or that there is no room for them to become leaders? Are there third variables at play? In a society where extraversion is the norm, many introverts are used to performing the role of extravert to fit in with expectations. One common phenomenon in social psychology is stereotype threat, whereby members of a stereotyped group are conscious of the stereotypes about them and unconsciously behave in ways consistent with the stereotypes. For example, if women are asked to check a box indicating their gender before a math test, their math performance is lower than if they had not been asked to check the gender box (Ryddell, Rydell, & Boucher, 2010). It seems likely that introverts might succumb to stereotype threat.

**Research Design**

If researchers do not consider their initial assumptions, the way research design and lab set-up may be involved, and the influence of broader cultural factors such as stereotype threat, in more broadly examining the qualitative meanings behind their results, then research studies are falling short of their full potential. While numbers and figures may support a certain hypothesis, there are often cultural explanations that could explain the results from a different perspective. In this way, psychological research would benefit from more anthropological or sociological perspectives, which examine the creation and development of societal and cultural structures and turns this same lens onto the assumptions and values underlying psychological inquiry. For results to be truly generalizable outside of the lab, they must take into consideration the context of cultural demands and expectations.

An example of a long-held belief that continues to be perpetuated is the commonly stated theory that extraverts are happier than introverts because trait-introverts lack the same levels of positive emotion as trait-extraverts (Zelenski et al., 2012). While such studies may have quality methods that produce reliable results, the factors are frequently examined only within the context of the laboratory and with an eye to confirming these long-held beliefs. This confirmation bias appears to be human nature in that it is common within both the research field and in a society wherein people tend to search for evidence to confirm initial beliefs rather than to disconfirm. Zelenski et al. (2012) recognize the lack of generalizability that comes with doing laboratory work, but they do not look at the factors influencing their hypotheses, as well as the potential emotion of introverts, as a cultural issue.

Hypothesis formation, literature review, and experimental design, interpretation of data, and study limitations can all be negatively impacted by unquestioned and unexplored negative assumptions about introverts. For example, Lischetzke and Eid (2006) describe a study of introverts and extraverts watching an emotionally ambiguous film and then examining to what extent extraverts versus introverts were able to maintain positive emotions. They report that extraverts were more successful than introverts at maintaining a positive mood and indicate briefly that the ability to do so benefits extraverts in their daily lives and explains why they are “happier” than introverts. Lischetzke and Eid (2006) state in their limitations section that they did not measure what types of methods the extraverts and introverts were using to maintain positive emotions.

There remains no in-depth analysis of intrapersonal and interpersonal processes, and their costs and benefits, used by extraverts and introverts. For example, one of the methods that Lischetzke and Eid (2006) suggest extraverts may use for maintaining positive emotions is diverting attention from sad aspects of the film or a natural inclination to pay more attention to the positive aspects of the film. If these theories are true, then it could be argued that perhaps it is a failing of emotional intelligence on the part of extraverts not to take the whole range of emotional content into consideration when viewing the film. Taken more broadly, such findings could also suggest a moral failing of extraverts to be
appropriately concerned by negative situations. Theories such as these are heavily based in speculation and suggest the influence of the extravert ideal, in which outcomes are interpreted as adaptive and desirable without consideration of alternative explanations that such qualities may also include maladaptive or undesirable aspects. Without considering more balanced new theories, it will be difficult for the field to continue to advance and for future empirical studies to be designed to consider a broader viewpoint.

**Operational Definitions: How Do We Talk About Introverts?**

The pattern and flow of research moves from the literature reviews and hypothesis formation into the operational definitions researchers use when talking about introverts. There appears to be a misunderstanding about what the characteristics of an introvert include when describing them in a research setting. Zelenski et al. (2012) wanted extraverts to act like introverts, so they were instructed to be “reserved, quiet, lethargic, passive, compliant, and unadventurous” (p. 294). Operational definitions determine exactly how to interpret what a study means by the terms they are using. By defining introverts with negatively-valenced terms like “lethargic” and “passive,” there is a dangerous reinforcement of stereotypes that already exist, despite their potential lack of accuracy.

Cultural biases inform not only our operational definitions of introversion but also the hypotheses that researchers test. For example, in a recent study, Spark, Stansmore, and O’Connor (2018) stated, “The objective of this study was to understand why introverts are less likely to emerge as leaders” (p. 88). Yet Susan Cain (2012) emphasizes that some of the most influential leaders we know such as Rosa Parks, Eleanor Roosevelt, Moses, Stephen Wozniak, and others were introverts. It is difficult to consider such a wide array of leaders from different backgrounds to all be the exception to the rule, suggesting that the initial premise about introverts failing to emerge as leaders may be oversimplified.

Stereotyping, though sometimes a useful heuristic, can also creep into the operational definitions used as the basis for a study. For example, Lischetzke and Eid (2006) state, “Extraverts desire to experience higher activated pleasant affect (e.g., enthusiasm, elation) and pleasant affect (e.g., happiness, cheerfulness) than introverts” (p. 1130). They do not offer a citation to support this assertion. While enthusiasm and elation may be accurate terms to use because introverts, especially as children, tend to have higher reactivity levels to external and internal stimuli (Kagan, Reznick, & Snidman, 1988), the idea that introverts do not desire “happiness” does not have a strong basis and the article fails to cite a study in connection with that statement. “Happiness” is a difficult word to use because so many people define it differently, including introverts and extraverts.

Because of the weight of such a word, it is important to stress once again the need for operational definitions to make it clear the exact context of the term.

**Models of Balanced Treatment of Introversion and Extraversion**

This paper has covered many ways cultural anti-introvert bias has impacted research. That is not to say that research that accurately and fairly portrays introversion and avoids negative stereotyping does not exist. Hendrick and Brown (1971) investigated interpersonal attractions between introverts and extraverts with the hypothesis that introverts would prefer those who are dissimilar from themselves, or extraverted. In forming their hypothesis, Hendrick and Brown (1971) were careful in stating that the results from a prior study that they were basing their hypothesis on, “suggests the normative desirability of extraversion as a social trait” (p. 31). By directly stating that extraversion is the norm, they give context as to why in another study they cite, that introverts describe an extraverted personality as their ideal as well as why they are predicting that introverts may be more drawn to extraversion. Further, in the discussion section of this paper, Hendrick and Brown (1971) explain their results in the context of social stereotyping. They found that introverts tended to prefer extraverts in short-term scenarios like who would be interesting at a party or has the ideal personality, yet preferred other introverts for long-term commitments such as being a reliable friend or being honest and ethical. These results, as they explain, are reflective of the stereotypes of fun-loving, outgoing extraverts versus the more stable, conscientious introverts. Unfortunately, this research will soon be reaching an age of about 50 years, making it “outdated” by most research standards, yet it provides a much more realistic perception of the limits of research when there are deep stereotypes to combat.

More recently, von Gehlen and Sachse (2015) studied the influence of arousal on performance in the context of personality, specifically introversion and extraversion. Rather than presenting the study as a juxtaposition of which personality type is better at performing with excess stimulation, the authors remained relatively neutral in tone. von Gehlen and Sachse (2015) found that extraverts’ work improved with cognitive arousal and that the arousal did not seem to impair introverts as expected. Though this study had limitations, the article’s language sets it apart from others discussed in this paper. The expectation that introverts would perform worse with cognitive arousal was based on physiological studies rather than stereotyped expectations.

Furthermore, when the results suggested that cognitive arousal did not negatively affect introverts’ performance, von Gehlen and Sachse looked at third variables that may have influenced their results, emphasizing the point that studies like these are rarely as straightforward as they are often presented.
Future Directions

While this paper has presented some shortcomings existing in the field of research, it would be remiss not to express the potential for better future outcomes. Attention-grabbing titles may get an article noticed, but it should not be at the expense of the identity of participants. Researchers and peer reviewers have the opportunity to demand neutrally valenced terminology in regard to personality traits like introversion in the same way that the field has made a move from referring to “schizophrenics” to “people with schizophrenia.” Higher standards have the potential to lead to better results.

Further psychology research, specifically in partnership with fields such as linguistics or anthropology, could examine the use of biased language and cultural influence to determine what criteria would be best for reviewers to target when reading journal submissions. If guidelines could be created, they could become as common place as “people with schizophrenia,” which would therefore eliminate much of the flaws seen in otherwise useful studies. If peer-reviewed articles can be published while supporting outdated stereotypes, then it lowers the expectation for accurately reporting introversion or other misunderstood concepts. However, if done correctly, the quality of work being produced will be much higher and the knowledge generated may provide a more nuanced picture of personality traits.

Furthermore, as Susan Cain’s (2012) book has shown, introverts across the world are looking for better representation. By taking responsibility in the research field to begin that movement could be influential for future generations. It is not enough to simply make research on extraverts more fair for introverts, personality psychologists can push for more research on introversion as its own trait. Introverted students should be able to find research that does not suggest that they are constantly lacking in extraverted qualities, especially since many introverts experience cultural messages that they are not as good as extraverts from before they enter school all the way through their academic careers. For any research, it is essential that potential biases be addressed from the beginning of a literature search or hypothesis formation all the way through to the writing of the discussion section.

Conclusion

Susan Cain (2012) started a public conversation about representation of introverts because of her desire for introverts like herself to be seen, heard, and valued. Six years later, however, the research in personality psychology appears slow to change. As seen in this paper, potential sources of bias against introverts appear throughout the research process; in research article titles, literature reviews, hypotheses, research design, etc. Authors who are contributing to the study on introversion in a positive manner should be looked to as examples for others, but combatting this problem is likely to be a long-term process including intentional steps by authors and editors to increase standards to reduce bias and reduce reliance on outdated misconceptions and stereotypes.

References


EFFECTS OF MISSION TRIP PARTICIPATION ON SOCIAL JUSTICE ATTITUDES AND BEHAVIORS

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Abstract

Research on the effects of mission trips on social awareness, attitudes, and behaviors towards social justice has been limited. In the current study, we examined whether volunteers going on a weeklong art camp in Guatemala with a non-profit, Athentikos, would show positive changes in their social justice attitudes and behaviors. Current trip participants (n=6) completed questionnaires before and immediately following their trip, whereas trip alumni (n=10) completed questionnaires regarding one previous trip. We hypothesized that participants will report an increase in social awareness as well as feelings about and plans for social action immediately following the trip. On average, all variables showed some increase from pre-trip to post-trip with confidence increasing significantly and interest in social justice related activities, evaluation of social justice obstacles and support, and empathic awareness showing trends towards statistically significant increase. Overall, trip attendees showed correlations within a number of positive social justice attitudes and behaviors.

Introduction

Poverty, racism, and other social issues exist cross-culturally; however, awareness of these issues varies among individuals. Moreover, it is of great societal interest to determine how to increase individual action in working to overcome these societal issues. This study will examine whether a voluntary week-long art camp in Guatemala will result in positive changes among participants in regards to levels of social awareness and desire for social justice. Social awareness is one’s recognition of issues like poverty or racism, which can be focused abroad (e.g., in Guatemala) as well as within the United States. Those higher in social awareness are most likely to engage in social action because the first step to intervening in an issue is the recognition that a problem exists (Darley & Latané, 1968). Social action is defined as visible behaviors that reduce social injustices, such as volunteering with humanitarian and social justice organizations and going on mission trips. Those who help often experience empathy, or experience another’s feelings vicariously, which leads them to then work to alleviate another’s suffering (Myers & Twenge, 2017). More specifically, ethnocultural empathy, as defined by Wang (2003), is a learned ability and personal trait that specifically examines empathy concerning members of different racial and ethnic groups.

Preconditions exist which either encourage or hinder helping behaviors. An individual must be aware that a situation exists, recognize it as problematic, and remember its existence. Then an individual must have a sense of responsibility for solving the problem. Feelings of responsibility are heightened through a shared sense of identity with the distressed group or must be inclusive to the extent that they would include the distressed group. Another precondition for helping behavior is a sense of empathy for others. Once an individual feels aware and responsible, they must then feel self-efficacy powerful enough to start action.

Knowledge of Social Issues

There is often a social, geographic, and economic divide between those with more and less privilege. Divisions partially occur because people tend to associate with those they feel share a common identity, also known as their “ingroup,” which in turn puts those who have different experiences into an “outgroup” (Sherif, 1965). These divisions can be found in social interactions or even in physical environments, where the privileged are distanced from inequalities and injustices.

Levine, Prosser, Evans and Reicher (2005) found that helping behaviors can be increased by creating inclusive identities in which similarities are emphasized and celebrated. Additionally, reminding people of their group identity strengthens the likelihood that they will help someone whom they perceive to share their identity. Levine et al. (2005) also found that expanding an identity to include a greater set of people results in increased helping behaviors. Because of the socio-economic and often physical differences between generally middle class North Americans and those living in poverty both stateside and internationally, it is difficult to breed familiarity. A type of “prejudice habit” occurs when a person may deny having certain prejudices but underlying discomfort may exist and arise in real life situations (Devine, 1989). The presence of underlying prejudices often occurs because of stereotypes, which prime people to rely on heuristics for information (Devine, 1989).
Learning Models

Since social injustices can occur at the individual, group, institutional, and societal levels (Rothenberg, 2007) there is a need to look at models for engagement and advocacy for social justice abroad as well as in the United States. Learning about an issue only through a textbook is not sufficient. The learning must stick with an individual over the long term. Memory models show information retention occurs in two ways: explicit or implicit (Myers, 2007). Explicit memory can be formed with intentional learning. Passive methods of learning, such as lectures, are not as effective as more active models such as immersive experiences (Choi & Kirkorian, 2016). Mission trips, especially international trips, are fully immersive, suggesting the outcomes of such trips will produce long-term explicit memory and learning for lasting results in behavior and attitude.

Perspective-Taking/Empathy

Because social justice actions and attitudes often lack direct or immediate benefits to an individual, it is beneficial for participants to feel connected to the cause they support. Having substantial interactions with a diverse group can encourage people to value others’ perspectives and the importance of engaging in social action (Hurtado, Engberg, Ponjuan, & Landreman, 2002). It has also been found that empathic concern is correlated with valuing the welfare of others; specifically, if a person perceives someone in need as someone of high value, they are more likely to offer assistance. Alternatively, those perceived poorly are less likely to receive empathy and assistance (Batson, Eklund, Chermok, Hoyt, & Ortiz, 2007). Therefore, it is crucial to develop an understanding and familiarity between people for them to become invested in the welfare of others.

Religious convictions have also been associated with helping behaviors, particularly if the behaviors are planned in advance or involve people (Galen, 2012). In this study, participants participated in a religious mission trip with a faith-based curriculum, meaning that spiritual elements such as forgiveness and redemption were discussed and incorporated into the artwork volunteers helped the children to create.

Beyerlein, Trintapoli, and Adler (2011) found that mission trips could increase a variety of civic activity, and out of the outcomes measured following short-term mission trips in adolescents, formal volunteering showed the largest increase. The current study will similarly evaluate whether Athentikos’s I AM ART religious short-term mission trip encourages attitudes and behaviors promoting social justice with a wider range of ages. Because the Athentikos trip is taken by a self-selected set of individuals, we would expect already elevated levels of social awareness, empathy, and self-efficacy and that the trip itself will strengthen those feelings.

Self-Efficacy/Confidence

Social justice-related self-efficacy is an individual’s perception of their capability of succeeding in doing social justice-related activities and having positive outcome expectations; increased self-efficacy predicts social justice activism (Miller et al, 2009). If there is a lack of self-efficacy in social justice activities, it is difficult to remain motivated to continue working, particularly if the participant is part of a more privileged group (Goodman, 2000). Feelings of self-efficacy have both direct and indirect effects on social justice interest, but those more interested in social justice tend to show greater commitment and high self-efficacy (Miller & Sendrowitz, 2011). Confidence and commitment toward political participation, civic engagement, and multicultural activism can be strengthened due to participation in a social justice education course (Krings, Austic, Gutiérrez, & Dirksen, 2015).

Athentikos’s I AM ART program

Scott and Amelia Moore founded Athentikos in 2008 following the adoption of their two sons from Guatemala. For an I AM ART program, Athentikos pairs with organizations in Guatemala that work with at-risk youth. American volunteers travel to Guatemala and spend three days learning about the culture and history of Guatemala and seven days hosting an art camp that teaches youth about different art mediums and connects art with the world around them. During the art camp, volunteers share the same facilities as the at-risk youth, often in orphanages and group homes, and are exposed to their daily lives. Many of the children have been victims of physical or sexual abuse, child labor, or homelessness. For the majority of volunteers, this is their first exposure to interacting with people from the aforementioned victimized groups.

Only a handful of studies have examined the impact of mission trips on social awareness, social justice, and ethnocultural empathy (Wang et al., 2003; Beyerlein et al., 2011; Krings et al., 2015; Hurtado et al., 2002). However, these studies typically use college students as their sample population and examine how learning experiences within the classroom affect desire for social action. The present research will examine multiple variables together in an adult sample of trip volunteer participants from the community. The purpose of this study is to examine a wider range of adults and measure how exposure to a short-term trip experience in Guatemala directly impacts the participant group’s social awareness and desire for social action.

Hypothesis

We hypothesize that, as compared to pre-trip levels, participants will have increased social awareness, and feelings about and plans for social action immediately following the trip.
Methods

Pre- and Post-Trip Participants

Participants were six Athentikos volunteers from the fall 2016 and fall 2017 I AM ART trips (6 females; age range: 19-48). The sample consisted of 5 White and 1 Hispanic/Latinx participants, all of whom identified as middle or upper-middle class. On average, participants completed a bachelor's degree or were in the process of pursuing a collegiate education. The majority of participants identified as Protestant and one participant identified as Evangelical Christian.

Alumni Participants

Alumni participants were 10 Athentikos volunteers from fall and summer I AM ART trips between 2014 and 2017 (6 females, 4 males; age range: 23-64). The sample consisted of 7 White and 3 Hispanic/Latinx participants, all of whom identified as middle or upper-middle class, with varying educational attainment (from high school to doctorate). The majority of participants, six of the ten, identified as Protestant; three specified they were Christian or Evangelic Christian, and one identified as Christian Scientist.

Design

Participation in this study had no effect on whether participants were able to participate in Athentikos's I AM ART program. Trip participants were emailed a link to the online consent form two weeks prior to their trip and after signing were redirected to pre-trip questionnaires on SurveyMonkey. One week following their trip, participants were emailed a link to post-trip questionnaires. Alumni were emailed the consent form link and then the post-trip survey. Of the 30 individuals who were emailed pre-trip, 10 completed the pre-trip questionnaires. Of those, six completed the post-trip questionnaires. Of 70 alumni emailed, 10 completed the questionnaires.

Measures

Pre-trip Measures for Current Trip Participants

Two subscales from The Social Awareness Inventory (Sheldon, 1996) were used: One measured self-experience from the self-perspective, including awareness of their own experiences and self-consciousness, such as: “When something upsets me, I think a lot about why I got upset” (Sheldon, 1996). Another subscale was others' experiences from others' perspective; this measures the awareness one has of others and their experiences, such as: “More than most, I put myself in another's shoes” (Sheldon, 1996). There are eight items in each subscale rated on a 5-point scale (1=Strongly disagree, 5=Strongly agree). Internal consistency in the present study was good for the self-experience from self-perspective, α=.82, and for others' experiences from others' perspectives, α=.80.

The Social Issues Questionnaire (Miller et al., 2009) addresses participants' awareness of issues like social inequalities, confidence about participation, and engagement in social justice and equality activities. There are 51 items, rated on several 10-point scales. 10 items examining confidence in participating in different social justice activities (0=No confidence at all, 9=Complete confidence), 10 items examining how much participants felt they could cause specific outcomes such as “reduce the oppression of certain groups” (0=Strongly disagree, 9=Strongly agree), 9 items addressing interest in social justice actions, such as: “enrolling in a course on social issues” or “going on a weeklong service or work project” (0=Very low interest, 9=Very high interest), 9 items examining potential encouraging factors of barriers to social justice activity (0=Not at all likely, 9=Extremely likely), and 9 items about how likely participants would be to “have access to a role model” (Miller et al., 2009). Internal consistency for the scale in the present study was adequate, α=.69.

Two subscales were used from The Scale of Ethnocultural Empathy (Wang, 2003). The first subscale on empathic perspective taking includes 7 items; the second includes 4 items, which measure empathic awareness. Both are rated on a 5-point scale (1=Strongly Disagree, 5=Strongly agree). Empathic perspective taking includes items meant to indicate an effort to understand those with racial or ethnic backgrounds different than one's own, whereas, empathic awareness focuses more on the knowledge that experiences differ between racial or ethnic groups (Wang, 2003). Internal consistency in the present study was poor for the empathic perspective taking subscale, α=0.62 and the empathic awareness subscale, α=.65.

Additionally, a 5-item questionnaire, designed for the present study, asked participants to rate their knowledge of Guatemalan and US history and poverty. Items were rated on a 5-point scale (1=not at all, 5=very).

Post-trip Measures for Current Trip Participants and Alumni

The same measures and subscales from The Social Awareness Inventory (Sheldon 1996), The Social Issues Questionnaire (Miller et al., 2009), and The Scale of Ethnocultural Empathy (Wang 2003) were given post-trip. Additionally, post-trip measures included two items regarding level of engagement with Athentikos and other humanitarian organizations (rated on a 5-point scale: 1=Not at all, 5=Very often), which asked “How engaged have you been with Athentikos since your trip?” as well as “How engaged have you been in humanitarian organizations outside of Athentikos?” The post-trip measures also included eight open-ended questions regarding positive, negative, and growth-producing aspects of the trip and participant experiences.
Results

Only participants with complete data were analyzed. Qualitative analysis of open-ended responses regarding trip experiences was examined for consistent themes between participants. Quantitative analyses used paired samples t-tests to test for changes from pre-trip to post-trip and correlations to examine interrelations among the post-trip and alumni group variables.

Qualitative Findings

Regarding the most positive aspect of the trip, the majority of participants reported that they most enjoyed working with the at-risk youth. The theme of working with the children emerged in reports of enjoyment of doing physical artwork, but also in more interpersonal ways such as sharing stories with the children or feeling a sense of community. One of Athentikos’s camps is held at Casa Bernabé, one of Guatemala’s orphanages. A volunteer from the 2015 Casa Bernabé camp stated, “The most positive experience was seeing how kids started sharing their stories with us, because that meant they trusted in us enough and maybe we can’t fix their problems but we can bring a little bit of relief through listening.”

Participants also expressed joy in the trip’s service elements. One participant stated, “Having seen many other parts of Guatemala but never the “inner” city, I greatly appreciated the opportunity to be in the La Limonada community for the week.” La Limonada is one of Guatemala’s largest slum communities located in what is referred to as a “red zone” due to the severe poverty and gang violence.

Regarding negative experiences on the trip, two participants were unhappy with a lack of hot water showers, while others struggled with the language barrier and communication. However, five participants noted they had no negative experiences or that leaving was the hardest part of the trip. One participant stated, “It was hard leaving the kids knowing I probably would never see them again,” while others simply wrote, “having to leave.”

Although many responses were relatively undeveloped, participants were most expansive in their answers to the most growth-producing or challenging aspect of their trip. Participants wrote about aspects like learning about the reality many of the children face regarding abuse and trying to understand it. Eight of the responses discussed what the trip organizers call “Conflict Day” and/or the children’s stories as one of the most challenging parts of their experiences. At one camp, during “Conflict Day,” volunteers are educated about their location at Oasis, a residential home for girls who have been victims of sexual violence, and they hear the stories of the girls who live there. One participant wrote that her greatest challenge was “the tears of our girls and hearing about all of the troubles at Oasis and in Guatemala on the night of Kate’s presentation.” Another said it was “knowing how much suffering there is in a place like La Limonada while trusting in God’s goodness and sovereignty.” Another participant, an interpreter, wrote about “Conflict Day” saying, “I have to leave my emotions behind for a little while and express what the kids are trying to say without crying all the time. What I’m trying to say is the third day pushes you to always go farther because all the emotions that are involved.”

Overall, the responses from participants illustrate how the experience of going on an I AM ART mission trip is more than a typical vacation. Participants’ responses indicated an awareness of the service elements’ value on the trip and positive associations with such elements. Though some negative experiences were reported, such as the lack of comforting amenities, overall, participants were positive about their experiences.

Pre-trip and Post-trip Quantitative Differences

Descriptive statistics for all variables at pre-trip and post-trip are shown in Table 1. To examine the extent to which social justice attitude and behavioral variables were influenced by trip experiences, pre-trip and post-trip scores were compared using paired samples t-tests. Most variables showed at least a minor increase from pre-trip to post-trip. However, likely due to the small sample size, the only statistically significant difference was found in the increased scores for confidence levels pre-trip to post-trip; t(5)=-2.214, p=0.039. The relationship indicated confidence levels post trip (M=137.67, SD=20.39) were higher than confidence levels pre-trip (M=119, SD=25.52).

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Descriptive Statistics for Primary Variables</th>
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<tbody>
<tr>
<td>Measures</td>
<td>Pre trip</td>
</tr>
<tr>
<td>Confidence</td>
<td>119.00</td>
</tr>
<tr>
<td>Perceived Benefits</td>
<td>62.33</td>
</tr>
<tr>
<td>Interest</td>
<td>35.17</td>
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<tr>
<td>Likelihood of Engagement</td>
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<tr>
<td>Self-Experience</td>
<td>36.36</td>
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<tr>
<td>Others-Experience</td>
<td>33.00</td>
</tr>
<tr>
<td>Empathic Perspective-Taking</td>
<td>22.83</td>
</tr>
<tr>
<td>Empathic Awareness</td>
<td>15.60</td>
</tr>
</tbody>
</table>

Similarly, interest, empathy, and evaluation of support and obstacles showed a trend towards an increase following the trip. I found a difference approaching significance in the scores for interest levels pre-trip and interest levels post-trip; t(5)=1.326, p=0.121: The relationship indicated a trend for higher interest post-trip (M=52, SD=5.80) than pre-trip (M=48.17, SD=8.61). There was a difference approaching significance in the scores for empathic awareness levels pre-trip and post-trip; t(4)=1.760, p=0.0765. Empathic awareness levels post-trip (M=137.67, SD=20.39) were somewhat higher than levels pre-trip (M=119, SD=25.52). Additionally, there was a difference approaching significance in the scores for evaluation of obstacles and support pre-trip and post-trip; t(5)=1.263, p=0.131. The relationship indicated post-trip levels for likelihood to engage in social justice activities (M=63.67, SD=7.15) were higher than pre-trip levels for likelihood to engage in social justice activities (M=55.5, SD=11.33).
There was a positive correlation between post-trip interest levels (M=49.80, SD=3.11) and confidence levels (M=130.04, SD=10.80), r = 0.447, p = < .05 as well as perceived benefits of engagement in social justice activity levels (M=59.37, SD=10.56), r=0.698, p= < .05.

There was a positive correlation between evaluation of obstacles and support (M=57.14, SD=9.24) and perceived benefits of engagement in social justice activity (M=59.37, SD=10.56), r= 0.672, p= < .05.

Empathic awareness levels (M=17.55, SD=0.64) were positively correlated with confidence levels (M=130.04, SD=10.80), r = 0.49, p = < .05, and with interest levels (M=49.80, SD=3.11), r = 0.51, p = < .05.

Discussion

This study evaluated the impact of participation in Athentikos’s I AM ART camps. As outlined in the literature review, to make a social impact, an individual must take a number of cognitive steps. Research has shown that there are multiple encouraging factors and obstacles in social justice activity. The current study examined a variety of those factors, many of which can be evaluated together and used to evaluate self-efficacy in the form of confidence levels, perceptions of support and barriers, and future intentionality of action.

First, given mission trip participation, it was assumed that all trip attendees were demonstrating recognition of the existence of social problems in Guatemala. Given this initial step, participants must a sense of responsibility for the problem. Volunteers invest resources into a trip like this because they feel the trip will produce change and solve issues. The results indicate that the ability to recognize social problems and feel a sense of responsibility is not restricted to experiences in Guatemala. Participants also indicated desires to participate in social justice activities in their communities upon their return.

It was found that participation in Athentikos’s I AM ART program resulted in increased levels of confidence in one’s ability to complete a variety of social justice activities from pre-trip to post-trip. The confidence levels subscale included items such as confidence in one’s ability to discuss issues related to racism, sexism, classism, etc. This growth suggests that the Athentikos trip helps participants feel more capable of speaking on social justice topics they may have avoided previously and taking action to effect change.

Confidence is an important part of self-efficacy (Cramer, Neal, & Brodsky, 2009), a prerequisite for this kind of social justice activity (Citchoka, Górska, Jost, Sutton, & Bilewicz, 2017). As a person’s self-efficacy increases, so does their likelihood to participate in a variety of activities. As seen in the present results, confidence levels were correlated with empathic awareness and interest levels in a variety of social justice activities. Participants expressed more awareness of how others are stereotyped or systematically oppressed. Further, once people have increased confidence following an I AM ART camp, that experience may be broadened to address people and problems in their communities (Smith, 1989). This suggests that groups such as Athentikos may bolster social justice activities beyond the populations they target.

Additionally, there are several interrelated benefits of participating in a mission trip including levels of interest in and perceived benefits of engagement in social justice activities, evaluation of obstacles and support, and empathic awareness. These correlations suggest mission trips may improve multiple social justice variables at once. As such, this study predicts a virtuous cycle, or spreading activation, among post-trip and alumni outcome variables. Though this study did not examine causality, it is possible, with factors like confidence levels and perceived barriers and support for engagement, that directionality exists. For example, if confidence grows, then one may perceive fewer barriers and more support.
However, that growth could occur in another direction. There is also potential for a spreading activation in which multiple variables are simultaneously increasing because of the trip itself.

Many of the variables that were significantly correlated with one another have been found in prior research to be predictive of future action, such as perceptions of barriers and support for social justice activities and the perceived benefits of engagement in social justice activities. It is noteworthy that trip alumni are 1 to 3 years post-trip and still reporting increases in desire for social justice action. This suggests trips may have a lasting impact and encourage not only momentary behavior adaptation, but also a shift in viewpoint and behavior over the longer-term, as might be expected with an experiential learning approach such as a mission trip.

Limitations

Due to a low response rate from a small population, this study had a limited number of participants with somewhat homogenous demographics. Despite the small sample size, this study still found significant results in five domains. However, a larger sample is needed in the future to produce more robust and statistically significant results. It is predicted that a larger sample will produce additional statistically significant results since there were a few domains approaching significance with the present sample.

This study used correlational data, which cannot prove causation or the impact of unknown third variables. However, due to more interactive experiences being more beneficial in learning (Choi & Kirkorian, 2016), it is possible that many of the results found in this study could be due to the immersive experience of a mission trip. However, a control group would be needed to formally make these comparisons.

Future Directions

As this field is relatively unexplored, there are a number of future possibilities to explore, such as examining different types of mission trips or the cultural differences between volunteers and the community they are serving. Furthermore, though the subscales addressed beliefs about potential behaviors, no data were gathered based on participants’ actions. Future observational methods would prove useful.

Athentikos’s I AM ART camp has a number of unique variables to potentially explore. For example, volunteers have the option to spend an extra three days in Guatemala at Lake Atitlán. It would be interesting to see if the effects of the trip are increased when volunteers are given deliberate time to process their experiences as opposed to rushing back into their daily lives. Though the time spent at Lake Atitlán is free for individuals to use as they wish, many use the time to write and reflect on their experiences or discuss the camp with other participants. This helps participants consolidate their memories and cognitive and behavioral changes by allowing adequate time for mental processing.

Aside from the effects on the volunteers, there are also the at-risk youth who learn about self-expression and healing through artwork. It would be interesting to see if there are measurable effects on the children as camp attendees. Furthermore, if this curriculum is found to be beneficial for at-risk youth who have often been victims of abuse or neglect, it may also be useful for adults who have experienced trauma.
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Abstract

This article contextualizes Cuban writer Reinaldo Arenas's narrative in his autobiography *Antes que anochezca* (1992). The author presents himself as a marginalized character living in a rural, poor area since childhood under the dictatorship of Fulgencio Batista (1952–1959). Likewise, the writer presents himself equally misunderstood in adulthood, both during Fidel Castro's 1959 rise to power and during his 1980 exile to the United States. Analysis of Arenas's progressive disenchantment focuses on his revolutionary ideals, the Revolution's impact on his sexual and intellectual life, and the sociopolitical environment observed before and after the Cuban Revolution's triumph, including his exile. The article's objectives are to answer the following: What can we learn from the memoirs of this young "guajiro" raised in rural Holguín? When does Arenas begin to feel excluded from Castro's revolutionary project? Lastly, does Arenas find moral and economic support as a political refugee in the United States?

Introduction

By publishing his manuscripts outside of Cuba without first obtaining government permission, Cuban writer, Reinaldo Arenas, was a fugitive in his own country living in fear of persecution and incarceration. According to Arenas, after escaping prison in the seventies and attempting to flee the area, he had limited options once police grew suspicious of two of his friends, Joris Lagarde and Juan Abreu, who had planned to help Arenas escape via boat. Unfortunately, boats had been prohibited and Castro's soldiers were aware of their suspicious activities (*Antes que anochezca* 196). Instead, Arenas hid in the Parque Lenin, where he began writing his autobiography in the empty notebook pages gifted to him by Abreu. Arenas states that the title of his autobiography *Antes que anochezca* (Before Night Falls) is appropriate because he “…escribía hasta que llegaba la noche, y en espera de la otra noche que me aguardaba cuando fuera encontrado por la policía. Tenía que apurarme en hacerlo antes de que oscureciera,” (198). However, he claims losing his original manuscript when he was arrested by the police and it was confiscated and reports that he retained its original content in memory (*Antes que anochezca 11*).

If what Arenas says is true, then the loss of his original manuscript in 1974 contributes to the complex nature of his autobiography caused by circumstance and timeframe variants. Therefore, determining the distinction between fact and fiction proves extremely challenging, as he claims to have resumed his writing during his exile to the United States in 1987. The lapse of time in conjunction with his deteriorating health due to AIDS most certainly contributed to a change in his attitudes and perspectives – both of which influenced his memories and his presentation of these memories. For example, death is a recurring theme throughout his memory recollections, from his first experience with his mother contemplating suicide to when he himself began to consider suicide in the Parque Lenin (*Antes que anochezca* 19, 201).

In addition to this, when the AIDS virus prevented him from writing, Arenas was forced to record himself to finish his memoirs. These recordings were later transcribed by his friends Antonio Valle and Lázaro Gómez (11). It is possible that Valle and Gómez inserted elaborations of Arenas's memories into his autobiography – suggesting that his autobiography is, in actuality, a combination of voices from his past and present selves as well as the voices of his transcribers and editors.

What Arenas recalls in his autobiography is by no means a historical account; rather, a personal perspective of what happened. However, in describing his life story, it is evident that Arenas suffered a triple marginality both before and after Fidel Castro's Cuban Revolution just as he did throughout his exile in the United States. According to Jonathan Crewe, "Historically, our discourse of the marginal can be seen as one response to widespread political violence done during the sixties and early seventies and as a cause/effect of radical upheavals and ideological destabilizations during that period," (121). This statement is especially true for Arenas. His marginality was the result of a combination of factors including low economic status, pursuing a writing career, and being homosexual in the sixties and seventies, but his marginality continued into the eighties and nineties as well. Understanding the effects of the political circumstances on these factors in each stage of Arenas's journey is pertinent to realize the profound impact societal perceptions had on his growth as an individual. In Arenas's case, there are several factors that contributed to what can be seen as a character reflecting multiple layers of marginality, including: poverty...
prominent during his childhood under dictator Fulgencio Batista; homophobic encounters in adolescence; and adulthood before and under Fidel Castro's government; and limited success of his writing and political views in the United States.

As this topic appears to be lacking literature specifically concerning Arenas's life, it is important to analyze and understand to what extent triple marginality can be used to explain the series of difficult situations he faced. Upon exploring Arenas's life struggles, the objective is to answer the following: What do we learn of the memoirs of this young peasant raised in the rural area of Holguín? In what moment does Arenas begin to feel excluded from Castro's revolutionary project? Lastly, does Arenas find moral and economic support in the United States?

**Theoretical Framework**

According to Arthur A. Cohen, marginality is defined as “...a psychic condition of self-deprecation, another instrument of importing nervousness, ambiguity, uncertainty into an otherwise sufficiently difficult enterprise” (316). Considering the many struggles in Arenas's life as well as the negative psychological impact it had on his life from causing him to worry about his own safety to changing his name, it is understandable why this subject pertains to him so much. Living under Castro's government, there were multiple struggles like poor nutrition and a worsening economy awaiting Cuban citizens. According to The Cuban Revolution (1977) by Hugh Thomas, by 1958 sales dropped and shop owners minimized their turnover (228). Starting in 1963, economic production was believed to have decreased about 0.5% per year, though lack of reliable statistics makes the exact figures unknown (Thomas 676). But Arenas, being both a homosexual and a provocative writer had to face even more persecution than the average person at the time. Negative social stigma against homosexuals caused him to live in fear of being found and incarcerated, as well as having to write under strict government regulations and requirements that led to his constant worry that his “unacceptable” manuscripts would be found. From this, it is clear to see that he was a marginalized character.

However, the extent of his marginality has primarily to do with the way in which Arenas presents himself in his autobiography. Sectioning off categories of his life and paying careful attention to his opinions and word choice suggests the presence of triple marginality. The existence of Arenas's layers of marginality has been developed in this article using a framework from the ideas explored in Gay Cuban Nation (2001) by Emilio Bejel and Becoming Reinaldo Arenas (2013) by Jorge Olivares.

During his analysis to support an interpretation of Arenas's text as a struggle between desire, power, dissidence, and transgression (140), Bejel mentions “...every stage in the narrator-protagonist's life has been a move from one oppression to another. Rather than a story of progressive liberation, the text narrates a process of increasing, ever-worsening oppression...” (146). However, Bejel takes a thematic approach, stating this suggests another perspective that Arenas's portrayal of himself is quite simply the consistency of struggles whereas triple marginality could be an alternative explanation to these occurrences. In addition, the understanding that there is a worsening of oppression adds another aspect to this marginalization theory with regards to Arenas, in that Arenas wants his readers to view his struggle as constant and ongoing, which grows worse with time. This can be seen by Arenas's description of the moon as a symbol of a miracle that he believes saved him throughout his life, but that shatters as he is contemplating his dream of a beach vacation during his exile: “Y ahora, súbitamente, Luna, estallas en pedazos delante de mi cama. Ya estoy solo. Es de noche” (340).

Bejel's ideas provide the framework for the consistency of marginalization in Arenas's text, but it is Olivares's ideas that suggest the importance of recognizing continuity and the influences of the past that are affecting the future. Olivares understands Antes que anochezca “...as a portrait of a mortally ill, exiled Cuban writer who, on his deathbed, writes the story of his life, a life that is about to end far from his father and fatherland” (66).

While his analysis mainly parallels the symbolic similarities between Homer's Iliad and Arenas's autobiography, Olivares does state, “Certainly, however, Arenas's erotic awakening in the countryside sets the course for his adult sexual life, initially in Havana and later in exile...” (72). Olivares's idea that consequences in the present are rooted in the past when applied to the perspective of Arena's marginality yields itself to another ideological perspective. This is an idea that while Arenas suffered in multiple ways, each of his experiences, including his suffering, are connected in some way to the past. For example, his first homophobic experience in school leads to further reinforcement that to be a homosexual is to be an outcast from society.

This is still relevant later in his life during exile when he must not only hide his sexuality to survive but also hide his AIDS diagnosis. AIDS is a sexually transmitted disease, although he was not aware, Arenas suffered from it likely due to the numerous sexual encounters he had with other men. This diagnosis in 1987 results in his suffering both physically and mentally, as he is dependent on others around him to complete everyday tasks and he is left feeling lonely when they leave: “Los dolores eran terribles y el cansancio inmenso. A los pocos minutos, llegó René Cifuentes y me ayudó a limpiar la casa y comprar algo de comer. Después me quedé solo” (Antes que anochezca 11).

Developing the categorization of the three dimensions of marginality (economic, political, and social) in three different times and spaces (Oriente under Batista, Havana during Castro, and Miami and New York in exile) that Arenas suffers requires combining the understandings of Bejel and Olivares's ideas. According to Bejel, the constant oppression suffered by Arenas results
in him living in the margins of society, while Olivares's perspective is that Arenas's oppression is in fact determined and influenced by the historical happenings of the time. Therefore, categorizing Arenas’s marginalization in childhood, adulthood, and later in exile in correlation to Batista, Castro, and the United States government, respectively (where adolescence crosses over between the Batista and Castro governments; serving as both a literal and figurative transition). Each of these periods had a set of characteristic changes that contributed to Arenas’s suffering: economic dependence on the United States contributed to socioeconomic decline under Batista; Castro’s political revolution limited his writing career; and social stigmas for having come in the Mariel boatlift isolated him during exile. This is not to say that Arenas’s social marginalization is limited to historical timeframes, but that each stage had a prominent challenge he had to face. Instead, the components of triple marginalization morph as time passes, and interactions among Arenas and his environment contribute to its severity.

**Part I: Poverty & Politics – Batista’s Rule**

For Arenas, his marginality began in early childhood. Among multiple contributing factors, the most prominent include poverty, his emerging homosexuality, and the political ideologies of the time because of Batista’s return to power in 1952.

The moment Arenas was born, there already existed foundations for uprising. In his autobiography, he recalls “un dolor de barriga terrible” which made him so desperate to the point of eating soil (17).2 In his opinion, this, in conjunction with political violence and Batista’s dictatorship, caused many families like that of Arenas’s to suffer extreme poverty. This is evident when he describes his living situation in which he, his single mother, aunts, his religious grandmother, and his politically opinionated grandfather lived under the same roof. Arenas describes that, “La situación económica se hizo tan difícil que mi abuelo decidió vender la finca – unas tres caballerías… ¡Cómo lloraban mi abuela, mi abuelo, mis tías, mi madre, yo mismo!” (55). Arenas had to work twelve hours for one peso a day, which was insufficient to support himself, much less his family.

Arenas's recognition of his homosexual tendencies early in life does not marginalize him initially, but it did cause him to feel disconnected from the people around him. As Bejel mentions, “la sexualidad del protagonista…es ambigua,” (34). This is interesting, because his experience of seeing naked men at six years old made him aware of his sexual tendencies early in life does not marginalize him initially, it not necessarily marginalize Arenas intensely at first, it caused him to feel another disconnect from the people around him – almost like a foreshadowing of his future marginalization. At a formative age, Arenas understood that to be homosexual is equivalent to negative social standing. He would be an outcast in his own community, which is likely due to the ongoing negative attitudes under Castro's government. This was only one of many homophobic encounters that marginalize Arenas from the rest of society.

The final defining characteristic of Arenas’s childhood and adolescence is politics. In fact, Arenas dedicates a whole chapter of his autobiography to Cuban politics during this stage of his life. In this chapter, which takes place in 1957, Arenas describes that “Casi toda la provincia de Oriente estaba contra Batista y había rebeldes en los montes” and sometimes rebels attacked Batista’s army since most of the town was against dictatorships (62). Arenas also mentions his grandfather, who he describes as “…antirreligioso, liberal y anticommunista. […] Para mi abuelo, todos los gobernantes anteriores a Batista también habían sido unos delincuentes,” (51). His grandfather identified as a member of the Partido Ortodoxo because of his undying support for politician Eduardo Chibás, who founded the party in 1947 due to his strong opinions against corruption (Thomas 31). Arenas emphasizes not only his father's devotion but that of his entire family. This is shown when Arenas recounts when his great-grandmother and Chibás died on the same day and his mother explained to him “No lloro por la muerte de mi abuela, sino por la de Chibás” (52). It is probable that those against Batista lived in poor economic situations and blamed dictatorship for it, especially with lack of food and limited money to buy it. According to Geraldine Lievesley, this opposition may alternatively have to do with the increasing hope or Cuba to become economically independent rather than depending on the United States. She states, “Nationalist opposition to Batista was linked in the minds of many Cubans with a desire to repudiate the conspicuous display of financial and military might and to reduce dependency upon US consumerism and its cultural manifestations on the island” (14).

When the conditions in Holguín continued to decline in 1958, Arenas decided to join as one of Castro's rebels. Although he had much enthusiasm and excitement, the rebels rejected him because he was too young and had no weapons of his own. That was the first time he felt excluded from the revolution project.
Eventually, Arenas was able to participate and contribute to the cause by attending a specialized school, teaching students to be agricultural accountants. Although he could experiment with other homosexuals, the school did not support homosexuality and the true purpose of the school was to form groups of young communists to support Castro during the Revolution.

The influence of his friends told him he would be successful. Curiously, within Cuba, Arenas struggled to find people who could help him. They often tried to do what they could, but most of the time they feared Castro's government.

Part III: Trading Success for Freedom – Exile in the U.S.

The largest transition in Arenas's life was in 1980 with his exile from Cuba to the United States. When the opportunity arose to leave through the Mariel boatlift, he had to assume a new name and occupation to attain permission to pass. Castro's objective was to rid the country of people who did not support the Revolution (increasing the concentration of supporters on the island), while prohibiting intellectuals such as writers and artists from leaving, this way they would be unable to utilize their freedom of speech and expression in the United States to write negatively of him or Cuba in general. Arenas was one of those writers. His decision to attempt an escape despite the risks and consequences of capture demonstrates his genuine desire for a better life. Not only this, but it also shows his hope of writing freely in the United States.

A symbolic moment during Arenas's separation from his native land happened when he had to sign a form accepting that he would never be able to return. From Arenas's perspective, this solidified the severity of the persecution inside Cuba, as Castro forced homosexuals, criminals and the mentally ill to leave. In addition, this signifies the definite exclusion of Arenas. Not only did he have to leave his home to start over in another country, but he was also leaving knowing that Castro's unfulfilled promises of social equality and improved conditions for intellectuals were the reason for this migration. Although he assumed a different identity, the fact that he still witnessed the critical faces of the Castro police further reinforced his perspective that the government did not care about its citizens.

Conclusion:

Although Arenas was happy to leave his dangerous environment behind, he underestimated the difficulty brought by his new life. Arenas was not the only Cuban writer fleeing Castro's government, and there were other writers who came across that jeopardized his success. Now there were many Cuban writers generating stories and testimonies of their experiences in the Revolution, which in turn decreased demand for that type of literature – which is typically the case of supply and demand within the capitalist economy. On the other hand, the chances of publication for this type of literature may have already been slim. Now that the Cuban writers, including Arenas, were no longer in Cuba, their writings were not of interest. When Arenas was in Cuba, his writing was desirable for authenticity and the idea that he struggled and fought to publish his work beyond the borders. However, now Cuban writers including Arenas faced a different kind of struggle; one against capitalism's supply and demand.

Now that his work could be easily written and published freely, the “unique” aspect of his work was lost and became like any other product on the market. In his autobiography, Arenas lists examples of other Cuban writers in a similar predicament as him, including Néstor Almendros and Orlando Jiménez Leal who he states “…ahora se encontraban con la imposibilidad de publicar sus obras aquí” (311).

The reality of the capitalist world crushed his dreams. In a segment of an interview with Arenas of a documentary called Conducta impropia directed by Néstor Almendros and Orlando Jiménez Leal, Arenas says that he is indignant that people who live in communist countries and want to publish their writing cannot because of failures in democracy and the hierarchy of wealth associated with capitalism. In saying this, Arenas suggests that capitalism has its own faults like communism. He believes that while communism in the case of Castro’s government was corrupt, capitalism in the United States favors the rich who can spend, which in turn determines the supply and demand of the economy.

Arenas had exchanged his career for his safety and freedom, although he found himself questioning how much freedom he actually had. The reality was that, in both Cuba and the United States, exclusion caused these ostracized situations. Those on the Mariel boatlift experienced negative stereotypes and therefore had fewer opportunities to survive economically. Because of this, Arenas tried to establish himself economically by relying on the promises of his friends. However, although his manuscripts were popular in France and his friends promised him part of the profits, he states a writer, and a homosexual. Arenas’s experience of primarily economic exclusion in childhood, social isolation during Castro’s reign, and the stigma surrounding members of the Mariel boatlift and an anti-Communist writer exiled by Castro (a “gusano”) in addition to the limited economic opportunities in the United States contributed to his triple marginality.
Before committing suicide, Arenas wrote one last note explaining his decision in which he blames the sequential events causing his outsider social status on Castro:

Dear Friends: Due to the precarious state of my health and the terrible spiritual depression I feel because I cannot continue to write and to struggle for Cuban liberty, I am ending my life. …There is only one person responsible: Fidel Castro. The suffering of exile, the pain of banishment, the loneliness and disease, surely would not have come about had I lived a free man in my own country. …I urge the people of Cuba, in exile and in the island, to continue struggling for freedom. My message is not a message of defeat but of struggle and of hope. (Arenas, “Carta de Despedida”)

In his final moments, Arenas wanted others to realize that his contributions towards Cuban liberty via his writing was what mattered most to him, more than the adversity he faced in his journey towards accomplishing this goal. As he urges for his suicide note to be a message of “struggle and hope,” one must consider to what extent society versus self-perseverance impacts fulfillment, and exactly how hope factors into influencing these aspects of life. Regardless, it is appreciating that Arenas's life was littered with homophobic experiences, economic adversity, and social stigma that serves as a prime example of the impacts of triple marginality.

Notes

1) From a literary perspective, another possible interpretation may be that this moment is a representation of the culmination of the constant struggles he had to endure, therefore extending the titles' meaning to reference a period of persecution in his life.

2) While referencing this part of his life, Arenas is also paying homage to magical realism writer Gabriel García Márquez's novel Cien años de soledad by alluding to Rebeca Buendía, who “…solo le gustaba comer la tierra húmeda del patio,” (58).

Works Cited


Conducta impropia. Directed by Néstor Almendros and Orlando Jiménez Leal, 1983.


P.M. Directed by Alberto Cabrera Infante and Orlando Jimenez Leal. 1961. Film.


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Abstract

"Imagen y simbología de la mujer fragmentada en Pablo Neruda’s Veinte poemas de amor y una canción desesperada" [Image and Symbology of the Fragmented Woman in Pablo Neruda’s Twenty Love Poems and a Song of Despair] explores the different ways in which the female body is constructed and represented in literature, specifically focusing on the objectification of the female body as a platform to devalue women and concurrently exert male supremacy. The purpose of this essay is to analyze the literary imagery that is being used in Pablo Neruda’s poetry in relation to women and their bodies, and his reasons for representing fragments of a woman, invisible female characters, or women made into objects.

Imagen y simbología de la mujer fragmentada en Veinte poemas de amor y una canción desesperada de Pablo Neruda

La forma en que el cuerpo de la mujer se conceptualiza y se construye es un tema central de la teoría feminista. La examinación y el reconocimiento de este tema ha sido uno de los mayores enfoques en la teoría, “[…] but what is different between this and dominant malestream approaches is that rather than a thoroughgoing disregard for things corporeal, feminism starts at least from a position of acknowledgment” (Price and Schildrick 2). En el campo de las letras existen múltiples y variadas formas de representación femenina. Según Lucía Guerra-Cunningham, la supremacía masculina en la literatura ha construido el cuerpo de la mujer a su favor, empleando representaciones que benefician al hombre:

Sí, por una parte, la sobrevaloración de lo masculino se nutre de la devaluación de lo femenino, esta sustentación del poder patriarcal se fundamenta también en un proceso esencial de descripción y definición del elemento subordinado. Adscribir significado a lo femenino es, en esencia, una modalidad de la territorialización, un acto de posesión a través del lenguaje realizado por un Sujeto masculino que intenta perpetuar la subyugación de un Otro. (13-14)

Es precisamente el juego de desvalorización hacia la mujer lo que permite visualizar dos ejes fundamentales sobre los que se presenta la supremacía masculina. El primero, existe en relación con la deconstrucción de la imagen de la mujer. El hombre ejerce un tipo de autoridad sobre la construcción identitaria de la mujer y sobre la forma en que ella concibe, para luego, como segundo eje, anteponer la deconstrucción desde la expectativa masculina y juzgar el comportamiento, la forma corporal y el lugar de la mujer en la jerarquía social y de género. El sociólogo francés Pierre Bourdieu plantea al respecto lo siguiente:

Y siempre he visto en la dominación masculina, y en la manera como se ha impuesto y soportado, el mejor ejemplo de aquella sumisión paradójica, consecuencia de lo que llamo la violencia simbólica, violencia amortiguada, insensible e invisible para sus propias víctimas, que se ejerce esencialmente a través de los caminos puramente simbólicos de la comunicación y del conocimiento o, más exactamente, del desconocimiento, del reconocimiento o, en último término, del sentimiento. (11-12)

La literatura es uno de los campos sobre el cual se ejerce la dominación masculina. A través de códigos de comunicación -que se valen en muchas ocasiones de símbolos ocultos-se reproducen y perpetúan representaciones negativas y perjudiciales de la mujer, hasta el punto de ser percibido como aceptable. La supremacía masculina no percibe a la mujer más allá del constreñimiento de su cuerpo.

Mediante el cuerpo femenino, el patriarcado busca establecer su superioridad. En este ensayo, como ejemplo usará Veinte poemas de amor y una canción desesperada de Pablo Neruda, para demostrar cómo la supremacía masculina en la literatura utiliza símbolos y representaciones del cuerpo femenino para construir a la mujer de manera inferior y recurrentemente construir al hombre de manera superior, ocultando esta práctica simbólica tras temas de amor.

Veinte poemas de amor y una canción desesperada se publicó en Chile en 1924. Aunque inicialmente la edición de esta colección de poemas fue pequeña se fue convirtiendo en “[…] uno de los libros cardinales de la sociabilidad lírica y la educación sentimental hispanoamericana” (González 94). Su producción incrementó enormemente con el transcurso de los años, convirtiéndose en una grapa en la literatura hispanoamericana: “Originally printed in a small
El cuerpo de la mujer está fraccionado al reducirlo a una sola parte de su cuerpo, como por ejemplo los “muslos”. Sobre la fractura y atención a los muslos Mercedes Bengoechea Bartolomé señala que “a lo largo de la historia del patriarcado, los poetas han textualizado su derecho a la intrusión visual en el cuerpo femenino y han plasmado su deseo por una mujer mediante su segmentación en partes corporales” (29).

El enfoque del deseo por los segmentos de una mujer indica una falta de deseo o atracción a una mujer completa, por consiguiente, a una mujer imperfecta. La práctica patriarcal de la fragmentación también tiene el propósito de minimizar a la mujer “mediante la denigración simbólica de lo femenino y la desigualdad de trato entre lo femenino y lo masculino” (Bengoechea Bartolomé 28). La segmentación del cuerpo de la mujer ha sido continuamente ligada al reduccionismo y con la cosificación de la mujer, en esa vía se visibiliza la construcción de una jerarquía en donde la mujer está posicionada por debajo de la figura masculina.

**Mujer = creación: Poeta = numen creador**

En el Poema 1, el poeta crea a la mujer imponiendo la superioridad patriarcal imperante. “Para sobrevivirme te forjé como un arma / como una flecha en mi arco, como una piedra en mi honda” (5). El cuerpo de la mujer, además de ser una composición natural es susceptible de ser modificado por otro, y ese otro, al tener poder de transformación, se inviste de divinidad. Al respecto, Gilda Pacheco Acuña explica que el poder de moldear un ser es una dote divina: “The second stanza seems to place us in the biblical times when Eve was created. But there is no God here taking Adam’s rib. It is he, the man, the peasant, who forged [her] like a weapon. […] Then, while her presence is ephemeral—a throwing stone or a passing arrow—he is the Creator reinforcing, then, the post-Romantic assertion of the male as a godlike creator” (34). Pacheco Acuña señala que al ser Eva creada de una costilla del hombre forma parte de él. Pero el poeta crea a la mujer fuera de sí mismo, reduciéndola y brindando un espacio para la cosificación. El cambio de la forma de elemento de naturaleza a un arma sirve para convertir a la mujer en un objeto y, paralelamente, esta permutación permite que el hombre se eleve al estatus de un dios.

**Mujer = muñeca: Poeta = escultor**

En el Poema 3, la mujer está representada por una muñeca, “crepúsculo cayendo en tus ojos, muñeca” (7). Este objeto de recreación, además de ser una representación severamente incorrecta, es una representación de pasividad, subordinación y silencio,

**Mujer = naturaleza: Poeta = observador**

En Veinte poemas de amor y una canción desesperada, el Poema 1 comienza a edificar el cuerpo de la mujer como parte de un paisaje: “Cuerpo de mujer, blancas colinas, muslos blancos / te parece al mundo en tu actitud de entrega” (5). La aproximación a la naturaleza, atrapándola en la imagen de colinas, para ser explorada y conquistada por alguien. Las colinas, como la naturaleza están feminizadas ya que la tierra se asocia a la fertilidad, donde la semilla brota. Las formas de las colinas blancas representan los senos de la mujer. En este poema la mujer está representada por dos fragmentos de su cuerpo: los senos y los muslos. Esta construcción es problemática, porque mediante la fragmentación la mujer se convierte en objeto de erotización y, simultáneamente por medio del cuerpo femenino, aproxima a la mujer a los elementos naturales y a los paisajes.

Gustavo V. García afirma que es una “representación imprecisa y distorsionadora donde la mujer ideal es una colección de trozos sin identidad propia” ("El discurso del deseo en Veinte poemas de amor y una canción desesperada," 238). García, además, analiza que el tema central tampoco es el amor, sino en su rol activo” (¿Modelo para armar?,“ 116). Fundada en esa misma lógica, el título tampoco representa el tema central de estos poemas: el deseo del hombre y la supremacía masculina. La mujer viene representada a través del cuerpo como el objeto de inspiración del poeta. La cosificación de la mujer le roba a la protagonista atributos humanos como pensar, sentir, soñar y amar. A través del cuerpo de la mujer, el “yo” poético describe su experiencia erótica o la evocación, excluye lo femenino, por lo menos en su rol activo” (¿Modelo para armar?, 116).

La supremacía masculina utiliza a la mujer como una plataforma para ejercer su dominación. El propósitono de esta invesigación es examinar y cuestionar los símbolos y las imágenes de la mujer y del cuerpo femenino reproducidos a través de Veinte poemas de amor, discutiendo, además, la fragmentación de la mujer desde una perspectiva feminista, que pone en cuestión el ejercicio bajo el que se ocultan estas prácticas simbólicas.

### Mujer = naturaleza: Poeta = observador

En Veinte poemas de amor y una canción desesperada, el Poema 1 comienza a edificar el cuerpo de la mujer como parte de un paisaje: "Cuerpo de mujer, blancas colinas, muslos blancos / te parece al mundo en tu actitud de entrega” (5). La aproximación a la naturaleza, atrapándola en la imagen de colinas, para ser explorada y conquistada por alguien. Las colinas, como la naturaleza están feminizadas ya que la tierra se asocia a la fertilidad, donde la semilla brota. Las formas de las colinas blancas representan los senos de la mujer. En este poema la mujer está representada por dos fragmentos de su cuerpo: los senos y los muslos. Esta construcción es problemática, porque mediante la fragmentación la mujer se convierte en objeto de erotización y, simultáneamente por medio del cuerpo femenino, aproxima a la mujer a los elementos naturales y a los paisajes.
puesto que la muñeca no habla, no reprocha, no siente, no exige. Este silencio se ve reflejado en el verso 10: “y tu silencio acosa mis horas perseguidas” (7). El poeta describe a una mujer con “brazos de piedra transparente” (v. 11). Un cuerpo de piedra evoca la imagen de una estatua, una mujer hecha por manos artísticas, una mujer perfecta e ideal, pero de piedra transparente, por ende, irreal. Bengoechea Bartolomé señala que “se trata de una representación poética en la que la prolijidad y la profusión no implican totalidad o integridad, incluso parecen privar a la mujer de su carácter humano, arrebatabándola sus sentimientos, su alma, su espíritu” (29). Este ideal de mujer recrea una construcción del cuerpo que le es ajena a su realidad, la atrapa bajo unos ideales en los que ella se concibe incompleta, incapaz de alcanzar el estereotipo que le han recreado.

Asimismo en el Poema 8, el cuerpo de la mujer está representado una vez más como estatua: “Ah desnuda tu cuerpo de estatua temerosa” (13), construyendo un cuerpo imposible e irreal para una mujer. Esta representación también evoca la imagen de una mujer pasiva, un cuerpo controlado. Al ser estatua, la mujer no tiene voluntad propia. Tan solo existe para ser idealizada y admirada. Tan solo existe a través de la mirada creadora del hombre. García observa que: […] otra vez, la pasividad de la amada equiparada a un objeto sin vida que solo representa lo exterior y que, al carecer de alma o interioridad, no requiere demasiada imaginación para ser “comprendida”. Pero una estatua es la representación de una representación. La mujer, en consecuencia, se esconde mejor cuanto mayor es el grado de mediatización. Esta nueva metamorfosis nubla la visión femenina: de carne viviente la dama es transformada en objeto sin vida que representa–para el poeta–a la mujer misma (“De carne y naturaleza”, 194)

Al ser representada como una estatua la mujer se convierte en un ser inerte. El silencio es otro ideal que se ve repetidamente reflejado en los versos “¡Ah silenciosa!” (v. 8), “¡Ah silenciosa!” (v. 16), “¡Ah silenciosa!” (v. 24). La mujer estatua además de existir para el placer visual masculino también es silenciosa. Guillermo Araya observa que “en el poema 8, se encuentra el recuerdo de la amada, el paisaje que el yo contempla sin ella y el persistente silencio que la envuelve cualquiera que sea la situación en que el Amador se refiera a ella” (175). El poeta idealiza el silencio en la mujer a lo largo de esta colección de poemas. El mensaje es claro, una mujer pasiva, sumisa y silenciosa es lo ideal.

**Mujer = animal; Poeta = ser racional**

El Poema 5 comienza con la palabra del hombre y los oídos de la mujer: “Para que tú me oigas / mis palabras / se adelgazan a veces / como las huellas de gaviotas en las playas” (10). En este apartado el poeta atiende a su voz facilitando a su interlocutor la comprensión, una ofrenda de adelgazamiento de palabras “para que tú, mujer, me escuches. El poeta, se ubica como el único ser racional, dotado de un lenguaje especializado, por lo tanto se ve obligado a simplificarlo para que el otro-mujer, pueda entenderlo. Mediante la reducción de su capacidad intelectual, el poeta afirma su superioridad como ser inteligente y racional.

Para alimentar la representación de poca capacidad intelectual en el Poema 5, la mujer también se presenta de manera animalizada. García explica que el rol de la mujer “[…] es muy pasivo: se limita a escuchar las palabras del amante que, al tener problemas para ser comprendido, recurre a un lenguaje de aves marinas” (“De carne y naturaleza”, 194). El poeta recurre entonces al lenguaje animal de aves para que la mujer pueda comprenderlo, reiterando la reducción de la capacidad mental de la mujer. En el Poema 6 se observa nuevamente la animalización de la mujer, “voz de pájaro” (v. 10). Estos versos dialogan con un poema anterior. Mientras que en el poema 5 el hombre cambia su lenguaje y lo disminuye para poder hablarle a la mujer en lenguaje animal inteligible, en el poema 6 ella le contesta con voz de pájaro, reforzando su animalización y deshumanización.

**Mujer = pasiva, invisible; Hombre = activo, visible**

Al comienzo del Poema 14, la mujer se vuelve invisible: “A nadie te parece desde que yo te amo” (22). El amor del hombre la construyó, por eso le pertenece. Ella ya existe por él y para él. Ella no existe fuera de él. Ella ya no tiene rostro porque está siendo totalmente poseída y absorbida por el hombre. Ella existe en el momento en que el “yo” poético que habla, la ve. En los versos 9 y 10, la voz masculina habla de la misma mujer en el pasado, antes de que él la amara. “Ah déjame recordarte cómo eras entonces / cuando aún no existías” (22), reiterando que él da vida. Bengoechea Bartolomé explica que “es un proceso sistemático por el que un ser sensible se deshumaniza, se reduce a una cosa, a un ser insignificante sin estatus social, se convierte en algo que se puede intercambiar, poseer, trocar, guardar, exhibir, usar, maltratar, disponer y desechar” (30). La mujer atrapada en un cuerpo invisible es símbolo de mucho poder, indica que el hombre la domina y llena todos los espacios de su vida y de sí misma. En cambio el hombre la construye y, consecuentemente, la posee. El poeta no la aprende, por el contrario, la crea, la moldea y la dibuja con sus palabras.

Otro símbolo de dominio y posesión fácilmente observable se encuentra en los últimos dos versos “Quiero hacer contigo / lo que la primavera hace con los cerezos” (22). La voz poética usa el símbolo de la primavera para evocar la fecundidad de la mujer. Cuando llega la primavera, los cerezos florecen. Por ende, la primavera domina y los cambia. Gustavo García observa que “Acá la hembra tiene una doble función. Primero, su cuerpo está representado una vez más como estatua: de carne viviente la dama es transformada en objeto sin vida que representa–para el poeta–a la mujer misma (“De carne y naturaleza”, 194), en consecuencia, se esconde mejor cuanto mayor es el grado de mediatización. Esta nueva metamorfosis nubla la visión femenina: de carne viviente la dama es transformada en objeto sin vida que representa–para el poeta–a la mujer misma (“De carne y naturaleza”, 194)
A pesar de que el único símbolo visual que vemos de la mujer es su boca, el Poema 15 es un poema silencioso. En "Sexo y pobreza" Jaime Concha nota que "silencio, distancia, muerte: son tres grados de una misma ausencia imperante en esta poesía" (144). La mujer otra vez está fragmentada y regresa la representación de una mujer en silencio como el ideal. "Me gusta cuando callas" se repite tres veces en los versos 1, 10 y 18. Alusiones al silencio se repiten a lo largo del poema, "y parece que un beso te cerrara la boca" (v. 5), "tu silencio es de estrella" (v. 17), reafirmando la belleza que se encuentra en una mujer que no habla, no opina, no protesta. Nuevamente se observa al poeta cambiando su lenguaje para comunicarse con ella, "Déjame que te hable también con tu silencio" (v. 14) en esta ocasión su lenguaje desaparece, contrario a lo que ocurre en los poemas 5 y 6, su lenguaje se reduce al silencio total, a la nada, al lenguaje de la mujer. Guerra-Cunningham señala que se trata a la categoría mujer como una construcción imaginaria escindida entre lo deseado y lo temido, como un objeto anclado en la imaginación y la prescripción. Ella es la figura central en la construcción y adquisición de la masculinidad [...] (14) Mediante el empleo de opuestos binarios o dicotomías, al definir lo femenino también se define lo masculino. En estos poemas, el reducir el lenguaje de la mujer a la nada, le resta valor a su voz, le resta agencia, le roba su opinión, sus necesidades y deseos y, a su vez, resalta la voz del hombre, la opinión del hombre, el sufrimiento y los sentimientos del hombre, sus necesidades y los deseos del hombre como los únicos existentes. Tal parece que el poeta la asume tan ajena a él que la invisibiliza antes de darse a la tarea de comprenderla. Y es que si bien, la hace parte de su relato, éste está atravesado por la imposibilidad de la voz del poeta de aprehender a la mujer toda, aquella que no es pasiva y que quizá para su beneficio y el de la voz patriarcal instaurada socialmente, es mejor silenciar.

La mujer atrapada en una imagen del cuerpo que no le corresponde, que no es real, es retomada cuando el "yo" poético declara que "le gusta cuando calla porque está como ausente" (v. 1). El mensaje es que a él le gusta su ausencia. A él le gusta su invisibilidad. A él le gusta su silencio, pues es sobre esta pasividad que él logra ejercer su poder. Louise A. Detwiler advierte la manera en la que el Poema 15 oculta fácilmente la feminidad de la mujer y la deshumaniza, además de realzar al hombre como el foco. "Me gusta cuando callas" se repite tres veces en los versos 1, 10 y 18. Al enfocarse en los "grandes ojos" y en "su oído" presenta a una mujer disecada, el todo por las partes y no las partes constituyentes del todo. Según García:

Tal cual se puede apreciar, en casi todas las composiciones de Veinte poemas el cuerpo de la mujer aparece despedazado: muslos, pechos, pubis, manos, cintura, brazos, ojos, boca y dientes. Estas piezas, a pesar de su belleza, son insuficientes para "armar" un sujeto femenino: lo que se tiene es una imagen fragmentada y, por tanto, incompleta. Este proceso de metamorfosis y fragmentación, además de resaltar metáforas eróticas muy visuales, tiene el propósito de penetrar en el misterio femenino por medio de la reducción a elementos de la naturaleza [...] Desembragar a la mujer o equipararla a "algo" conocido es una forma de deshumanizarla y (des)conocerla mejor, ya que la parte no explica al todo y el todo es más que la suma de sus partes ("De carne y naturaleza", 195-96)

La fragmentación contribuye a la construcción de la mujer como ser inferior, que no es humano, que es objeto. García llama a esto (des)conocerla porque la aniquilación simbólica de la mujer requiere olvidarse de que es un ser humano. (Des)conocer a la mujer es olvidarla, borrarla, rompiéndola y despedazándola hasta que ya no se le pueda reconocer. Esta práctica violenta hace que el cuerpo de la mujer se reduzca a fracciones y piezas, se convierta en un espacio ajeno donde ella no puede reconocerse.

El tema de la posesión y del dominio masculino se observa en el Poema 20 en el verso 31, "De otro. Será de otro. Como antes de mis besos" (31). La implicación es que la mujer no tiene identidad propia. Ella pasa de hombre en hombre siendo poseída y definida por cada uno de los que llegan a su vida. Según John Gledson en "Poetry and the Female Body in Manuel Bandiera," el cuerpo de la mujer en la poesía se trata de manera que beneficia la supremacía masculina: "The female figure of poetry remains a slave, adored and placed in an exalted position, but not self-sufficient, as true automatic writing would be. She is ruled by the poet/master" (110). Al no ser autónoma en este poema, la mujer se convierte en un espacio que el poeta puede poseer. Esta práctica produce dos efectos: establecer al hombre como el poder dominante y distorsionar a la mujer con el propósito de poseerla. En el verso 31, esta mujer viene definida por el hombre anterior a él y por el que la definirá después de él. Esto la delimita y la deshumaniza, además de realzar al hombre como el género dominante. Ella no cambia a ninguno de los hombres con los que ella está. Ellos no son de ella. Pero la mujer es poseída y pertenece a cada uno de ellos y su identidad se ve cambiada según lo que le sea impuesto.

**Mujer = partes del cuerpo**

En el Poema 20 la invisibilidad continúa, la mujer se encuentra atrapada entre recuerdos del pasado del poeta. Las únicas imágenes que él brinda de la mujer están fragmentadas. "Como no haber amado sus grandes ojos fijos" (v. 13) y "Mi voz buscaba el viento para tocar su oído" (v. 24). Al enfocarse en los "grandes ojos" y en "su oído" presenta a una mujer disecada, el todo por las partes y no las partes constituyentes del todo. Según García:

Tal cual se puede apreciar, en casi todas las composiciones de Veinte poemas el cuerpo de la mujer aparece despedazado: muslos, pechos, pubis, manos, cintura, brazos, ojos, boca y dientes. Estas piezas, a pesar de su belleza, son insuficientes para "armar" un sujeto femenino: lo que se tiene es una imagen fragmentada y, por tanto, incompleta. Este proceso de metamorfosis y fragmentación, además de resaltar metáforas eróticas muy visuales, tiene el propósito de penetrar en el misterio femenino por medio de la reducción a elementos de la naturaleza [...] Desembragar a la mujer o equipararla a "algo" conocido es una forma de deshumanizarla y (des)conocerla mejor, ya que la parte no explica al todo y el todo es más que la suma de sus partes ("De carne y naturaleza", 195-96)

La fragmentación contribuye a la construcción de la mujer como ser inferior, que no es humano, que es objeto. García llama a esto (des)conocerla porque la aniquilación simbólica de la mujer requiere olvidarse de que es un ser humano. (Des)conocer a la mujer es olvidarla, borrarla, rompiéndola y despedazándola hasta que ya no se le pueda reconocer. Esta práctica violenta hace que el cuerpo de la mujer se reduzca a fracciones y piezas, se convierta en un espacio ajeno donde ella no puede reconocerse.

El tema de la posesión y del dominio masculino se observa en el Poema 20 en el verso 31, "De otro. Será de otro. Como antes de mis besos" (31). La implicación es que la mujer no tiene identidad propia. Ella pasa de hombre en hombre siendo poseída y definida por cada uno de los que llegan a su vida. Según John Gledson en "Poetry and the Female Body in Manuel Bandiera," el cuerpo de la mujer en la poesía se trata de manera que beneficia la supremacía masculina: "The female figure of poetry remains a slave, adored and placed in an exalted position, but not self-sufficient, as true automatic writing would be. She is ruled by the poet/master" (110). Al no ser autónoma en este poema, la mujer se convierte en un espacio que el poeta puede poseer. Esta práctica produce dos efectos: establecer al hombre como el poder dominante y distorsionar a la mujer con el propósito de poseerla. En el verso 31, esta mujer viene definida por el hombre anterior a él y por el que la definirá después de él. Esto la delimita y la deshumaniza, además de realzar al hombre como el género dominante. Ella no cambia a ninguno de los hombres con los que ella está. Ellos no son de ella. Pero la mujer es poseída y pertenece a cada uno de ellos y su identidad se ve cambiada según lo que le sea impuesto.
Conclusión

Las representaciones negativas de la mujer con frecuencia pasan inadvertidas. Se ocultan bajo símbolos que se reproducen múltiples veces, año tras año, dando la sensación o impresión de ser naturales al rol femenino. Estas prácticas simbólicas se ocultan en lo cotidiano, en las cosas que vemos repetidamente, como lo son los temas de amor en la literatura. En el transcurso de la exploración de Veinte poemas de amor y una canción desesperada de Pablo Neruda se puede observar un registro de proyectos masculinos cuya intención es construir a la mujer a través de símbolos y representaciones que disminuyen; subyugan y oprimen a la mujer beneficiando la supremacía masculina. Cuando un solo lado se ve beneficiado, dicha manifestación recibe el nombre de privilegio. En la literatura, explicar y definir a la mujer a través de símbolos ocultos que sistemáticamente la hacen inferior, reducirla a partes de su cuerpo y representarla por medio de objetos tiende a privilegiar a un solo género. Las representaciones de la mujer en Veinte poemas de amor, aunque a primera vista nacen del amor, realmente le restan agencia y voz a la mujer, haciendo de su propio cuerpo un ambiente hostil de ideales inalcanzables que además la deshumanizan. Quizás lo más sorprendente de esta investigación es la agenda de la supremacía masculina en la literatura ya que disfrazándose de temas de amor pasa de forma desapercibida. Abordar y examinar una colección de poemas clásicos de la literatura hispanoamericana con ojo crítico, trae a la luz preguntas de crítica feminista como ¿Qué significa el concepto de “mujer”? ¿Quién o quienes están creando esta definición? ¿Qué imágenes se reproducen con respecto a la mujer y su cuerpo? Para desafiar la supremacía masculina, debemos también cuestionar la literatura y, dentro de ello, los conceptos y representaciones que creemos conocer y entender.

Bibliografía


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THE SYNTAX OF CHALDEAN NEO-ARAMAIC

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1. Introduction

Chaldean Neo-Aramaic is a Semitic language spoken by the Chaldean Christians in Iraq and around the world. There are many dialects of Chaldean Neo-Aramaic, and in this research, I will be examining ACNA, which is spoken in the town of Alqosh in the Plains of Nineveh in the northern part of Iraq. Currently, the language is in decline and is understudied. Therefore, this paper attempts to preserve the ACNA by generally describing its syntax, and specifically determining its word order, which typically refers to the order of subject (S), verb (V) and object (O) in a sentence.

1.1 Historical Overview

Chaldean Neo-Aramaic is a northeastern dialect of Modern Aramaic from the west Semitic branch of the Afro-Asiatic language family. The word Chaldean is ambiguous if used solely because it may refer to the Church, people, or language. Therefore, the term Neo-Aramaic is added as a reference to the language as well as its Aramaic root. Aramaic is a reference to the ancient Arameans who lived in Aram – modern day Syria. Earliest indication of Aramaic comes from the Aramaic kingdoms, which was written in ancient Aramaic. Then Aramaic became the official tongue after big empires had adopted it as the administrative language (Greenspahn, 2007, p.6). Among these kingdoms were the Babylonian, Assyrian, and Persian empires, thus making Aramaic the lingua franca of the entire Near East (p.1).

In his book, Dr. Greenspahn (2007) highlights the importance of differentiating between a language and a script (p.6). The arthrography of Ancient Aramaic was based on the Phoenician alphabet. In time, the ancient Israelites adopted the more squared writing style of Ancient Aramaic to write their own language, from which the Biblical Aramaic had developed, whereas the cursive style became what is known as the Syriac alphabet, which is the ancient Aramaic orthography that was used later by the early Christians. Due to religious conflict, Syriac developed two distinctive writing systems: Western and Eastern, both of which are still used today by the church in Syria and Iraq.

The dialects of Aramaic can be arranged according to the time in which they were used. First, ‘old’, or ‘ancient’ Aramaic was used in the first millennium B.C.E. which “… the division between the Aramaic and the Canaanite branches of Northwest Semitic was relatively recent” (p.6). When the big empires, such as Babylonian, Assyrian, and Persian, used Aramaic as their official language, which marked the next period of Aramaic, and that is the Official, Imperial, or Standard Literary Aramaic. After the falling of the Persian Empire, regional variations of Aramaic had emerged due to the lack of language standardization. The third period of Aramaic, Middle Aramaic, was spoken during the time of Jesus Christ. The time between the second and the ninth centuries C.E. marked ‘Late’ Aramaic. Finally, Modern Aramaic is currently spoken by most Christians in Iraq and Syria, southeastern Turkey (near Tur Abdin), and Mandeans in southern Iran (p.6-7).

Modern Aramaic has various variations, one of which is Chaldean Neo-Aramaic. The first reference of the language appeared in a work of literature in the 17th century. Rather than writing in Classical Syriac, the School of Alqosh produced a religious poetry in the colloquial Neo-Aramaic and called the language ‘Chaldean Neo-Aramaic’ (Murre-van den Berg, 1998, p.508), thus marking the Neo-Aramaic dialects spoken in the Plains of Nineveh in northern Iraq.

1Alqosh is located 50 kilometers (31 mi) north of Mosul.
2Western Aramaic alphabet is also called Classical Syriac or Estrangēlā, which is no longer used. The term Western roughly refers to the west of Euphrates. Sertā is simpler and has been used since the 8th century in Syria and Lebanon for religious purposes.
3Also called Madnhāyā, which means ‘eastern’
4Probably between the tenth and the seventh centuries (Greenspahn, 2007, p.6)
Figure 1 – Semitic Language Family Tree
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Figure 2 - The Relationship of Chaldean and Assyrian to Other Semitic Languages
Jim Hlavac (2012) Monash University, Author’s Copy
Chaldean Neo-Aramaic has a historical relationship with other languages in the Semitic family as shown in Figure 1 and Figure 2. In the previous page, the highlighted branches in Figure 1 are used in Figure 2 to present the historical relationships of Chaldean Neo-Aramaic to the Semitic languages. The dotted arrows in Figure 2 show a direct influence of other languages in Chaldean Neo-Aramaic, while the regular arrows present the origin of the language.

1.2. Present-Day Issues

According to UNESCO’s Atlas of the World’s Languages in Danger, the vitality status of Chaldean Neo-Aramaic is ‘definitely endangered’ (Moseley, 2010). There are a number of socio-political reasons for such status, such as discrimination, immigration, and mass media. First, as a minority, Chaldeans have been underrepresented politically in the Iraqi government. The former government of Saddam Hussein did not target Chaldeans directly; however, many Chaldean villages were destroyed under his rule. As a result, many Chaldeans moved to big cities such as Baghdad and Mosul. After the Iraq War in 2003, a large number of Chaldean Christians left the country due to religious prosecutions, thus decreasing their population from 8 percent in 1987 to 5 percent in 2003 (San Diego Union Tribune, 2014). There has not been any updated data regarding Chaldean Christian’s population because there has been no official census after 2003 in Iraq.

In the diaspora, Chaldeans live in communities where they strive to keep their old culture and language alive. For example, Metro Detroit, Michigan, has the world’s largest Chaldean population outside of Iraq (The Chaldean Community Foundation). However, the population does not necessarily reflect the numbers of speakers. Determining the exact number of Chaldean Neo-Aramaic speakers is not an easy task because there is a large portion of Chaldeans, or at least those who identify themselves as such, who do not speak Chaldean Neo-Aramaic. The UNESCO’s Atlas of the World’s Languages in Danger reported an estimated of 240,000 speakers worldwide (Moseley, 2010). However, some statistics show an estimation of 120,000 speakers of Aramaic dialects in Iraq (Murad, 2007). At any rate, there has not been any attempt to consider the number of ACNA speakers.

Another reason for the decline of Chaldean Neo-Aramaic is the lack of effective resources to preserve the language. First, Chaldeans are schooled in languages other than Chaldean Neo-Aramaic. Only those who are affiliated with the church, e.g. priests and monks, are required to read and write in Aramaic, which is far from the spoken Chaldean dialects. Moreover,

there are numerous dialects of Chaldean Neo-Aramaic, some of which are mutually unintelligible. Furthermore, there is no mass media production in Chaldean; instead, newspapers and TVs are in either Arabic or English. In brief, for the lack of both efficient means to maintain the language, and linguistics research and analysis, this paper is my first step in the ladder to explore the language deeply in an attempt to preserve it.

2. Current Study

The focus of the present study concerns the grammatical judgments of word order with a corresponding syntactic analysis in order to create a model for the syntax of Chaldean Neo-Aramaic. This study focuses on three types of verbs, and those are intransitive⁵, transitive⁶, and ditransitive⁷, each of which was used in the simple and progressive aspects.

2.1. Research Questions and Hypothesis

Languages in the Semitic family, usually, have multiple word orders, some of which have completely changed from one order to another. For example, Hebrew has shifted from VSO in Biblical Hebrew to SVO in Modern Hebrew. On the other hand, Classical Arabic and Modern Standard Arabic (MSA) are both VSO and SVO, whereas Arabic colloquial is mostly VO and SVO. Similarly, ACNA is expected to have a flexible word order, for which often VSO order is preferred over SVO. Therefore, the hypothesis for this study suggests that by using a variety of syntactic hypotheses, a model tree of ACNA’s syntax will be presented and examined, and then a final model tree will be constructed for ACNA, but first, it is essential to answer the following questions:

I. What is the word order in ACNA?
II. Is it flexible?
III. If so, what is the preferred word order?
IV. What are the factors that influence such preference?

¹ Depends on where the Chaldeans are populated, they study Arabic in Iraq, in English in the US and Australia; etc...

⁵ Intransitive verbs require one argument only, such as sleep in ‘Mary slept’

⁶ Transitive verbs require two arguments, a subject and an object, such as hit in ‘the car hit the tree’

⁷ Ditransitive verbs require three arguments, a subject and two objects, such as give in ‘Mary gave John a pen’ or ‘Mary gave a pen to John’
3. Data Generalization

Speakers of ACNA have the tendency to omit the subject if it has already been stated. Even when the subject is deleted from the sentence, the subject agreements are always morphologically formulated within the verb. A subject agreement can be an affix, which can be defined as a bound morpheme that attaches to the stem of a word. In ACNA, subject agreement usually appears as a suffix; however, they are inseparable from the verb, and they must agree with the subject’s person, number, and gender. In general, subject noun phrase can either precede or proceed the verb, or be omitted as previously stated; however, a verb is always minimally required in order to create a sentence in ACNA. Generally, verbs in Chaldean Neo-Aramaic are free morphemes (independent words); however, if the verb is a copula, it may be a suffix.

3.1. Data Collection

The main resources used for this research are collected previously from the Field Methods course and Summer Undergraduate Research Fellowship (SURF). For the purpose of this research, additional data was also primarily collected by audio-recorded elicitation sessions with native speakers of ACNA in San Diego, California, and Las Vegas, Nevada.

3.2. Data Transcription

The data is transcribed using the International Phonetic Alphabet (IPA). All data is translated using a word-to-word translation. Then the equivalence translation of English is provided as well.

4. Analysis

Examining the data begins with analyzing the small entities that construct a sentence. Generally, a sentence is mainly comprised of a verb, a subject, and sometimes an object. However, languages such as Spanish, Italian, and Arabic do not require a subject in the sentence for the reason that the formation of the verb indicates the subject’s person, gender, and/or number. As a member of the Semitic family, ACNA possesses similar characteristics of subject omission, which, in linguistics, is referred to as a null-subject language. As a result, forming a sentence in ACNA requires at least a verb, which is the main element of the sentence.

4.1. Word Order

Word order is the syntactic ordering of constituents in a given language; in other words, it denotes the location of important sentence elements such as the subject, the object, and the verb. There are six possible word orders for sentences that are constructed of a subject (S), a verb (V), and an object (O). Over 85% of the languages are SOV and SVO (Tomlin, 2014, p.120). According to Carnie (2013), nearly 9 percent of languages around the world are VSO (300). As previously mentioned, ACNA is selectively flexible in its word order. This is shown in (1).

(1) a. dmɔɾja Mary
dmɔɾj-a Mary
sleep.REC-3.SG.FEM Mary
‘Mary slept’

b. Mary dmɔɾja
Mary dmɔɾj-a
Mary sleep.REC-3.SG.FEM
‘Mary slept’

Sentences with intransitive verbs may start with the subject followed by the verb, or vice versa. When native speakers were asked to translate the sentence and then determine which sentence is more acceptable, they stated that both were equally correct. Moreover, they specified that the first word heard is the most important piece of information that the listener needs to know. Therefore, the flexibility in the subject-verb order is a matter of emphasis. However, this is not the case for both transitive and ditransitive verbs. Thus, the word order is affected by argument structure.

4.1.1. Explicit Subject

Languages can be formed differently from each other, some of which requires a subject and a verb, and other may require a verb only. For example, creating a simple sentence in English requires a subject noun phrase and a verb predicate. In other words, the subject is an independent entity of the verb in the syntax of English. On the other hand, the verb in ACNA is morphologically formed to include the subject; both the verb and the subject are inseparable from each other. Furthermore, subject pronouns are used only when ACNA speakers are being emphatic. Because this research examines word order, the majority of the data includes explicit subjects. Speakers of ACNA typically express intransitive and transitive sentences with explicit subjects as in (2).

(2) a. sni kdsmyj
sni k-dsmy-i
3.PL.NOM hair-sleep-3.PL
‘They sleep’

b. Mary dɔɾjəqə bɾənəh
Mary dɔ-ɾjəq-a bɾənə-h
Mary fut-kiss-3.SG.FEM son-GEN
‘Mary will kiss her son’
Although (2a) includes an overt pronoun, in these cases native speakers of ACNA mainly use the verb only (without the subject pronoun). However, (2a) is acceptable and interpreted as emphasizing the subject. In addition, due to flexibility in word order, /kɑbmɔxə lɛn/ is also acceptable. Typically, speakers of ACNA start the sentence with the progressive aspect with the copula, which includes the tense and the subject agreement, followed by the subject then the main verb. This is shown in (3)a. Moreover, speakers of ACNA point out that the same sentence in (3)a can be communicated by starting with the subject, followed by the verb – as in (3)b – as well as starting with the verb and then the subject, as shown in (3)c.

Even though ‘Mary is sleeping on the sofa’ can be uttered in three different word orders, speakers of ACNA declared that their preference is (3)a. They clarified that (3)b significantly emphasizes the subject. It’s important to note that speakers of ACNA prefer to hear what they consider more important piece of information in the sentence, and that is the copula because it carries the tense and subject reference – when did the action happen and who performed it. Clarifying the subject is the only case speakers of ACNA would use (3)b. On the other hand, the participants rated (3)c as grammatical yet rarely used, thus not preferable. Evidently, SVO word order in (3)a and (3)b is highly preferred over VSO order in (3)c in the progressive aspect.

4.1.2. Null Subject Hypothesis

As indicated previously, according to language typology, the grammar of null-subject languages (NSLs), such as Spanish, Italian, and Arabic, allows the deletion of the subject in the sentence, while the verb typically encompasses the subject agreement, which is a referent of the subject’s person, number, and/or gender. In ACNA, the usage of subject pronouns is unnecessary in the sentence, as shown in (4).

<table>
<thead>
<tr>
<th>(4)</th>
</tr>
</thead>
</table>
| kɔpɔlɔtwa  
k-dɔmɔx-h-wa  
HAB-work-2.SG.MASC.PST  
‘You (used to) work’ |

The subject agreement clarifies who or what the subject is, and in (4), it is a third person singular masculine. Each subject agreement is part of the morphological construction of the verb. In ACNA, there are nine different types of subject agreements (shown in Table 1), and those agreements are suffixes, except for their person singular masculine (he), which is part of the in the verb’s pattern.

<table>
<thead>
<tr>
<th>‘work’</th>
<th>Subject Agreements</th>
<th>English Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>klɔsɔm</td>
<td>-m</td>
<td>I (fem) work</td>
</tr>
<tr>
<td>kɔlɔm</td>
<td>-n</td>
<td>I (masc) work</td>
</tr>
<tr>
<td>kɔlɔŋ</td>
<td>-h</td>
<td>We work</td>
</tr>
<tr>
<td>kɔlɔt</td>
<td>-at</td>
<td>You (sg/fem) work</td>
</tr>
<tr>
<td>kɔlɔt</td>
<td>-et</td>
<td>You (sg/masc) work</td>
</tr>
<tr>
<td>kɔlɔtu</td>
<td>-stu</td>
<td>You (pl) work</td>
</tr>
<tr>
<td>kɔlɔu</td>
<td>-He</td>
<td>He work</td>
</tr>
<tr>
<td>kɔlɔ</td>
<td>-She</td>
<td>She work</td>
</tr>
<tr>
<td>kɔlɔt</td>
<td>-i</td>
<td>They work</td>
</tr>
</tbody>
</table>

Table 1 - Subject Agreements in ACNA

In English, the category of work is ambiguous because it can be a verb as in ‘I work every day,’ or a noun as in ‘my work is difficult.’ One must heavily rely on the syntax of English in order to determine whether ‘work’ is a noun or a verb. On the contrary, words in ACNA are formed in patterns; each of which defines the category of words. Therefore, creating a verb requires putting a root of a word into its verb pattern, and then attaching the subject agreement suffix to it. Most importantly, verb patterns and subject agreements are inseparable from each other. Native speakers of ACNA use a proper noun only at the beginning of a conversation to establish whom or what the subject is, and then they omit it for the rest of the conversation, thus falling under the null-subject languages.

4.1.3. The Importance of Verbal Type on Word Order

Verbs in ACNA are the most important element in the sentence. Not only do verbs carry all the necessary information such as tense, aspects, and subject reference, but also their category directly affects the word order. Specifically, word order could be either strict or flexible depending on whether the verb is intransitive, transitive, or ditransitive. In order to examine any possible word order, the data following sections includes both the simple and progressive aspects of the present tense accompanied with an explicit subject.

As previously described, word order is flexible for intransitive verbs, as shown in (1) and (3). On the other hand, sentences with transitive verbs may be flexible, as shown in (2b), or not. When asked about grammatical judgment, speakers of ACNA stated that (5) sounds strange.

For sentences with transitive verbs, the word order is not as flexible as intransitive verbs. The only acceptable word order is SVO, in which the subject must always precede the main verb. Speakers of ACNA expressed that at first, they assumed that Mary in (5) was the person being kissed. Upon the request of some participants, the sentence was repeated. Only then they were able to indicate that (5) is unconventional.
Sentences with ditransitive verbs in ACNA can be structured in two ways. The verb in first form is followed by indirect object then direct object, as shown in (6a). In the second form, the verb is followed by a direct object then a preposition phrase (indirect object), as shown in (6c). In contrast to intransitive and transitive verbs, the only acceptable word order for sentences with ditransitive verbs is SVOO, as shown in (6).

Speakers of ACNA stated that only (6a) and (6c) are acceptable, whereas (6b) and (6d) are ungrammatical. The speakers’ grammatical judgment indicates three facts. First, the subject must always precede the ditransitive verb. Second, it is extremely preferred that the subject precedes the transitive verb, and third, the subject and the intransitive verb can freely exchange their order. In other words, SVO is generally preferred over VSO in ACNA.

4.2. Syntax Tree Diagram

Once the word order for ACNA is established, I began the process of constructing a model for ACNA syntax. The basis of this analysis is the English syntax tree in Figure 3. Many sentences in ACNA were put in the English model; however, it failed for VSO sentences.

Speakers of ACNA stated that only (6a) and (6c) are acceptable, whereas (6b) and (6d) are ungrammatical. The speakers’ grammatical judgment indicates three facts. First, the subject must always precede the ditransitive verb. Second, it is extremely preferred that the subject precedes the transitive verb, and third, the subject and the intransitive verb can freely exchange their order. In other words, SVO is generally preferred over VSO in ACNA.

4.2.1. The Transformational Rules

Transformational rules can move words around in the sentence such as $\text{VERT}$ and $\text{TEXC}$. The first type of movement allows the verb to move to the $T$ head in the tree; this is known as verb raising or $\text{VERT}$ movement. This movement addresses the issue of adjunct (adverbs) when it appears between the verb and its complement. It also explains tensed auxiliary movement in English (Carnie, 2013, p. 291-311). In ACNA, this movement perfectly fits the simple aspects in Figure 4; however, it was unfitting for the progressive aspects as shown in Figure 5.

At first glance, $\text{VERT}$ movement seems to work for ACNA, as shown in Figure 4. Some linguists prefer to keep /din̂k̂a/ ‘will kiss’ in $V$ and add [+fut] in $T$ while keeping the arrow to indicate the tense. In any case, while $\text{VERT}$ movement may work for other languages, it was problematic for the progressive aspect because it did not work for TSVO order.

The second movement that was subject to examination is (TEXC), which is used in English and other languages, typically for yes/no questions. However, forming a yes/no question in ACNA is a matter of intonation, thus making the movement unnecessary. In short, both $\text{VERT}$ and $\text{TEXC}$ function in the basis of the Head-to-Head movement, in which $T$ is the head of TP, $V$ is the head of VP, and $C$ is the head of CP. Given that the position of the subject has not been solved yet, the proceeding section will examine the VP-Subject Internal hypothesis and then apply the Head-to-Head movement into the tree.

The English tree may work for VSO sentences; however, it completely failed for TSVO, which is the most preferred order for the progressive aspect. For example, /wɔlə Mary bɔntərə Adam/ ‘Mary is guarding Adam’ failed completely in Figure 3.3 because the NP subject is the specifier of VP; therefore, any insertion between $T$ and $VP$ is not permitted. In the next section, a deeper examination is provided using transformational rules to accommodate the flexibility in ACNA word order.
4.2.2. VP-Subject Internal Hypothesis

As a rule, the subject is positioned in the specifier of the TP. From this point of view, the subject is a separate entity from the verb, which completely fails in languages with a VSO order. Syntacticians suggest that the subject should be lowered to become part of the verb phrase. Koopman and Sportiche (1991) suggest that the subject is “generated in the specifier of a VP” (Carnie, 2013, p.305). According to this hypothesis, the subject becomes an argument of the verb, thus closer to it. Such a scenario perfectly works for VSO languages, and especially ACNA, whose verb morphology includes subject agreements. The examination of this hypothesis is in Figure 7. The sentence in Figure 7 can be expressed as /wɜla Mary bɜnɜaqa brɜnɜħ/, which fits perfectly in the tree, or /Mary wɜla bɜnɜaqa brɜnɜħ/ in which a Head-to-Head movement is required. Consider the following:

4.2.3. Inner-Aspect

According to Travis (2010), there is an inflectional domain within VP, which is used to determine the Inner Aspect (p.1). Moreover, Travis discussed the possibility of a non-lexical category, or the inflectional domain being aspect (p.7). In ACNA, the aspect is morphologically inflected with the main verb, as shown in with progressive bɜ- in (7a) and habitual k- in (7b):

\[
\begin{align*}
\text{(7a)} & \quad \text{bɜ-dmaga} \\
\quad & \text{bs-dmaga} \\
\quad & \text{PROG-sleep} \\
\quad & \text{Sleeping}\text{16} \\
\text{(7b)} & \quad \text{kdmaga} \\
\quad & \text{k-dmga-a} \\
\quad & \text{HAB-sleep-3 FEM} \\
\quad & \text{She (habitually) sleeps}
\end{align*}
\]

The final tree is presented in Figure 9, which is examined using Head-to-Head movement. It perfectly fits VSO and TSVO. In addition, the subject ‘Mary’ may rise to be positioned in the specifier of the ASPP then TP, presented in orange arrows, thus creating an ideal structure for SVO. The continuous aspect in ACNA is always prefixed to the gerund to create a progressive verb. Some linguists have argued that the morphology of the verb may parallel the syntax. Considering this point of view, an aspect phrase can be added to the diagram.

5. Conclusion and Future Research

The purpose of the present study was to examine the word order of ACNA in order to accurately describe the syntax of ACNA. The results were that the ACNA has a flexible word order, in which SVO is preferred over VSO. According to ACNA speakers, such flexibility occurred for two reasons: emphasis and influence of other languages. Furthermore, the type of verb determined the acceptable word order. After applying a variety of syntactic hypotheses such as Transformational Rules of movements, Null-Subject, VP-Subject Internal, and Inner-Aspect, a model tree of ACNA’s syntax was presented in Figure 9 and then examined. The model should be able to present any sentence produced in ACNA. Future research will have to investigate different types of sentences such as negative and interrogative sentences in order to further investigate its syntax in attempts to preserve the language due to its decline.
References


List of Abbreviations

| 1 | first person | nom  |
| 2 | second person | np   |
| 3 | third person | pl   |
| aspP | aspect phrase | POSS |
| caus | Causative | PRES |
| cop | copula | PROG |
| cp | complementizer phrase | PST |
| fem | feminine | rec |
| fut | future | Singular |
| hab | habitual | spec |
| loc | Locative | TP |
| masc | masculine | tense phrase |
| | | VP |
YOGA AS AN ADJUNCT THERAPY THROUGH THE LENS OF POSITIVE PSYCHOLOGY THEORY AND NEUROSCIENCE

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Abstract

Therapeutic interventions incorporating mindfulness have proliferated as complementary treatment. One adjunct mindfulness intervention that warrants further study is Yoga; a physical and spiritual practice to facilitate a mind-body connection. Research has shown a consistent yoga practice can affect cognitive, behavioral, and emotional wellbeing and may be effective for reducing symptoms of anxiety and depression. Neuroimaging studies have begun to explore the neurophysiological benefits to determine whether these are specific to yoga or present in metabolically equivalent forms of exercise. The objective of this paper is to review empirical literature on the benefits of yoga and examine whether current positive psychology theory and neuroscience research offer support for yoga as an adjunct therapy.

Introduction

Randomized control trials of yoga have illuminated how yoga can make a positive impact on health by emphasizing the importance of the mind-body connection. Wei and Groves (2017), authors of The Harvard Medical School Guide to Yoga and trained psychiatrists, find building the mind-body connection provides the capacity to handle mental and physical stress by redirecting thoughts and increasing self-awareness. Under stress the body releases the hormone cortisol along with catecholamines which trigger the heart to beat faster, pupils to dilate, and the breath to become accelerated and shallow. The fight, flight, or freeze physiological responses are facets of the sympathetic nervous system. The parasympathetic system, the counter response, releases acetylcholine to slow heart rate, relax muscles and return the breath to its normal respiration rate. These two physiological responses of the autonomic nervous system aim to balance each other. However, when the sympathetic nervous system is hyperactive for too long the body becomes unbalanced in a stressful state. Meditation and yoga can elicit a relaxation response of the parasympathetic system by manipulating the breath and redirecting one’s thoughts (Toschi-Dias et al., 2017; Villemure et al., 2014). Yoga has many lessons to offer but arguably the most important is the realization of the mind-body connection.

Many studies of yoga and stress have centered around cortisol, a steroid termed the stress hormone and end product of the hypothalamic-pituitary-adrenal-axis. Cortisol has served as an important evolutionary protection by setting off an alarm in the body to subside nonessential fight or flight bodily functions. One effect of cortisol includes the sudden burst of energy in response to perceived threats. Modern day chronic activation of the HPA in neuroendocrine studies has shown to impact cognition, mental health and affect brain structures (Lupien, McEwen, Gunnar & Heim, 2009; Gothe, Keswani, & McAuley, 2016). By limiting nonessential fight or flight responses such as digestion, immune response, and sleep other systems become affected. The research of yoga interventions suggests mind body activities play a down regulatory effect in response to stress. The exact mechanism of action is unclear but it appears yoga attenuates the deleterious effects of prolonged stress from cortisol activation which could lead to mental health abnormalities.

The practice of yoga is an ancient discipline originating in India. In the United States yoga is most often practiced following the tradition of Hatha Yoga, an umbrella term emphasizing physical postures. Some other forms of yoga include Iyengar, Yin, and Ashtanga which differ in style, rigor, pace, and breathing techniques. However, across all types of yoga one predominant characteristic is the focus on a philosophy of gratitude and acceptance of oneself to bring balance to physical, mental, and emotional states. For instance, yoga incorporates mindfulness; the intention of bringing awareness to the present moment to develop a non-judgmental attitude or relationship to thoughts, feelings, and sensations as they occur (Holzel et al., 2011). Cognitive behavior therapy follows these same principles of redirecting thoughts and feelings to a desired behavior (Greenberger & Padesky, 1995). Thus, many researchers have begun to investigate the impact of yoga as an adjunct treatment for anxiety and depression. Meanwhile, neuroscientists have also begun to explore if the benefits of yoga effects the brain’s biochemistry, morphology, and function. The objective of this paper is to consider empirical research from positive psychology theory and neuroscience, for analysis of yoga as an adjunct therapeutic intervention.

Positive Psychology and Yoga

Positive psychology, the scientific study of human potential and positive aspects of life, focuses on the positive emotions of human character and subjective wellbeing (Peterson, 2006; Butzer, Ahmed & Khalsa, 2015). Author and clinical psychologist Alan Carr (2013) suggests, one of the major concerns within the field of positive psychology is the distinction of hedonic and eudaimonic wellbeing. The hedonic approach to
wellbeing is through pain avoidance and the eudaimonic approach focuses on meaning and self-realization. Carr believes the hedonic tradition of pleasure may lead to addiction because of pleasure seeking through the overindulgence in material goods, alcohol, drugs, or food that can lead to mental or physical health ailments. The approach of yoga to subjective wellbeing is through the tradition of eudemonic aspects; personal growth, connectedness of mind-body-spirit, and meaning in life. Momentary experiences of pleasure through materialism, that are characteristic of hedonic happiness, do not have a sustainable impact on subjective wellbeing compared to the eudaimonic aspects of happiness obtained through realizing one’s potential. Yoga is an ideal practice to conceptualize one’s own potential, build resiliency, and increase eudaimonic pleasure for sustainable happiness.

Positive psychology and yoga are intertwined because of the emphasis provided on constructs related to wellbeing such as meaning in life and gratitude. In a study by Ivtzan and Papantoniou (2014), researchers found a positive correlation between a consistent yoga practice and meaning in life and gratitude as reported by self-surveys. Their research also suggests the longer individuals practice yoga, the higher their levels of reported gratitude are. As a positive emotion, gratitude also contributes to the concept of Frederickson’s (2001) “broaden and build” theory. As one broadens positive emotions, a positive repertoire is built through increased resiliency, social integration, and willpower. Consequently, this new positive repertoire contributes to positive intrapersonal growth and development. Positive emotions can also undo the effects of negative ones, while spanning intellectual activity through more creative, flexible, or efficient patterns of decision making (Ivtzan & Papantoniou, 2014; Armenta, Fritz, & Lyubomirsky, 2017). Thus, by providing meaning in life, a space to practice gratitude and setting the structural framework for fostering intrapersonal growth, yoga is incorporated into many constructs of positive psychology.

Other elements of positive psychology include self-discipline and self-awareness, both related to the concept of flow (Ivtzan & Papantoniou, 2014). Flow is a positive psychology construct involving a state of complete engagement and immersion in the moment (Nakamura, J., & Csikszentmihalyi, M., 2009). According to Csikszentmihalyi, psychologist and author, flow experiences require a balance of challenges and skill. From a perspective pointed out by Waterman, flow is one indicator of eudaimonia particularly when talents or skills are expressed as the best aspects of an individual’s potential (American Psychologist, 2007). The extensive research on flow has stemmed from the experiences of musicians, athletes, and artists who have coined their experiences of flow as being in the groove or in the zone. One randomized control study on young adult musicians by researchers Butzer, Ahmed, and Khalsa (2016) found a yoga and mindfulness intervention induces states of flow. The experimental group also reported a decrease in performance anxiety compared to controls. The absorptive state experienced in yoga, flow, and mindfulness can also foster creativity and persistence in a task. These positive outcomes can also lead to enhanced self-esteem to combat against negative outcomes or feelings of anxiety. Butzer and colleagues’ study is inconclusive, however, based on their findings inferences can be made to improve human potential and increase the positive aspects of life.

**Yoga and Brain Health**

Advances in neuroimaging have provided non-invasive measures to study the underlying mechanisms of the brain. One area of interest is how the brain responds to experience and rewire itself, a term neuroscientists refer to as neuroplasticity. Theories on neuroplasticity suggesting ‘neurons that wire together fire together’ detail the malleability of the brain’s capacity to change according to conditions based on the environment and alterations of thinking patterns (Power & Schlagger, 2017). Neuroscientific and psychological research have been particularly interested in the malleability of the hippocampus from experience, a structure associated with learning, memory, and emotional regulation. Another area of focus is the structure known as the amygdala, credited for motivation and intense emotions such as fear and aggression. Non-invasive measures such as magnetic resonance imaging or MRI can show detailed images of tissues inside the body to gain a better understanding. Magnetic resonance spectroscopy or MRS complement MRI scans to quantify selected metabolites (Buonocore & Maddock, 2015). Other techniques such as voxel-based morphometry or VBM reveal concentration of gray matter for comparisons between participants (Ashburner & Friston, 2000). An increase in gray matter could indicate a denser neuronal network from repeated exposure due to training or experience. The research on neuroplasticity and yoga have focused on structures such as the hippocampus and amygdala using MRI, MRS, and VBM to better understand motivation, behavior, and emotional processing for possible therapeutic interventions.

In one study by Holzel and colleagues (2011) involving an 8-week mindfulness-based stress reduction intervention, gray matter or GM in the hippocampus increased and GM in the amygdala decreased. Participants in their study were randomized into groups and scanned using a MRI with an image analysis performed by VBM before and after the program. The experimental group consisted of mediation naive individuals who engaged in a body scan, mindful yoga, and sitting meditation. Participants followed 45-minute guided mindfulness exercises daily at home using audio recordings. Techniques were also taught to carryout mindfulness into everyday activities. These techniques were taught in weekly meetings over two and a half hours. Their findings were compared with a waitlist control group. Morphological differences could support the role of mindfulness to ameliorate mental functioning based on previous research suggesting the hippocampus’ role on learning, memory, and emotional regulation. These findings provide support of theories on...
neuroplasticity and make inferences on possible mechanisms of action as to how yoga and mindfulness could be influencing morphological differences impacting brain function.

Regular exercise has shown to prevent numerous health problems including the mitigation of depressive symptoms such as ruminative thoughts, restless sleep, and apathy. However, little research has been done on the effects of metabolically matched exercise to determine if yoga is unique to other methods of physical activity. Depression has been correlated with decreased activity levels of the inhibitory neurotransmitter γ-aminobutyric acid or GABA (Brambilla et al., 2003). Research by Streeter and colleagues (2010), using MRS, conducted a study on healthy subjects who were randomized to a 12 week intervention of yoga or a metabolically matched walking exercise for 60 minutes three times a week. Results of the study, comparing yoga to walking, found higher GABA activity in the yoga and meditation group. In a similar previous study by Streeter and others (2007), a comparison between a 60 minute yoga session and a reading session found increased GABA levels after a session of yoga compared to reading alone. Therefore, yoga could not only serve as an outlet for stress but help rebuild the brain and serve as adjunct treatment options for depression and anxiety.

Yoga may also impact different regions of the brain depending on the type of practice and act as a preventative mental and physical exercise to guard against age related GM degradation. A study by Villemure et al. (2015) evaluated participants based on their yoga practice according to years and weekly/hourly devotion. Controls were excluded based on previous yoga experience to maintain the integrity of the study. Results revealed through analysis of MRI and VBM that the numbers of years of yoga practice was positively correlated with specific regions such as the left mid-insula, left frontal operculum, right middle temporal gyrus, and left orbital frontal cortex. Weekly yoga practice was positively correlated with GM volume increases in the right primary somatosensory cortex, hippocampus, and primary visual area. There was also a negative correlation with age and GM volume seen in controls that was not reflected in the yoga practitioners suggesting yoga could be neuroprotective against GM volume loss. Researchers attribute these differences to neuroplasticity training and the skill acquired through yoga of self-regulation.

Yoga as a Therapeutic Intervention

Ashtanga, a specific type of yoga meaning eight-limbed path, is often depicted as a metaphorical tree with the limbs representing moral guidelines (Wei & Groves, 2017). These limbs aim to lead the practitioner to spiritual enlightenment or samadhi, the original goal of yoga. The asanas or postures are the most practiced branch, however, ashtanga emphasizes other branches such as pranayama (breathing), dhyana (meditative absorption) and dharana (focused concentration). All of these branches share common goals to improve self-discipline, willpower, and self-control. Self-discipline, like a muscle, becomes stronger with practice (Baumeister & Tierney, 2011). Ashtanga also parallels programs such as the 12-step program for addiction therapy (Shankar et al., 2014). The 12-step program begins by introducing the concept of a symbolic staircase with each step focusing on an area of self-improvement leading to a spiritual awakening. Both yoga and the 12-step program include aspects of eudaimonic wellbeing (spirituality) considered to have significant dimensions for virtuous behavior; humility, forgiveness, altruism, gratitude, and compassion (Carr, 2013; Ivtzan & Papantoniou, 2014). These objectives in the context of the 12-step program or eight-limbed path, aim to change patterns of thinking and decision making for improving overall wellbeing.

Anxiety is an ordinary emotion characterized by the apprehensive feeling about an event of uncertain development. However, excessive fear, stress, worry, or anxiety may be indicative of anxiety disorder (American Psychiatric Association, 2013) that could lead to concerns about health and quality of life. Studies of individuals with anxiety and emotional disorders have found low levels of mindfulness (Curtiss & Klemanski, 2014). Therefore, targeting one area such as mindfulness through yoga could help alleviate some symptoms of anxiety or mitigate the progression of generalized anxiety disorder. One form of yoga emphasizing mindfulness is Yin yoga. Yin yoga is arguably one of the most credited for reducing anxiety as it is a slow practice modifiable for everyone. Hylander, Johansson, Duakantaite, and Ruggeri (2017) conducted a randomized control trial of mindfulness and yoga in a non-clinical sample to evaluate the precursors of anxiety such as stress and worry. Their study of Yin yoga and mindfulness excluded participants having ongoing or previous yoga/mindfulness experiences for longer than six months. The experimental group participated in a five-week practice two times a week while the control was waitlisted. Their study was unique as Yin yoga was combined with evidence-based psychotherapy which consisted of 10 content specific themes to teach individuals a better self-directed practice. Consistent with their hypothesis, results suggested that the Yin yoga and mindfulness group established a setting where individuals showed improved mental health by decreased self-reports of perceived stress and worry from self-report surveys.
Depression is one of the most common psychiatric disorders presenting with symptoms that could affect cognitive, behavioral, and physical health. One study worth recognition is by Schuver and Lewis (2016) who conducted a study to determine the efficacy of yoga relative to a walking control group. Their study found in a sample of women with history of diagnosed depression and current depression, over a 12-week mindfulness-based yoga intervention, had decreased depressive symptoms and less ruminative thoughts from baseline to post intervention. Unique to their study, participants were sent home with a DVD guide of yoga focusing on pranayama, meditation, and asana. Participants were instructed to do 60-75 minutes twice a week of guided yoga designed for the management of depression and anxiety symptoms. A mindfulness education session was also provided over the phone. Even though participants were instructed to complete the DVD guide twice a week, they were encouraged to do more in their free time. Phone calls by the experimenters recorded yoga frequency and answered questions.

The notion that yoga could act as a preventative practice for psychiatric symptoms is also consistent with other research that compared yoga to another exercise group of stretching. Gaiswinkler and Unterrainer (2016) found highly involved yoga practitioners have less psychiatric symptoms such as depression compared to moderately involved practices of stretching in a gymnastics control group. Participants were asked over an internet survey to rate their degree of yoga involvement and compared to a group of gymnastic practitioners. Both sample groups were female. The total sample size included 362 yoga practitioners and 93 gymnasts. The majority of the yoga practitioners (68.2%) stated they followed Hatha yoga. The study found empirical support for the positive impact of yoga when the individual is highly involved in the practice by exhibiting the lowest amount of mood pathology in comparison to other groups with less involvement. Yoga is multifaceted and the exact cause for the reduction in depressive symptoms is unclear. However, it is credited to be the encouragement of self-awareness, mindfulness and the mind-body connection which elicits the change.

Limitations

The research on yoga as an adjunct treatment has many strengths but there are several limitations to be considered. Much of the research on the benefits of yoga are correlational and directionality is unclear (e.g., the directionality of flow and mindfulness associations with performance anxiety in young adult musicians is inconclusive (Butzer et al., 2016). Another limitation in the research of yoga worth addressing involves self-report surveys. For example, in the study by Schuver and Lewis the participants in the intervention knew of the researcher’s intentions prior to completing self-report surveys. Informing participants of the study’s hypothesis or goals could increase demand characteristics; leading the participant to respond in ways that unconsciously change their behavior to fit the study. Self-report surveys can also be problematic because of framing effects (cognitive bias) and social desirability other experimental artifacts of unconscious behavior.

Conclusion

Stress is a common obstacle in everyday life yet prolonged stress can be detrimental to mental and physical health. Yoga can offer coping strategies for alleviating anxiety, mitigating depression and providing tools on how to better respond to stressful stimuli. Research on the positive benefits of yoga has been gaining popularity and slowly becoming integrated as an adjunct treatment. Many of these effects remain to be understood but with the help of positive psychology theory and advancing technology in neuroscience, science can help explain the neurobiological processes and cognitive changes of yoga’s influence.

Yoga has shown a lot of potential as an adjunct therapy for anxiety and depression for use in recovery. However, more research is needed. Wei and Groves (2017) note research in promoting alternative therapies is important in gaining the attention of insurance companies to offer affordable coverage. Thus, more studies should be conducted to evaluate how yoga can be a preventative and a neuroprotective practice to promote yoga as an adjunct option. This review supports how yoga can be implemented as a complementary therapy to enhance constructs from positive psychology, such as meaning in life and gratitude, while also providing objective findings from brain research on yoga and brain health.
References


Author Biographies

Christopher Demezier

Christopher Demezier is recent graduate from Florida Atlantic University (FAU). He finished with a Bachelor of Science in Nursing and a Bachelor of Art in Psychology. He is a member of the American Nurses Association, Omicron Delta Kappa Leadership Honor Society, the Honor Society of Phi Kappa Phi, and Sigma Theta Tau International Honor Society of Nursing. During his time at FAU, he was awarded the Leadership Excellence honor, the Undergraduate Researcher of the Year, the University Scholar of the Year, Student Leader of the Year, and the DAISY in training award. He is continuing his education at Georgetown University where he is pursuing his Masters. Christopher currently lives in Palm Beach County.

Supriya Gudi

Supriya Gudi is a fourth-year student at the Harriet L. Wilkes Honors College of Florida Atlantic University in Jupiter, FL. She is pursuing a major in Cellular Neuroscience and a minor in Spanish Language and Literature. Supriya is currently conducting scientific research at the Godenschwege Lab on the FAU Jupiter campus, and has interned at the Tomchik Lab of The Scripps Research Institute in Jupiter, FL for three semesters. She has a strong music background and is a talented vocalist and pianist, having taken lessons for several years. Aside from academics, Supriya is an active musician for a non-profit organization called Mind&Melody, Inc., where she teaches and performs music to patients undergoing neurological impairments, such as dementia.

Tucker Hindle

Tucker Hindle is an undergraduate student in the College of Engineering and Computer Science at Florida Atlantic University and will graduate with a B.S. in Geomatics Engineering in spring 2020. He conducted research, supported by the FAU Kelly Family Foundation Undergraduate Internship Program in Coastal Affairs, which investigated and mapped historical changes in Florida’s coastline from 1875 to 2000. He is involved in two FAU student organizations serving as the current president of the American Society of Photogrammetry and Remote Sensing and a member of the Florida Surveying and Mapping Society.

Alexis Martin & Alex Copeland

Alexis Martin is a senior pursuing a Bachelor of Science in Biology and a Bachelor of Arts in Chemistry. In college, she found an interest in organic chemistry and devoted her time researching marine natural products chemistry in Dr. West’s lab. The following year, she initiated a collaboration between Dr. West’s lab and Dr. Lowell, whom she started research with for the Small World Initiative (SWI). SWI is a program that crowd-sources antibiotic discovery against the increasing evolution of multi-drug resistant bacteria. In June 2018, Alexis plans to present the research findings of the collaboration at the Small World Initiative Annual Symposium in Madison, Wisconsin. After graduation in August 2018, she plans to pursue an industry career before attending graduate school to further her education in interdisciplinary sciences.

Alex Copeland is a senior majoring in biological sciences with a specialization in environment sciences at Florida Atlantic University. He plans on pursuing his Master of Science, with hopes of further researching antibiotic discovery or a related discipline. Alex is a part of Strategies for Ecology Education, Diversity & Sustainability (SEEDS) as well as Association of Biological and Biomedical Students. He enjoys giving his time back by volunteering in Science Olympiad, a science competition for elementary and middle school students, and local clean-ups to preserve South Florida’s wildlife and natural ecosystems.
Courtney Noya

Courtney Noya is a recent graduate from Florida Atlantic University's Harriet L. Wilkes Honors College. She has been an intern with Athentikos, a nonprofit that hosts camps to teach creative arts to at-risk youth in Guatemala. Inspired by her internship, Courtney has spent the past two years working on her undergraduate honors thesis studying the effects of mission trip participation on volunteers’ levels of social awareness and desires for social justice. Following graduation, Courtney will spend a year doing mission work in the United Kingdom while exploring potential academic or professional options for continuing work with nonprofit organizations.

Alyssa Payne

Alyssa Payne is a rising sophomore student pursuing a major in Neuroscience and a minor in Spanish Literature at the Harriet L. Wilkes Honors College in hopes of attending graduate school for Speech Pathology. As a first generation Cuban-American, she has taken an interest examining the historical impact that Fidel Castro’s government has had in current Cuban politics. Her prior research in this area focused on historical analysis of the causes and repercussions of the 1961 Bay of Pigs Invasion. With her latest research, historical contextualization of Reinaldo Arenas’ autobiography combined with literary analysis provides a glimpse into the struggles of a marginal subject before, during, and after the 1959 Cuban Revolution.

Jazly Pizzuti

Jazly Pizzuti was born in Colombia (South America) and came to the United States as a 3 month old baby. She came to Florida to study at the Harriet Wilkes Honors College of Florida Atlantic University. She graduated Cum Laude and now has a Bachelors in Women Studies and a double minor in English and Spanish. She will be applying to graduate programs Fall 2018 in pursuance of becoming a University Professor and a published writer. Jazly identifies as a bicultural, bilingual woman. She feels every as American as she feels Latina. Writing Imagen y simbología de la mujer fragmentada en Pablo Neruda’s Veinte poemas de amor y una canción desesperada allowed her to examine male supremacy by exploring the fragmentation of the female body in literature in a bilingual and bicultural context. As a bicultural feminist she feels passionately about the impact that hidden images and symbols have on their readers, especially because they go so easily unnoticed, simultaneously laying a strong foundation for gender inequality.

Catrin Seepo

Catrin Seepo is an enthusiastic linguist perusing her masters in Linguistics. Originally from Baghdad, Iraq, she grew up as a Chaldean. Displaced by war in her country, Catrin and her family moved to the United States in 2009. Since then, she has obtained a bachelor’s degree in Linguistics, and she seeks to further her studies. As a native speaker of Chaldean Neo-Aramaic, she employs her linguistic education to preserve her native language as well as furthering her linguistic research.

Haylee F. Trulson

Haylee Trulson is a senior at the Wilkes Honors College pursing a major in Neuroscience and Behavior. She first became interested in Science through the unique clinical tales of Oliver Sacks, who opened her eyes to the world of Neurology and Psychiatry. As an advocate for mental health, she aspires to become a psychiatrist to enrich the lives of others and remove the stigma of mental illnesses. She currently works in the Human Development Lab using EEG and eye tracking to study perceptual and cognitive changes of facial perception. Outside of her life as a student she works as a flight attendant and yoga instructor. She spends her free time volunteering, doing yoga, reading, and attending to her two pet cats Sansa and Arya.
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