




Laridae

SALISBURY UNIVERSITY

Undergraduate Academic Journal



Make Tomorrow Yours > 

Volume 6 – Fall 2024

Office of Undergraduate Research and Creative Activity (OURCA)



SADAKA NI IBADA TOSHA

Ruby Muzanila

(Featured on the cover and above)

FACULTY MENTOR: Professor Jinchul Kim

ABSTRACT

Sadaka ni Ibada Tosha is a self-portrait created in 2024, composed with oil on canvas and measuring 18" x 24". The artist explores the implications of subjugation through this piece. The title, which translates to "Sacrifice Is Worship Enough" in Kiswahili, is a proverb often used in a spiritual context to refer to religious sacrifice. Here, this proverb is used to symbolize the fallacies that sustain oppressive hierarchical structures. In the painting, the figures are cornered in a room with sage green walls, forcing confrontation of the artist's reality; the girl gazes unabashedly over her shoulder at the viewer, expressing a longing for consideration and recognition of her humanity while also revealing a fear of persecution. In the background, a dove is depicted in a gold cage with an inscription of the proverb at its base. This is representative of the structural subjugation of humanity that suppresses inherent human dispositions. Commonly doves are associated with peace, love, and morality; in the painting the bird is used as visual metaphor for humanity. The bird flailing within the cage represents desire to express these inherent dispositions despite being taught otherwise.

There were various sources of inspiration which led to the creation of this composition. Influences include Maya Angelou's *I Know Why the Caged Bird Sings* and the symbolism found in classical portraiture, which shaped the depiction of the caged bird. Additionally, the literary topics of liberty, alienation, assimilation, and existentialism in Franz Kafka's *A Report to an Academy* informed the thematic elements of the composition. Lastly, the works of Lucian Freud played a significant role, influencing the style direction and approach to this self-portrait. The rawness and confrontational nature of Freud's self-portraits, along with his psychological approach, are reflected in each brush stroke.

Keywords: humanity, liberation, existentialism, identity, etc

ACKNOWLEDGMENTS

The author thanks Professor Jinchul Kim for his support and mentorship through the development of this composition.

Contents

Letter from the Co-Editors-in-Chief Lian Peach and Jane Simoncic	1
Letter from the Incoming Editor-in-Chief Ben Cooper	1

ARTICLES

(ARTICLES APPEAR IN THE STYLE OF THEIR DISCIPLINE)

Storytelling for Success: The Effects of Preserving Campus Lore on Salisbury University's Admission and Retention Rates Catherine Egan	2
The Evolution of Education: How Environmental Education Has Evolved in Maryland Public School Systems and Suggestions for Improvement Paige L. Cohen	7
Evaluating the Impacts of Near-Shore Land Usage on Aquatic Nutrient Profiles Ellie Welsh	13
Bottled Up: Effects of Polystyrene Microplastics on Alcohol Dehydrogenase Kinetics and DNA Secondary Structure John Todd	21
Corporate Social Responsibility in Latin America and the Caribbean: Motivation for Implementation Gibelle Beaujon	28
Folklore of the Fallen Woman: Private Storytelling in Victorian Dramatic Poetry Sophie Detorie	34
Secrets of the Squirrels in the Sky: How the Moon Shapes Flying Squirrels' Behavior Ashley Gernert	38
Cats, Witches, and Demons: The Role of the Animal Familiar in the English Witch Trials Lydia Loftus	42
Eating Disorders in Transgender and Gender Non-Conforming Communities Bee Watts	47
Postural Orthostatic Tachycardia Syndrome in Universities: The Importance of Improving Accessibility to Accommodations Mackenzie L. Wheelock	52
Evaluating the Need for a Comprehensive Battery of Assessments to Track Concussion Recovery in the Subacute Period Samantha Watson	57
Preventing K-12 School Shootings: Training Educators to Recognize Warning Signs in Students Allison Yeager	62
Period Power: Addressing Period Poverty in Wicomico County Public Middle Schools Abigail Potter, Lian Peach, Maggie Atherton	66
Language Assistance and How Language Barriers Affect the Quality of Healthcare of People Who Do Not Speak English as Their Primary Language Allison Griffin	69
The Princess Paradox: Addressing Misrepresentation of Native American Women in Media Kade Richardson	74
Is Inspiration Ethical? An Exploration of Cultural Appropriation in Art and Media Willow Nyland	80
Microplastics, Nanoplastics, and Their Known Health Implications: Potential Solutions to Implement in the United States Jasmine N. Bowie	84
Unmasking the Pandemic: A Groupthink Analysis of Vaccine Hesitancy During COVID-19 Nicole Washington	91

ART

Sadaka ni Ibada Tosha Ruby Muzanila	Cover
Patience Momina Waheed	20
Vigilant Makayla Bounds	33
The Burden of Time Daijah Richardson	46
451 in K-12 Delaney Cinnamon	65
The Puzzle Bradley Powers	79

Letter from the Co-Editors-in-Chief



This year marks the sixth edition of *Laridae*. As co-editors-in-chief, we both come from different educational backgrounds; Lian represents the social sciences as a political science major, and Jane represents the sciences as a biology major. We have used these diverse interests to support the growth of the journal in many different fields. The number of submissions the journal receives steadily increases every year as more students get to know about the opportunities *Laridae* provides. With this increase in submissions, we see more and more unique student works from original research to creative works of art from a range of different mediums.

Every edition of *Laridae* is organized by a different group of people who bring their own perspective and experiences to achieving the goals of the journal in showcasing the research and creative works of the campus. We thank all of the people who made this edition possible, especially Dr. Rhyannon Bemis, OURCA's director and *Laridae*'s advisor. Thank you to all our authors, faculty mentors and reviewers, and student editors for your hard work preparing each of the submissions for publication. We are so appreciative of the incoming editor-in-chief, Ben Cooper, as well as the co-faculty advisor, Dr. Sherry Maykrantz. We look forward to seeing where you take the journal for its next edition.

This year, we received 38 submissions. Among those, 24 were accepted, and their authors worked alongside the editing team to prepare the best versions of their works for this edition of *Laridae*. From discussing educational best practices to expressing cultural identity through storytelling to studying squirrel behavior, the sixth edition of *Laridae* contains a little bit of everything from all the different fields of interest at Salisbury University. We hope you enjoy reading through the journal and discovering something new.

LIAN PEACH & JANE SIMONCIC

Co-Editors-in-Chief

Letter from the Incoming Editor-in-Chief



It's been such a deep honor and privilege to have been able to work with such a talented group of artists, writers, and researchers for this year's edition of *Laridae*. Seeing where *Laridae* has come from, seeing the edition we were able to create this year, and looking into the future of the journal has provided such a deeply rewarding experience for us editors, the contributing researchers, and hopefully for our readers as well.

This year's selection of submissions was diverse, covering topics ranging from the implications and dangers of microplastics in our everyday lives, to the prevention of shootings in K-12 schools, all the way to the role that dramatic Victorian poetry played in early feminist movements. I have never seen a more diverse array of work included in an edition of *Laridae*, and I am so excited to have been able to help put this edition together.

Of course, *Laridae* is only possible through the continued support of the lovely people in the Office of Undergraduate Research and Creative Activity. Without them, *Laridae* wouldn't be half as rich and exciting as it is this year. On top of their support, the various editors in each given research section have been fundamental to the success of the journal, helping the submitted works come into their own and working with the authors to present their research in the clearest way possible. Obviously, a journal would be nothing without the success of its brilliant contributors. They are the ones that make *Laridae* worth reading in the first place, and without their support, we would not be able to do what we do.

The publication and support of undergraduate research is such a vital experience in the development of forward-thinking researchers, and for many students on campus, changing the world for the better starts here in the pages of *Laridae*. I hope that we never take that for granted.

BEN COOPER

Incoming Editor-in-Chief

Storytelling for Success: The Effects of Preserving Campus Lore on Salisbury University's Admission and Retention Rates

Catherine Egan

FACULTY MENTOR: Dr. Viktoria Basham

ABSTRACT

Admission and retention rates at a university depend on the institution's reputation, which is then dependent on the university's image from the students' and community's perspective. Previous research has shown that when a university has a positive reputation, students are more willing to stay enrolled in their chosen institution through graduation and remain involved as alumni, while donors are more likely to make financial contributions to the university. To increase admission and retention rates at a given university, this paper focuses on how to improve reputation and make connections through the telling of campus legends and the preservation of the institution's history. Storytelling allows people to connect and provides a feeling of familiarity that can be applied to relationships between the students and the university, as well as between the university and its donors. To improve Salisbury University's admission and retention rates, this research recommends the incorporation of campus legends in Salisbury University's tours for students and donors on the physical campus through story signs. Doing so may spark a personal connection between the university and the audience, leading to increased feelings of loyalty and willingness to support the institution.

Keywords: university reputation, admission rates, retention rates, donation rates, university students, institution of higher education, campus legends, campus heritage, lore, storytelling.

INTRODUCTION

Identifying causes for student admission and retention in universities is a growing necessity. As data collected by the National Center for Education Statistics in 2023 demonstrates, the number of students enrolled at an institution of higher education declined by 3% from 41% in 2010 to 38% in 2021. Furthermore, Weissman (2024) quotes Doug Shapiro as he recognizes the impact of COVID-19 on university enrollment rates in that "... after years of decline ... the total number of undergraduates is over a million fewer than the number enrolled five years ago, in 2018." This data is supported by Saul (2022), who notes that admission rates at public universities decreased by about 5% in the spring of 2022. Although prior research by Conard and Conard (2000) shows that the quality of academic resources and the level of education in faculty influence admission and retention rates, this paper argues that the telling of campus legends and the publicizing of campus heritage also improves an institution of higher education's admission and retention rates by building a good reputation (Merchant et al., 2014; Slobodova, 2023). Additionally, the enhancement of a student's experience in the university as a result of forming connections with the university corresponds to a greater retention rate (Haverila et al., 2020; Yang et al., 2008), and positive connections between the institution and the community increase their overall willingness to get involved with and donate to the university

(Merchant et al., 2014; Speck, 2014). This paper also recognizes the general necessity for high admission and retention rates in institutions of higher education like Salisbury University and proposes the implementation of campus legends and culture around the university's campus and in students' daily lives to improve the university's reputation and subsequent admission and retention rates.

WHY DO STUDENT RETENTION AND ADMISSION RATES MATTER?

To relate admission rates to a university's reputation and subsequent retention rates, it is important to identify what ideal admission rates are as well as identify what Salisbury University's acceptance/admission rate is. Admission rates are a key factor for prospective students when determining an institution of higher education to attend (Sunquist, 2017) and is defined as "the rate at which applicants are accepted" (para. 4). Asserted by Sunquist (2017), for a university to have a lower acceptance rate, they must have more prospective students applying than they are able to accept. One can conclude that due to Salisbury University's higher acceptance rate of 91% (US News, n.d.), the university must not receive as many applicants compared to other institutions of higher education, and therefore should strive to attract more prospective students.

The number of admitted students that stay with the institution until they graduate defines a university's students retention rate (Seidman,

2005). A high retention rate is critical to a university because the number of loyal students determines the monetary gain and graduation rate (Lau, 2003), and being unable to admit loyal students to a university is not only harmful to the institution financially but can also hurt its reputation from the community's perspective. Additionally, the "ability to retain students has become a determining factor in obtaining outside funding" (Nash, 1996, as cited in Lau, 2003, p. 126) and is important because outside funding is a main component in keeping a college operating and able to support students (Faria et al., 2019). Such support, for example, may include the ability of a university to hire reputable and capable professors, provide adequate housing arrangements, and financial aid (Haverila et al., 2020). These aspects of college life are important to students when they are considering an institution of higher education to commit to.

The same outside funding that maintains and improves the institutions' support services which increase students' feelings of loyalty can also come from donations by community members or alumni that feel strongly about the university. For this reason, it is important to demonstrate that there is a crucial connection between retention rates and donations by showing how higher donation rates contribute to increased retention rates. One can conclude that donations contribute positively to a university's retention rate and therefore should be examined

when considering how storytelling can impact a university's admission and retention rates.

HOW DONATIONS BENEFIT A UNIVERSITY

Increasing student retention rates may be accomplished through improving aspects of student life on campus, such as housing, extracurricular activities, and financial aid programs. According to Haverila et al. (2020) and Lau (2003), the quality of campus life impacts students' feelings of loyalty toward a university and can raise or lower the student retention rate. The retention rate of a university influences the perceived quality of said university from the donor's point of view (Faria et al., 2018). Evidence of this is seen in Lau (2003), where it is stated that the retention rate of a university "affects the way that stakeholders view the institution" (p. 126). When the community (including donors and students) perceives the institution as high quality or reputable (Faria et al., 2018), community members will feel more inclined to make a financial contribution (Speck, 2014). The quality of a university, for example, can be determined by the presence or absence of educated and "talented" professors, as well as the ability of the institution to possess multiple assets for receiving outside funding (Forbes, 2009). Because of this, it is vital for an institution of higher education to pursue methods of outside funding to be able to maintain the reputation of a desirable campus life in the students' point of view, as well as the reputation of an institution from the donors' point of view.

According to Yang (2008), the quality of university assets, such as educational facilities, can influence the institutions reputation. Such university assets may be improved with any donations given to the university. Evidence of this is cited in Johns Hopkins Bloomberg School of Public Health (2024), where Johns Hopkins University alum Michael Bloomberg donated a total of \$3.7 billion to Johns Hopkins University throughout his life. Because of his donations, Johns Hopkins University saw a vast increase in its reputation. This is further proved by Faria et al. (2018), claiming that Johns Hopkins University is considered among the highest quality institutions in the nation, ranking #9 out of all universities in the United States (US News, n.d.), preceded only by institutions such as Brown University and Duke University. From 1991 to 1996, Bloomberg donated \$1.8 billion to Johns Hopkins University, drastically increasing the university's ability to fund research and scholarships. In another large donation in 2018, Bloomberg donated another \$1.8 billion to the university

to "support undergraduate student financial aid." (Johns Hopkins Bloomberg School of Public Health, 2024). Bloomberg's donations resulted in a release of financial pressure on students, motivating them to remain loyal to the university. Students are frequently forced to withdraw from college due to their inability to afford tuition, so financial support from donors can significantly reduce dropout rates and improve student retention (Lau, 2003). Later, in 2021, Bloomberg would donate \$150 million to the Vivien Thomas Scholars Initiative that enabled historically underrepresented students to complete their degree at Johns Hopkins University by supporting these students financially and opening opportunities for STEM education (Johns Hopkins Bloomberg School of Public Health, 2024). This is also supported by Barbaro (2013) in that the "major improvements in the university's reputation and rankings, its competitiveness for faculty and students, and the appearance of its campus" (p. 155) were a result of Michael Bloomberg's donations. Given this evidence, one can safely imply that the improvements made to Johns Hopkins University with Bloomberg's donations were a main factor in Johns Hopkins University's rise in national rankings and subsequent reputation.

By attracting donors with stories of campus history and therefore forming a connection between the donors and the university, an institution of higher education such as Salisbury University may use funds like these to increase the availability of financial aid, which, according to Haverila et al. (2020) and Lau (2003), is a factor that students consider when deciding upon their level of commitment to the university. Joseph et al. (2012) support the idea that financial aid, or lack thereof, is a major factor in shaping students' opinions toward a university. Their research studied the criteria that students currently attending a university consider when selecting an institution. The findings revealed that cost is one of the main considerations in choosing a university.

To increase the possibility of financial contributions from donors, campus tour guides will tell popular campus legends and tales when giving tours or 'pitching' the campus to possible donors (Speck, 2014). Salisbury University would benefit from displaying campus legends and heritage because community members who are involved in the telling of the campus legend may feel more connected with the history of the university, feeling a stronger sense of community or emotional attachment as a result (Lawrence & Paige, 2016; Slobodova, 2023). This paper recognizes the similarity in

how student and university relationships are formed, and the formation of relationships between donors and the university to conclude that donors may also develop an emotional connection to the institution of higher education through storytelling and therefore make a financial contribution to the institution.

UNIVERSITY REPUTATION

The willingness of students to enroll and commit to a university is driven by a university's reputation (Yang et al., 2008). University reputation is defined as "perceived educational quality and student experience and includes the quality of faculty, support staff, and study spaces" (Joseph et al., 2012, p. 1; Merchant et al., 2015, p. 28). Student experiences mainly involve the personal views of the student (Yang et al., 2008) and may include the students' personal opinions about their relationships with their friends and professors, experience with the food, and experience with their living conditions. Because of this, it is important to have a reputation that holds the professors, housing quality, and food quality in high regards. An example of student opinions regarding the quality of education is found in Salisbury University reviews from 2020 which state "professors made it very difficult and were not easy to work with" (Niche, 2020), as well as another review from 2022 relating their living situation in one of the dorms as "our dorms had mold" (Niche, 2022).

These experiences by two different students may cause any prospective student who is reading those reviews to feel negatively about Salisbury University and decide not to apply or commit to the institution, forming a pattern of decreasing admission rates. Since students often rely on "word of mouth influences in making college choices" (Bowers & Pugh, 1973, as cited in Joseph et al., 2012, p. 4), having more students who think positively of the college and would label the university as reputable would be beneficial to 'spread the word' to boost Salisbury University's reputation as a quality institution of higher education. Universities that do not have a good reputation from the student's point of view would not receive that same good press and would harm the institution's admission and retention rates.

FORMING CONNECTIONS THROUGH STORYTELLING

Storytelling is an incredibly powerful method of communication that can be utilized to bring people together. As stated by Lawrence and Paige (2016), storytelling is a "collaborative, inclusive, and participatory way of creating and sharing knowledge" (p. 70). Such knowledge, in this case, could be records of past events,

buildings, or traditions that remain relevant throughout a university's history. An example of past buildings can be found in Salisbury University's own history. Originally designed to be a college for aspiring educators, Salisbury University's 105 students "learned, slept, and dined" in the only building on campus at the time: Holloway Hall. A variety of buildings once constructed to accommodate the demands of the increasing population of potential teachers including the Campus Elementary School, Tawes Gym, the Musical Arts Building, Powell Dining Hall, and the Memorial Student Union, were all demolished by 2000 to make way for a new 'generation' of buildings to be built (Salisbury University, n.d.).

Because "connecting current students with their campus history can create strong attachments" (Speck, 2014, p. 115), sharing this history with community members and students alike may forge personal and emotional connections. This may spark a feeling of familiarity and attachment to the institution in the student (Lawrence & Paige, 2016), which translates to a feeling of belonging that contributes to the student's willingness to stay loyal to the university (Lau, 2003; Slobodova, 2023). This is supported by Simon J. Bronner, a folklorist quoted in Speck (2014) who states, "students strive for a feeling of belonging to a community" (p. 117). The relationship or connection between the student and the university may be formed by the sharing of campus stories. By creating meaningful and intentional relationships with prospective and current students, the university will improve its image (Haverila et al., 2020; Yang et al., 2008), leading to increased student enrollment and greater financial contributions from donors (Garretson-Folse, Netemeyer, & Burton, 2012, as cited in Merchant et al., 2014).

The student's experience with the social and cultural aspects of the university relates directly to their decision to stay with the institution of higher education (Jensen, 2011, as cited in Haverila et al., 2020, p. 374). From this, the author of this paper may reasonably make the conclusion that storytelling helps form connections between the student and the university. Said connections can contribute to increased retention and admission rates because of the feelings of belonging (Slobodova, 2023) that are developed when stories are told between people.

STORYTELLING AS A FORM OF MARKETING

Knowing how stories "can move people to action" (Slobodova, 2023, p. 9) is important because, in the case of a university, stories would assist an

institution of higher education financially by attracting and maintaining possible students and donors. Action could be achieved through the telling of campus heritage, or "features belonging to the culture of a particular society, such as traditions, languages, or buildings, which come from the past and are still important" (Merchant et al., 2014, p. 27). The awareness of campus heritage can generate positive awareness and inspire generosity toward the university from students and donors (Speck, 2014) because heritage has positive influences on the "cognitive, affective, and intentional attitudes" (Merchant et al., 2014, p. 28) of students concerning the university image. The backstory behind historical landmarks – whether physical locations or memories – often has the potential to improve a university's reputation by leveraging campus heritage as a marketing strategy to benefit the university. This means that the presence of university heritage could positively influence students' perceptions of the institution and strengthen their sense of dedication and loyalty, leading to increased student retention rates for the university.

Because the telling of stories allows people to exchange feelings and important events in their lives (Lawrence & Paige, 2016), a sense of familiarity or belonging between the storyteller and the listener is formed, leading to the teller being trustworthy and credible in the eyes of the audience (Slobodova, 2023; Speck, 2014). A video titled "Harnessing the Power of Stories," which presents research done by Jennifer Aaker, informs the audience that the stories we tell "shape how others see you" (Stanford Graduate School of Business, 2013, 00:05:15). Aaker continues to elaborate by saying that telling stories can influence people and can help them decide if they want to buy your product, work with you, or shape how they perceive you. Essentially, storytelling is a powerful tool used by many people to communicate, preserve culture, and change opinions (Lawrence & Paige, 2016), and can be applied to market an institution of higher education such as Salisbury University to prospective students and donors.

INCORPORATING STORYTELLING INTO SALISBURY UNIVERSITY

To incorporate campus legends and heritage into the daily life of students at Salisbury University, the author of this paper suggests the construction of informational 'story signs' outside locations of popular campus stories that would serve to educate and entertain prospective students, current students, and donors in the history of their respective buildings. Because Speck (2014) holds that having accurate records

of campus history improves the credibility and subsequent reputation of the campus archives, advertising Salisbury University's campus history and heritage and exposing prospective students to campus tales through storytelling would be overall beneficial. Such an interaction "engages the audience [and] promotes a positive relationship between the storyteller and the audience" (Korez-Vide, 2019, as cited in Slobodova, 2023, p. 10). In addition to a relationship between the university and the audience, the image of Salisbury University from the students' perspective must also be carefully crafted. University image, as defined by Yang et al. (2008) is the "perception of an organization" (p. 146) and is made up of how students' feel about their social life, academic success, or lack thereof, the quality of facilities in which they live and study, size and appearance of campus, level of financial support, and the strength of campus 'spirit' (Duarte et al., 2010). By sharing select campus tales that indicate the presence of such attributes, Salisbury University's image would therefore improve and may serve to increase student admission and retention rates.

The true story of Frank Benjamin Harper, fondly nicknamed "Bennie" by Salisbury University faculty and students, is still told by faculty and students to this day and serves as an excellent example of a campus tale that improves Salisbury University's image. According to Bradley et al. (1999), 'Bennie,' from 1971 to 1993, would regularly attend classes taught by professors he found interesting. 'Bennie' was not an official student, rather, he traveled from Ocean City to Salisbury University's campus for the sole purpose of sitting in on classes. It was said that having 'Bennie' sit in your class was an honor, because "Mr. Harper would never attend a dry or boring lecture!" (p. 13). Bennie's story contributes to the positive image of Salisbury University by sharing the inclusive and welcoming nature of the staff and students, which may spark an emotional connection between the university and the student. Furthermore, after hearing this story, prospective students may think that the faculty at Salisbury University are talented and qualified enough that someone like 'Bennie' would choose to listen to their lectures and learn from them, which contributes to the image of quality education that is sought after by students when searching for a university to commit to (Joseph et al., 2012).

The addition of 'story signs' to advertise stories like Bennie's would be beneficial during tours, during orientation week, and when it is observed by current students as they go about their daily life. Additionally, these markers may

be utilized as class material, for courses such as history or marketing. According to Speck (2014), stories can educate people about each other, and the telling of an institution's history would serve to form a positive image of the institution in the audiences' minds, which leads to increased admission rates (Joseph et al., 2012; Merchant et al., 2014). As demonstrated in this paper, engaging students and donors through thoughtfully selected and vivid campus legends would improve the emotional connection that the students and donors have with the university (Aaker, 2013; Lawrence & Paige, 2016; Slobodova, 2023; Speck, 2014), promote the desired branding of the institution, and give observers or listeners information about the history of the university. Individually interpreted by prospective students and parents (Yang et al., 2008), these historical details and background would bring to life the 'personality' of Salisbury University and overall serve to increase Salisbury University's admission and retention rates.

THE FLAWS OF ADVERTISING UNIVERSITY HERITAGE

While there are many benefits to including campus history in curriculums, daily life, and tour, a different point of view is posed by Speck (2014), who claims that the sharing of campus culture within inaccurate historical records and misinterpretation of legends and tales could negatively affect the reputation of the university that they are connected to. Evidence of this is shown within the University of Maryland's student body, where there exists a rumor that current students have the right-of-way even when they are not on a crosswalk. In the fall semester of 2011, an accident involving two student pedestrians occurred on the campus of the University of Maryland. In an interview after the accident, a student claimed that they "cut in front of cars all the time because we have the right-of-way" (p. 119). This could be harmful to the University of Maryland's reputation because it could negatively impact how people see the safety of the campus. From this, it can be concluded that some campus tales and legends do have the potential to be harmful to

the university's reputation, and if not accurately recorded, could damage the university's credibility which would decrease the value of the university in donors' and students' perspectives. Such damage to a university's reputation results in a decline in admission and retention rates.

Holloway Hall, which was finished in 1925, is the oldest building on Salisbury University's campus (Salisbury University, n.d.). A number of legends about Holloway Hall involving unfortunate student deaths exist. Some of these stories can be traced back to real events and for some there is no clear historical evidence; however, when shared, these stories could potentially be harmful to the image of Salisbury University, resulting in a decline in admissions rates. One example of a real event that has evolved into a Holloway Hall legend is the story of Mike Mammano, who tragically passed away in 1985. Mike Mammano was a talented football player and student (Thomas, 1985) who fell to his death while attempting to "jump from the roof of Holloway Hall to a tree limb" (p. 23). Mike's story has become a part of Salisbury University's history, and students tell different variations of it some of which speculate on the reasons why Mike was on the roof, while others connect it to Holloway Hall hauntings. Such a story may be frightening and discouraging to a potential or current student presenting the campus as unsafe on multiple levels. This may cause the student to feel detached from the institution and may encourage them to seek other safer campuses.

With this potential outcome in mind, the selections of the legends that are related either verbally or physically must be approached through the lenses of mindful marketing strategies that focus on maintaining the positive image of an institution. Such marketing strategies would include university archivists choosing stories based on their ability to entertain and educate the audience (Slobodova, 2023), or making students aware of the ways that historical records can be interpreted differently over time (Speck, 2014). If students become familiar with campus tales that involve tragic and traumatizing events, those pieces

of history may be discussed as cautionary tales and can be used as a safe outlet for students' fears and anxieties. One could argue that by telling these stories, students can live through their fears and doubts about campus life and their newly found freedom in a safe controlled place where the spook factor replaces real life tragic outcomes. Storytelling can also be used to warn students about the dangers of campus life that they might not be familiar with or fully understand, rendering haunting stories such as those regarding Holloway Hall to be beneficial in certain situations and circumstances.

CONCLUSION

The strategic and mindful presence and advertisement of campus legends and history will positively affect an institution of higher education by improving the university's reputation through increased student retention and admission rates. Throughout the past decade, universities have seen a decrease in the number of students enrolled (Saul, 2022), which may lead to a lack of funding and a decrease in reputation. To combat this decline and hopefully inspire more students to enroll and stay loyal to a university, the incorporation of stories involving campus history and culture into the daily life of a student, or even in the first impression of the college a prospective student may have, would be beneficial. A case study documenting the effects of storytelling on university students would be a helpful next step, as well as further research into specifically what types of campus tales and historical stories should be used. Would ghost stories spark interest or inspire fear? Would wild fraternity tales instill paranoia into the minds of new pledges or make them eager to join? Would legends about students committing suicide present the institution as unsafe and challenging? Storytelling is a fundamental part of human communication, and so it would be beneficial for universities like Salisbury University to take advantage of this tool to improve their reputation by sharing the university's heritage, which will increase admission and retention rates by forming connections between the university and students and donors.

REFERENCES

- Barbaro, M. (2013, January 26). \$1.1 Billion in Thanks from Bloomberg to Johns Hopkins, *The New York Times*. <https://www.nytimes.com/2013/01/27/nyregion/at-1-1-billion-bloomberg-is-top-university-donor-in-us.html>.
- Bradley, S., Culver, R., Hawkins, G., McNeill, M., Ohanian, P., Perdue, R., & Sahler, T. (1999, Spring). 99 Stories. *Salisbury State University Magazine*, 13.
- Conard, M., & Conard, M.A. (2000). An analysis of academic reputation as perceived by consumers of higher education. *Journal of Marketing for Higher Education*, 9(4), 69-80. DOI: 10.1300.
- Duarte, P.O., Alves, H.B., Raposo, M.B., (2010). Understanding university image: a structural equation model approach. *International Review on Public and Nonprofit Marketing*. 21-36. DOI: 10.1007.
- Faria, J.R., Mixon, F.G., & Upadhyaya K.P. (2019). Alumni donations and university reputation, *Education Economics*, 27(2), 155-165. DOI: 10.1080.
- Forbes. (2009, August 10). *What makes a university great?* <https://www.forbes.com/2009/08/10/world-class-best-university-ranking-world-bank-opinions-colleges-salmi.html?sh=953017a1fc20>.
- Haverila, M.J., Haverila, K., McLaughlin, C. (2020). Variables affecting the retention intentions of students in higher education institutions: A comparison between international and domestic students, *Journal of International Students*, 10(2), 358-382. DOI: 10.32674.
- Johns Hopkins Bloomberg School of Public Health. (2024). *A Public Health Champion*. <https://publichealth.jhu.edu/about/history/mike-bloomberg>.
- Joseph, M., Mullen, E.W., & Spake, D. (2012). University branding: Understanding students' choice of an educational institution, *Journal of Brand Management*, 20(1), 1-12. DOI: 10.1057.
- Lau, L.K. (2003) Institutional factors affecting student retention, *Education*, 124(1), 126-136. <https://web.p.ebscohost.com/ehost/pdfviewer/pdfviewer?vid=0&sid=c4cb97fe7e5d-45df-b999-e42da700916f%40redis>.
- Lawrence, R.L., & Paige, D.S. (2016). What our ancestors knew: Teaching and learning through storytelling. *New Directions for Adult & Continuing Education*, 2016(149). DOI: 10.1002/ace.20177.
- Merchant, A., Rose, G.M., Moody, G., & Mathews, L. (2014). Effect of university heritage and reputation on attitudes of prospective students. *International Journal of Nonprofit and Voluntary Sector Marketing*, 20(1), 25-37. DOI: 10.1002/invsm.1515.
- National Center for Education Statistics. (2023, May). *College Enrollment Rates*. <https://nces.ed.gov/programs/coe/indicator/cpb/college-enrollment-rate>.
- Niche. (2022, March 23). *Salisbury University Reviews*. <https://www.niche.com/colleges/salisbury-university/reviews/?rating=Poor>.
- Niche. (2020, August 7). *Salisbury University Reviews*. <https://www.niche.com/colleges/salisbury-university/reviews/?rating=Poor>.
- Salisbury University. (n.d.). *A Timeline of SU Buildings & Presidents*. Retrieved July 1, 2024, from <https://www.salisbury.edu/discover-su/campus-history/whos-who.aspx>.
- Salisbury University. (n.d.). *A True Tradition of Academic Excellence*. Retrieved April 22, 2024, from <https://www.salisbury.edu/discover-su/campus-history/>.
- Salisbury University. (n.d.). *\$19.2 Million in State Funding Approved for Blackwell Hall Renovation*. Retrieved May 6, 2024, from <https://www.salisbury.edu/news/article/2024-4-15-192-Million-in-State-Funding-Approved-for-Blackwell-Hall-Renovation>.
- Salisbury University. (n.d.). *SU Consistently Ranks Among the Nation's Best*. Retrieved April 22, 2024, from <https://www.salisbury.edu/discover-su/outcomes.aspx>.
- Saul, S. (2022, May 26). College enrollment drops, even as the pandemic's effects ebb. *The New York Times*, <http://www.nytimes.com/2022/05/26/us/college-enrollment.html>.
- Seidman, A. (2005). *College student retention: Formula for student success*. Greenwood Publishing Group.
- Slobodova, Z. (2023). Storytelling method as a marketing communication tool in the tourism industry. *Društvena i tehnička istraživanja*, 9(1), 3-14. https://www.ceps.edu.ba/Files/DIT/2023-1/1_Slobodova.pdf.
- Speck, J.G., (2014). Walking the high wire: The impact of campus tales and legends on the college or university archivist. *Archival Issues: Journal of the Midwest Archives Conference*, 35(2), 115-126. <https://web.p.ebscohost.com/ehost/detail/detail?vid=4&sid=022ea12c-2aea-4fe1935a-01fc5ef7785d%40redis&bdata=JnNpdGU9ZWWhvc3QtbGl2ZQ%3d%3d#db=asn&AN=109109056>.
- Stanford Graduate School of Business. (2013, March 13). *Jennifer Aaker: Harnessing the Power of Stories* [Video]. YouTube. <https://www.youtube.com/watch?v=9X0weDMh9C4>.
- Sundquist, K. (2017, April 30). What do acceptance rates really mean? *Collegevine*. <https://blog.collegevine.com/what-do-acceptance-rates-really-mean/>.
- Thomas, B. (1985, May 19). SSC football standout always looking for a challenge, dies. *The Daily Times*, 23. <https://www.proquest.com/hnpmarylandcollection/docview/2379072928/CDCFD6B45AE94C51PQ/2?accountid=28711&sourcetype=Historical%20Newspapers>.
- U.S. News. (2023, October 27). *Best National University Rankings*. <https://www.usnews.com/best-colleges/rankings/national-universities>.
- U.S. News. (n.d.). *Salisbury University Admissions*. Retrieved May 18, 2024 from <https://www.usnews.com/best-colleges/salisbury-university-2091/applying>.
- Weissman, S. (2024, January 24). *Enrollments Rise After Pandemic-Related Declines*. Inside Higher Ed. <https://www.insidehighered.com/news/students/retention/2024/01/24/enrollment-rising-first-time-pandemic>.
- Yang, S.U., Alessandri, S.W., & Kinsey, D.F., (2008). An integrative analysis of reputation and relational quality: A study of university-student relationships. *Journal of Marketing for Higher Education*, 18(2), 145-166. DOI: 10.1080.

ACKNOWLEDGMENTS

The author thanks Dr. Viktoria Basham, Ms. Katie Delezenski, Ms. Jen Pulsney, and Ms. Christine Smith for their help and support while developing and editing this paper.

The Evolution of Education: How Environmental Education Has Evolved in Maryland Public School Systems and Suggestions for Improvement

Paige L. Cohen

FACULTY MENTOR: Professor Jaime Bunting

ABSTRACT

Over the past 30 years, Maryland has grown to be a pioneer in the field of environmental education, leading the nation in learning experiences that promote environmental literacy and climate change awareness among Maryland students in public K-12 schools. However, despite these accomplishments, Maryland has yet to fully address the diverse perspectives of environmental education that today's scholars agree are most pressing. The purpose of this research is to analyze how environmental education has evolved in the state of Maryland since its implementation in 1989, as well as give recommendations as to how Maryland can improve going forward. By expanding equitable and comprehensive environmental education to all students, regardless of race, gender, ability, or socioeconomic status, it will give them the knowledge and the confidence to make informed environmental decisions in their community.

Keywords: environmental education, policy, Maryland, race, gender, ability, socioeconomic status, equity, environmental literacy, pro-environmental behavior, climate education

ENVIRONMENTAL EDUCATION: AN OVERVIEW

Environmental education (EE), as it is currently defined, is a process which teaches people how to investigate problems in their environment, attempt to solve those problems, and take part in community action to improve the overall state of their environment. The EE process teaches individuals to deepen their connection with the environment and allows them to make informed decisions in their community (EPA, 2023). The central theme of advocating for the environment has stayed present since EE's conception in 1970. The first definition of EE was published in 1970 by William Stapp and his students at the University of Michigan. He and his students define EE as being aimed at creating a population that understands their natural environment and its issues, and is aware of and is motivated to solve said issues (Stapp, 1970). Although this central theme has stayed the same, many aspects of EE have changed, most notably in the ways that we view the environment. At EE's conception, Stapp (1970) held an anthropocentric view of the environment, reiterating how man can alter his environment, and we must understand the environmental issues that are confronting mankind so that we may solve them. Although there are still aspects of anthropocentrism in today's EE, it is now more focused on exploring and addressing environmental issues regardless of their impact on humans. Current-day EE is also focused on instilling stewardship and civic engagement, critical thinking skills, social and

emotional learning, and pro-environmental behavior.

The Maryland State Department of Education (MSDE) is a pioneer in its support of environmental and outdoor education in the K-12 public school system. MSDE leads the nation in learning experiences that promote environmental literacy and climate change awareness among students and teachers. Despite these accomplishments, the state of Maryland has yet to fully address the diverse perspectives of environmental education or the inequitable funding and availability for environmental education programming throughout the state. Addressing these shortcomings would, in turn, give all students the knowledge, confidence, and skills to make informed environmental decisions in their communities.

A BRIEF HISTORY OF EE

Although the term *environmental education* only dates back to 1969, its predecessors date all the way back to the 18th century. In 1762, Jean-Jacques Rousseau published his novel, *Emile*, which explains that education should focus on the environment and teachers should provide opportunities for students to guide their own learning in nature. Later, in 1891, Wilbur Jackman published *Nature Study for the Common School*, in which the nature study movement was defined. This movement gained momentum in 1903 when John Muir and Teddy Roosevelt popularized the term *wild nature* as a place for people to experience and enjoy.

Then in the 1930s, the Dust Bowl raged through the Midwest and sparked the beginning of conservation education. This type of education was focused on teaching people how to conserve Earth's natural resources and giving people hands-on learning experiences (Bruker, 1973).

Arguably the biggest jump towards modern day environmental education was Rachel Carson's 1962 book, *Silent Spring*, which made people acutely aware of their deteriorating environment and the reasons for its deterioration (Davis, 2012). After this, environmental education exploded and was adopted by scholars, educators, and politicians around the world. In 1969, the Journal of Environmental Education was published by Professor Clay Schoenfeld. In 1970, President Nixon signed into law The National Environmental Education Act. In 1971, the North American Association for Environmental Education (NAAEE) was created, as well as similar organizations in the UK (1960), Australia (1980), and South Africa (1982). In 1977, the Tbilisi Intergovernmental Conference took place, at which the Tbilisi Declaration was developed and signed by 265 delegates and 65 representatives and observers (NAAEE, n.d.). To this day, the goals, objectives, and guiding principles outlined in this declaration are used to steer the field of environmental education (Wong, 2018). Since the Tbilisi Intergovernmental Conference, countless other conferences have been held, laws have been created, and books have been written on environmental education and its place in the world. Over the entire course of EE history, the

field has expanded from being primarily focused on ecology and nature, to now also delving into economic and social issues that are impacting our environment (Wang and Chiou, 2018).

BENEFITS OF EE

The presence of environmental education is beneficial in numerous ways, including improving students' social-emotional learning as well as academic achievement. In a study conducted by Stanford University, they found clear evidence indicating that EE improves skills such as leadership, teamwork, self-esteem, and character development. This study also found that due to many students' natural curiosity of the environment, EE was a useful and effective tool in delivering educational information regarding mathematics, chemistry, biology, ecology, and more. Academic skills including critical thinking, oral communication, analytical skills, problem solving, and higher-order thinking were also shown to have significant improvements in students receiving environmental education (Ardoin et al., 2017). According to Dr. Doug Knapp of Indiana University Department of Recreation, Park, and Tourism Studies, "Environmental education creates meaningful learning experiences and engages students in ways that help them grasp and retain new information more effectively than conventional curricula" (NAEOE, n.d.).

In addition, EE creates environmentally literate citizens who exhibit pro-environmental behaviors. These qualities motivate individuals to make informed decisions in their community and in the world (Farmer, 2018). These citizens will then have the knowledge to influence legislation and policies aimed at solving environmental problems. They will also be able to elect representatives whose goals align with the environmental education that they received (Stapp, 1969). Without EE, society would have a lack of environmentally literate citizens which is dangerous given our current climate crisis. The exploitation of natural resources as well as land development are destroying our planet, and the most effective way to combat it is through environmental literacy and instilling positive environmental behaviors (Wong, 2018).

SCHOLARLY VIEW OF EE

The current stance among scholars in the field of environmental education is that equitable consideration of race, ability, gender, and socioeconomic status should be the primary focus for environmental educators to achieve an environmentally literate population. According to Stapleton (2020), we all have drastically

different backgrounds and identities, which make our experiences and understandings of the environment subjective. There is not one true way of looking at the world, and therefore teaching environmental education should reflect this complexity. Lloro-Bidart and Semenko (2017) point out that neoliberalism tasks women with the role of caregiver, which implies that caring for the environment is inherently feminine (pp. 18-25). This manifests in current-day environmental education in the way that environmental educators are primarily female, and thus there is a lack of representation for male students in environmental leadership roles and an enforcement of the idea that environmentalism is inherently linked to women.

In the same vein, environmental educators are primarily white. A study conducted in 2020 shows that when students take classes where the teacher is the same race or the same ethnicity as them, they progress faster than they would have if they had a teacher of a different race/ethnicity (Grissom et al.). Not only is the current state of EE primarily female and white, but it is also most easily accessed by individuals of higher socioeconomic status. Stern (2021) points out that common barriers for students of low socioeconomic status receiving EE include limited access to green space, cost, and lack of transportation (pp. 197-215). Stern's research also indicates that students from lower socioeconomic classes exhibited more positive outcomes than wealthier participants (Stern et al., 2021). Current EE research suggests that students' race, culture, ability, gender, and income have a significant effect on the quality and quantity of EE that they receive.

INITIAL IMPLEMENTATION OF EE IN MARYLAND

COMAR 13A.04.17 Environmental Education was proposed to MSDE on February 10, 1989. Its purpose was two pronged –to give students the ability to make decisions and take actions that would solidify a strong bond between themselves and their environment, and to preserve and protect the Chesapeake Bay watershed and Maryland's other natural resources (State Board of Education, 1989). The Maryland State Board of Education officially implemented *COMAR 13A.04.17 Environmental Education* into its public schools on June 12, 1989. This historic standard solidified Maryland as a pioneer in the field of EE, given that it was the first state to require an interdisciplinary environmental education program in its public school system (Salmon, 2019). The caveat to this

was that the legislature's verbiage was vague and nonspecific. The regulation outlined the purpose and goals of EE in MSDE, but it also said that schools should "address [environmental education] at least once each at early, middle, and high school learning years," and periodic reports on teacher's implementation should be submitted (State Board of Education, 1989). *COMAR 13A.04.17* did an excellent job at outlining the goals of environmental education in MSDE, but what it lacked were the specific objectives for students to meet those goals, as well as a definitive timeline for implementation review. In addition to the lack of objectives and definitive timeline, legislators wrote that this executive order should cost local school systems \$3,254,218 for "curriculum development, purchase of instructional material, and teacher training" (State Board of Education, 1989), but the document does not go into any more detail on how MSDE planned to allocate these funds or how this number was established. The overall vagueness of this regulation was most likely what led to EE's slow start in Maryland public schools.

CURRENT POLICIES AND TRENDS IN MARYLAND

Since the implementation of *COMAR 13A.04.17*, a graduation requirement as well as three major executive orders have been implemented by MSDE to ensure a high level of environmental education is implemented into Maryland Public Schools. In 2011, Maryland furthered its reputation as a pioneer in the implementation of EE when it became the first state to require that all of its students within the public school system achieve environmental literacy by the time they graduate grade 12 (MAEOE, n.d.). In addition to this, the first of three executive orders, 01.01.2008.06 *Maryland Partnership for Children in Nature*, was implemented in 2008 (Maryland State Archives, 2022). One of the aims of this Partnership was to increase the amount of time that Maryland children were spending outdoors. The Partnership achieved this goal through creating more opportunities for environmental education and outdoor recreation like expanding schoolyards, creating walking and biking paths throughout communities, building playgrounds, as well as creating the Civil Justice Corp. for children in the juvenile detention system to work in "conservation crews". Maryland Partnership for Children in Nature also established easier access to naturalists and partnered with various organizations to make accessing state parks and protected land easier for minority children across the

state. The other aspect of this Partnership was the State Environmental Literacy Plan, which is an annual review of EE implementation in MSDE. These documents assess the level of environmental literacy children are achieving, as well as new ways to help educators teach EE in their classrooms (Maryland State Archives, 2022). Although the language of this document did not explicitly say that the Partnership was a tool to combat the climate crisis, it did point out the importance of sustainable resource management, environmental stewardship, and that the loss of connection between Maryland's children and the natural world is a major threat to the state of the environment (Department of Legislative Services, 2008).

The second executive order, 01.01.2017.12 *Project Green Classrooms Initiative* (PGC), replaced *Maryland Partnership for Children in Nature* in 2017 (Maryland State Archives, 2023). PGC was a renewal of the state of Maryland's commitment to environmental education in the public school system. The policy was similar to the Partnership in many ways, but PGC put a much stronger emphasis on using resources to promote equity so that all students, regardless of income, race, ethnicity, or language, could have sufficient access to outdoor learning experiences. A recent progress report released by MSDE showed that in 2022, PGC made strides in developing and strengthening equitable EE programs across the state, specifically for people that have historically lacked access to nature. First, PGC developed higher education courses for educators across numerous disciplines and demographics which addressed current environmental literacy goals. Second, they updated the logic and action plan for the Chesapeake Bay Program (CBP) to expand access to age-appropriate learning experiences in the Chesapeake Bay watershed. Third, PGC worked with the CBP to create the Maryland Environmental Literacy Advisory Network which strengthened connections with state environmental nonprofits to expand outdoor learning opportunities to Western Maryland, the Eastern Shore, and within predominantly Spanish-speaking communities. Fourth, they funded The Baltimore County Public Schools Environmental Empowerment Project, which redesigned Baltimore County's science curriculum to address historic and current environmental injustices in their community. Lastly, PGC continued to partner with the Maryland Department of Natural Resources (DNR) to expand Es Mi Parque, which brought environmental education and recreational opportunities in state parks to Spanish speakers,

and launched the first Spanish Junior Rangers program (Maryland Department of Natural Resources, 2023).

As a way to meet their environmental literacy requirements, Maryland school systems have recently begun implementing Meaningful Watershed Educational Experiences (MWEEs) into their curriculum. A MWEE is a learner-centered framework that not only prioritizes investigating local environmental issues, but also leads to informed action by students. The four essential elements of a MWEE are: defining the issue, conducting outdoor field experiences, synthesizing ideas and creating a conclusion, and developing an environmental action project (Chesapeake Bay Foundation, n.d.). Because of how successful they have been, MWEEs are now being required in nearly all public school systems in the state of Maryland, which echoes the goals described in the initial COMAR from 1989 (State Board of Education). It is important to note that school systems often partner with local environmental agencies and non-profits to help run the outdoor field experiences and action project components of the MWEE and require a large amount of teacher participation. In order to achieve this level of participation and time commitment, the partner organization(s) often provide professional development courses for teachers.

In celebration of Earth Day on April 22nd, 2024, Governor Wes Moore signed a new executive order, 01.01.2024.15 *Maryland Outdoor Learning Partnership*, which will absorb *Project Green Classrooms Initiative*. This Partnership aims to provide students with structured, outdoor education opportunities where they will be empowered to access, conserve, and restore our natural resources and create a more "climate-ready" Maryland. More specifically, this Partnership commits to fostering collaboration, coordinating resources, and delivering recommendations so that all Maryland students have access to environmental and climate education, are equipped to enter college and the green workforce, and engage with nature by spending more time outside. The Maryland Outdoor Learning Partnership also will also ensure that Maryland's teachers receive the required funding, training, and support to implement curriculum and support students in achieving all State standards related to environmental literacy.

CHALLENGES AND OPPORTUNITIES

Moving forward, MDSE has multiple areas to potentially improve their quality of EE. To preface, this section will be utilizing *Project*

Green Classrooms Initiative as the reference point for MSDE's current progress, since *Maryland Outdoor Learning Partnership* has only been signed recently and has not yet created any significant changes to Maryland's EE.

From the policies that have been published by MSDE, it appears that through the lens of EE scholars, Maryland is excelling in some areas, while not addressing others. MSDE (2022) reported having 85,259 professional educators, of which ~70% were white, ~20% were Black, and ~10% were of another race. MSDE also had 889,971 students, of which ~33% were white, ~33% were black, ~34% were of another race. These numbers show that an area of improvement for MSDE is representation for its black, Asian, Hispanic, and Pacific-Islander students. If school systems are required to conduct environmental education, then the racial and ethnic diversity that has been shown to improve the quality of EE should be reflected among their educators.

Additionally, Project Green Classrooms addressed racial equity well, but it did not address the topics of gender or ability equity at all. Statistically, physically and mentally disabled people are more likely to be impacted by environmental issues and disasters than able-bodied people are because of the societal and environmental barriers that they are faced with (Salvatore & Wolbring, 2022.) Excluding the environmental barriers that disabled people face from the teaching of environmental education is doing a disservice to a large portion of the population. In addition to this, ignoring the fact that gender plays a role in the ways that we perceive the environment is also doing a disservice to 50% of the population.

Based on the review of Maryland's diversity and inclusion, the first step that MSDE should take to fill the gaps in perspectives within EE should be to address what an environmental education curriculum would look like through a gendered lens, as well as to address gender inclusion for students in environmental education. According to Decker (2021), gender is not typically a topic that many environmental educators take into consideration (pp. 854-855). In a set of interviews conducted on 20 environmental educators regarding the extent to which gender plays a role in their teaching, 12 of them admitted that they did not think about gender within the context of their teaching methods nearly as much as they believe they should be. Educators must be aware of the potential that EE has for disrupting masculine norms and allowing boys to express in traditionally feminine ways, as well as

the potential for disrupting feminine norms and allowing girls to express in traditionally masculine ways (Decker, 2021). By becoming aware of traditional gender roles and how they play a role in how EE is taught, educators can blur the binary line which determines the ways people are supposed to act in regards to the environment.

In addition to the barriers that are created when feminine and masculine norms are assigned to specific genders, using gendered language also makes it difficult for all students to feel represented and included in an environmental education setting. With young learners especially, there is a strong tendency for educators to use male pronouns when referring to animals, plants, and even inanimate objects in nature. When people of other genders hear this, it can be challenging for them to see themselves as a part of nature (Decker, 2021). This is why gender is such an important lens to consider in EE. For individuals to build a positive environmental outlook and feel like they have agency in improving the world around them, they must see themselves as being an extension of their environment.

There are many ways in which MSDE can improve its lack of gender-focused inclusion in its EE curriculum. First, MSDE can establish training sessions for staff to build gender competency and awareness. Getting environmental educators to start thinking about how gender plays a role in their teaching is the first step towards building a more gender-inclusive space. Once environmental educators are educated on the ways in which gender plays a role in EE, it will be easier for them to further identify other ways in which gendered stereotypes and roles exist in their classroom as well as outside of environmental lessons. Another way that MSDE can improve its gender-focused inclusion is through prioritizing hiring more transgender, non-binary, and gender fluid educators. These educators have an extensive background understanding gender as a concept, and thus, through the ramifications of their lived experience, provide an incredibly unique perspective that is important in EE. While getting students to explore both the feminine and masculine roles can lead to gender decoding, dismantling male and female gender roles completely and fostering a space for exploration outside of the binary has the potential to decode gender more extensively in environmental education (Decker, 2021).

The next step for MSDE should be to address what an environmental education curriculum would look like through a disability lens, as well

as to address disability inclusion for students in environmental education. Despite the thoroughness of the documents, nowhere in the PGC executive order (Department of Legislative Services, 2017) or in the PGC 2022 annual report (Maryland Department of Natural Resources, 2023) is there any mention of accommodating students with special needs or disabilities. Students with physical and mental disabilities are just as capable of grasping environmental education concepts as mainstream students, but they may need additional accommodations to get there. For some students, this may mean creating a special educational environment where they are supported by adult mediators/paraprofessional educators who can structure the experiences appropriately and use proper communication techniques to enable participation in activities (Chapman & Pease, 2009). For others, this could mean things like consciously maintaining continuity throughout lessons, creating sensory friendly activities, or utilizing accessible environments in which EE lessons can be conducted.

One way that MSDE could improve its equity, accessibility, and inclusion measures for disabled students is by taking inspiration from other organizations who are already effectively addressing special needs through EE. The Whitefield School in Centre, London typically has a high ratio of students receiving specialist provisions or individualized education plans. According to Chapman and Pease, two educators at the school, the top priority for learning impaired students is teaching them to know and care about their environment as opposed to teaching them to learn in order to display knowledge for an evaluation. They do this through conducting less learning through talking, and more learning through actively engaging with their environment (Chapman & Pease, 2009). Students with special needs, as with other students, have so much to gain from an environmental education-based curriculum, which is why in the future, MSDE's environmental education improvements should be focused on including the perspectives of disabled learners as a priority.

Arguably the most significant factor that Project Green Classrooms did not adequately address was the geographical wealth disparity leading to inequitable EE across the state of Maryland. Although the Maryland Environmental Literacy Advisory Network has strengthened connections between public school systems and environmental nonprofits, that alone is not enough to create long-term environmental education programs in less affluent counties.

In the state of Maryland, dedicated EE centers that are financially supported and staffed by the local school system exist disproportionately in wealthier counties compared to poorer counties. Of Maryland's 24 counties, 11 have environmental education centers through their public school system. And of these 11 counties, 9 have per capita incomes that sit in the top 50% for the state. On the other hand, 6 out of the 9 counties on the Eastern Shore have per capita incomes that fall in the bottom 50% for the state, and none of these counties have EE centers financially supported and staffed through their public school system (Maryland State Archives, 2022). School systems without their own EE centers must rely on temporary grant funding to receive supplemental environmental education curriculum, experiences, and action projects through local environmental nonprofits. This makes providing sustainable EE much harder for counties without school system-supported EE centers, putting the burden of finding funding for a state-mandated graduation requirement on county science supervisors, individual teachers, and local partnering organizations.

To create sustainable environmental education in counties on the Eastern Shore, the state should be chiefly addressing the funding issues, not the counties themselves. *Maryland Outdoor Learning Partnership* states that the Partnership shall ensure

"Maryland's teachers have the funds, training, and support necessary to implement curriculum to support student achievement of the Environmental Literacy Standards, the Next Generation Science Standards, the Maryland Health Education Standards, Social Studies Standards, and other State standards of education as they relate to environmental literacy" (Department of Legislative Services, 2024).

The current system of individual counties applying for grants in 1-3 year cycles in order to fund their environmental education curriculum is not sustainable, nor does it align with the commitments that the Maryland Outdoor Learning Partnership agrees to. It also doesn't provide an easy pathway towards developing and sustaining MWEs in K-12 public schools because of how much money is required to effectively integrate them into established curriculums. To solve this issue moving forward, the state of Maryland should contribute funding to help sustain EE programs, especially in counties without school-system run EE centers, so the burden no longer falls on nonprofits and school systems to write and be awarded grants.

CONCLUSION

Since its implementation in 1989, Maryland has been a prominent leader in the field of environmental education, developing and implementing learning experiences that promote environmental literacy and climate change awareness within the public school system. However, the quality of this education is not equitable in every county, nor is it currently

equitable for every student. All students in Maryland's K-12 public schools deserve the opportunity to become stewards of their environment and to feel confident and educated enough to make informed decisions when faced with environmental issues in their communities and globally. This is why moving forward, MDSE should prioritize hiring educators with diverse backgrounds relating to gender, race, ethnicity,

socioeconomic status, and ability. In addition, the state of Maryland should also prioritize funding sustainable, long term EE programs for all counties. If these priorities are established, all students graduating from Maryland's public schools will be capable of making decisions that will drive humanity towards a more environmentally sustainable future.

REFERENCES

- Ardoin, N. M., Bowers, A. W., Roth, N. W., & Holthuis, N. (2017). Environmental education and K-12 Outcomes: A review and analysis of research. *The Journal of Environmental Education*, 49 (1), 1-17.
- Bruker, R.M. (1973). A historical approach to environmental education. *The Clearing House*, 48 (3), 135-137.
- Carson, R. (1962). *Silent Spring*.
- Chesapeake Bay Foundation. (n.d.). *Meaningful watershed education experiences*. <https://www.cbf.org/join-us/education-program/mwee/index.html>
- Davis, F. R. (2012, December). *Silent Spring* after 50 years. *Endeavor* 36 (4), 129-130.
- Decker, A., & Morrison, S. A. (2021). Decoding gender in nature-based education: perceptions of environmental educators. *Environmental Education Research*, 27 (6), 848-863.
- Department of Legislative Services. (2008, August 18). *Maryland partnership for children in nature*. Maryland General Assembly. <https://mgaleg.maryland.gov/Pubs/LegisLegal/2008-executive-orders.pdf>
- Department of Legislative Services. (2017, June 8). *Project green classrooms*. Maryland General Assembly. <https://mgaleg.maryland.gov/pubs/legislegal/2017-executive-orders.pdf>
- Department of Legislative Services. (2024, April 22). *EO 01.01.2024.15 Maryland outdoor learning partnership*. The State of Maryland Executive Department. https://governor.maryland.gov/Lists/ExecutiveOrders/Attachments/45/EO%2001.01.2024.15%20Maryland%20Outdoor%20Education%20Partnership_Accessible.pdf
- Environmental Protection Agency. (2023, July 10). *What is environmental education?* EPA. <https://www.epa.gov/education/what-environmental-education>
- Farmer, J., Knapp, D., and Benton, G. M. (2007). An elementary school environmental education field trip: long-term effects on ecological and environmental knowledge and attitude development. *The Journal of Environmental Education* 38 (3), 33-42.
- Grissom, J. A., Kabourek, S. E., & Kramer, J. W. (2020). Exposure to same-race or same-ethnicity teachers and advanced math course-taking in high school: evidence from a diverse urban district. *Teachers College Record* 122 (7).
- Jackman, W. (1891). *Nature Study for the Common School*.
- Lloro-Bidart, T. and Semenko, K. (2017, January 1). Toward a feminist ethic of self-care for environmental educators. *The Journal of Environmental Education* 48 (1), 18-25.
- Maryland Association for Environmental and Outdoor Education. (n.d.). *Making Maryland's Students Informed and Responsible*. MAEOE. <https://maeoe.org/environmental-literacy/defining-environmental-literacy/maryland-environmental-literacy>
- Maryland Department of Natural Resources. (2023, January). *Project green classrooms 2022 annual report*. https://dnr.maryland.gov/pgc/Documents/PGC_Annual_Report_2022_Final.pdf
- Maryland State Archives. (2022). *Maryland Economy -Personal income (per capita) - by county*. MSA. <https://msa.maryland.gov/msa/mdmanual/01glance/economy/html/income.html>
- Maryland State Archives. (2022, March 14). *Maryland partnership for children in nature*. MSA. <https://msa.maryland.gov/msa/mdmanual/26excom/defunct/html/08childn.html>
- Maryland State Archives. (2023, October 6). *Project green classrooms initiative*. MSA. <https://msa.maryland.gov/msa/mdmanual/26excom/html/18greenclass.html>
- Maryland State Department of Education (2022, September 30) *Maryland public school enrollment by race/ethnicity and gender and number of schools*. Maryland Public Schools. https://marylandpublicschools.org/about/Documents/DCAA/SSP/20222023Student/2023_Enrollment_ByRace_Ethnicity_Gender.pdf
- Maryland State Department of Education (2022, October) *Professional staff by assignment, race/ethnicity and gender*. Maryland Public Schools. <https://www.marylandpublicschools.org/about/Documents/DCAA/SSP/20222023Staff/2023ProfStaffbyRace.pdf>
- North American Association for Environmental Education. (n.d.). *Lesson 2: timeline of EE history*. eePRO. <https://eeepro.naaee.org/learning/eelearn/eelearn-2-history-ee/lesson-2-timeline-ee-history>
- North American Association for Environmental Education. (n.d.) *The benefits of environmental education for K-12 students*. eeWORKS. <https://naaee.org/programs/eeworks/benefits-k12-students>
- Rousseau, J.-J. (1762). *Emile*.

- Salmon, B.K. (2019, April 23). *Revision of Maryland's environmental literacy standards*. Maryland State Department of Education. <https://marylandpublicschools.org/stateboard/Documents/04232019/TabJ-EnvironmentalLiteracyStandards.pdf>
- Salvatore, C. and Wolbring, G. (2022, January 21). Coverage of disabled people in environmental-education-focused academic literature. *Sustainability* 14 (3), 1211
- Schoenfeld, C. (1969). *The Journal of Environmental Education*.
- Stapleton, S.R. (2020). Toward critical environmental education: a standpoint analysis of race in the American environmental context. *Environmental Education Research* 26 (2), 155-170.
- Stapp, B.W. (1970). The concept of environmental education. *The American Biology Teacher* 32 (1), 14-15.
- State Board of Education. (1989, February 10). 13A.04.17 Environmental Education. *Maryland Register*, 16(3), 354-355.
- State Board of Education. (1989, June 12). 13A.04.17 Environmental Education. *Maryland Register*, 16(11), 1219.
- Stern, M. J., Powell, R. B., & Frensley, B. T. (2021 October 25). Environmental education, age, race, and socioeconomic class: An exploration of differential impacts of field trips on adolescent youth in the United States. *Environmental Education Research*, 28 (2), 197-215.
- Wang, Y. and Chiou, S. (2018 November 5). An analysis of the sustainable development of environmental education provided by museums. *Sustainability* 10 (11), 4054.
- Wong, C.A., Herman, S., Afandi, M., Ramachandran, S., Kunasekaran, P., Kim, J., and Chan, L. (2018). Experiential learning on enhancement of environmental literacy among university students. *International Journal of Business and Society* 19 (1), 128.

ACKNOWLEDGMENTS

The author thanks Professor Jaime Bunting and Dr. Michael Lewis for their help with developing and editing this paper.

Evaluating the Impacts of Near-Shore Land Usage on Aquatic Nutrient Profiles

Ellie Welsh

FACULTY MENTOR: Dr. Jennifer Nyland

ABSTRACT

The Eastern Shore of Maryland is situated on the Chesapeake Bay, with the Wicomico, Nanticoke, and Pocomoke rivers contributing directly to the watershed. Agricultural and urban land profiles along riverbanks contribute to nutrient pollution, but their direct effects are still unknown. Therefore, this study aims to determine the different impacts of predominant near-shore land usage on aquatic nutrient profiles using stable isotope analysis. Sites for study were chosen based on predominant land usage of that area surrounding the river, and separated into developmental, agricultural, or natural influences. By using zooplankton tows and stable isotope analyses of Carbon and Nitrogen across two summers, data was collected and examined to determine the effects of limited buffer zones on the Chesapeake Bay watershed. Conclusions can be drawn on the impacts to the aquatic ecosystems with increased anthropogenic influences. Evaluation based on $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ have shown correlation between development influenced sites (DI) – $\delta^{13}\text{C}$ for DI sites averaging -28.35‰ in 2023 – and very depleted $\delta^{13}\text{C}$ phytoplankton signatures indicative of systems with increased nutrient loading. There has also been a change from the summer of 2022 to 2023, with a $\delta^{13}\text{C}$ value decreasing from -25.31‰ to -26.70‰ , and a $\delta^{15}\text{N}$ increasing from 9.38‰ to 10.02‰ . This study demonstrates the use of stable isotope analysis to analyze human impacts on riverine ecosystems through analysis of zooplankton and can provide implications for future trends of human impacts that may be observed.

Keywords: stable isotopes, estuary, Chesapeake Bay watershed, ecological interactions, trophic levels, land usage, water quality

INTRODUCTION

As human populations increase over time, land usage has changed worldwide to sustain the various lifestyles that have been adopted. Shifts in land usage have vastly altered ecosystems, specifically, rivers and bodies of water are heavily affected. While agricultural practices, urban development, and industry are beneficial for economic expansion, they are some of the leading causes of water quality decline (Maloney et al. 2018). The Chesapeake Bay is the largest estuary in the United States and has an extensive watershed covering six states that supports complex aquatic and terrestrial ecosystems while also providing various economic and cultural practices. The water quality and integrity of the Bay are essential for these practices to operate successfully, however increased economic needs have caused the overall health of the Bay and its tributaries to decline (Maloney et al., 2018). Development along coastal zones can degrade habitats and disrupt ecological processes that are essential for growth, feeding, and reproduction of various organisms (Davias et al., 2013). Abundance of primary producers and primary consumers are essential for larger organisms that comprise secondary and tertiary consumer trophic levels, so understanding organisms at the basis of food webs is essential for analyzing ecosystem health.

Eutrophication is a phenomenon where excessive nutrients such as nitrogen and phosphorus cause algal blooms that outcompete most other photosynthetic or aquatic organisms.

Large amounts of phytoplankton floating on surface water blocks sunlight from penetrating to the benthic zone, preventing photosynthesis of underwater sea grasses which decreases primary productivity (Reay, 2009). The decomposition of phytoplankton and organic matter by bacteria decreases oxygen levels in the water, thus creating hypoxic conditions that are not conducive for life (Reay, 2009). Agricultural practices are named as the highest producer of excessive nitrogen pollution in rivers and bodies of water worldwide (Hashemi et al., 2018, Reay, 2009). Increased demand for crops has created a need for synthetic fertilizers and pesticides which increase yields – products that contain significant amounts of nitrogen. Without proper buffer zones full of vegetation that soak up these excess nutrients or detailed regulation of chemical use on agricultural lands, local bodies of water receive increased nutrient loads due to run off (Hashemi et al., 2018).

The destruction of wetlands to provide land for infrastructure has caused increased sediment erosion, excess nutrient pollution, and the introduction of industrial heavy metals due to decreased buffer zones (Reay, 2009). Wetlands act as a natural filter for excess nutrient, chemical, and sediment loadings into a body of water (Irwin et al., 2018). By having buffer zones between adverse land profiles such as agriculture, increased nutrient loadings into a body of water can be decreased, therefore diminishing negative impacts. The health and quality of estuaries and watersheds are

impacted by near-shore anthropogenic land uses and can be analyzed through various markers such as chlorophyll and nutrient concentrations, as well as stable isotope compositions of organisms (Oczkowski et al., 2014, Fry, 2002). Salinity, water depth, light, and other seasonal variations such as temperature are abiotic factors that can increase the effects of eutrophication and impact organisms at the base of food webs in aquatic ecosystems (Close & Henderson, 2020).

Elements found in nature have naturally occurring isotopes – atoms that contain a different atomic weight from the most abundantly present atom (Fry, 2006). Stable isotopes are isotopic variations of an element that are non-radioactive, so over time they do not decay into other elements, thus keeping their abundance in a system static (Fry, 2006, Peterson & Fry, 1987). The composition of these atomic variants moves in predictable ways through a system, allowing researchers to identify key tracers in biogeochemical cycles and understand natural cyclic phenomenon's (Peterson & Fry, 1987). Stable isotope analysis can be used in ecological research to track how energy and biomass move through an ecosystem by analyzing organism tissues. In addition to food web interactions, stable isotopes can also be used to track allochthonous inputs into a system and get a better understanding of the assimilation of these outside inputs.

The abundance of a stable isotope in a system is denoted by the delta (δ) notation, which signifies the difference in composition

between the analyzed sample and a standard for that isotope (Fry, 2006). Using the δ notation, composition of heavy isotopes are displayed in a linear fashion which represents the abundance as a percentage out of 1000 – permil (‰) (Fry, 2006). Higher δ values correspond to higher amounts of the heavy isotope found, which is referred to as a sample being enriched with that isotope, whereas a lower δ value corresponds to lower amounts of the heavy isotope found, which is referred to as a sample being depleted of that isotope in reference to the standard (Fry, 2006). Tracking these isotopes movements in an ecosystem is commonly determined by analyzing the fractionation of these compounds, which is the separation of the heavier and lighter isotopes within a closed system, typically through the metabolism of an organism (Fry, 2006). The fractionation factor can demonstrate what isotopes are being assimilated, and if they are present in a higher composition than the standard abundance (Fry, 2006).

Carbon isotopes show effectively no fractionation between trophic position, with an average trophic shift of around 0‰, representing the primary producers consumed by the organisms (O’Leary, 1992). These values provide a basis for the food web and show what likely organisms primary consumers are eating based on their isotopic composition of ^{13}C . Consumption of various primary producers can impact this composition, and mixing models can be derived to determine what percentage of an organism’s diet comes from a specific primary producer (O’Leary, 1992). Nitrogen isotopes, however, show fractionation with increasing trophic level with an average trophic shift of around 3‰ per trophic position (O’Leary, 1998). Tracking of the heavier Nitrogen isotope, ^{15}N , provides key insights into trophic position which can help model food webs and track what secondary and tertiary consumers are eating.

Isotopic composition of the heavier isotope of carbon, ^{13}C , in phytoplankton and zooplankton can reflect the nutrient composition of the corresponding watershed (Oczkowski et al., 2014). Eutrophic systems that receive increased nutrient additions have been shown to have increased chlorophyll concentrations reflecting a higher phytoplankton density that comprise the base of many marine ecosystems (Oczkowski et al., 2010). $\delta^{15}\text{N}$ values are important aspects of understanding the trophic position of a consumer, but they can also be influenced by anthropogenic sources such as wastewater and chemicals entering waterways (Davias et al., 2013). Enrichment of ^{15}N is evident in areas that are heavily influenced by development and agriculture, which can

be analyzed in organisms at the base of food webs which have a lower trophic position and therefore less natural nitrogen enrichment (Davias et al., 2013).

In this study, $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ of zooplankton samples that were collected from the Pocomoke, Nanticoke, and Wicomico rivers along the Chesapeake Bay watershed of the Eastern Shore were analyzed to determine the impact of near-shore land usage on aquatic ecosystems. Zooplankton were collected and analyzed from fifteen sites among these three rivers based on the predominant land usage found within that section of the watershed. Land usage along these rivers varies greatly – from very natural wetland areas to urbanized hubs that can impact the integrity of the aquatic ecosystem in different ways. Smaller-scale crop farmland is common along the Eastern Shore, as well as large Perdue chicken facilities that can house both livestock and feeding materials. Urban development and water-front properties also contribute various chemicals into waterways through impervious driveway and road surfaces as well as wastewater treatment from private residences. With such differences in surrounding near-shore land usage, comprehensive analysis

of organisms at the base of the food web in these areas can provide further insights on larger consumers and organisms within an ecosystem that contribute greatly to food webs and economic practices.

METHODS

SITE DETERMINATION

Using geographic information system (GIS) maps and land usage data, sites along the Pocomoke, Nanticoke, and Wicomico rivers were categorized based on the predominant land usage along the watershed of each river. Land usage categories are as follows: rural forested wetland (RF), mixed natural (MN), mixed rural (MR), development influenced (DI), rural agriculture (RA), and natural (NAT). DI sites have the most anthropogenic influence, while RF sites experience the least. Thirteen sub-watershed sites across the three rivers have been identified with individual sites within that sub-watershed. For our study, we are comparing sub-watersheds as a whole rather than individual sites. The Pocomoke River contains sub-watersheds DI, RF, MN, and RA; in this study we analyze zooplankton from the RA,

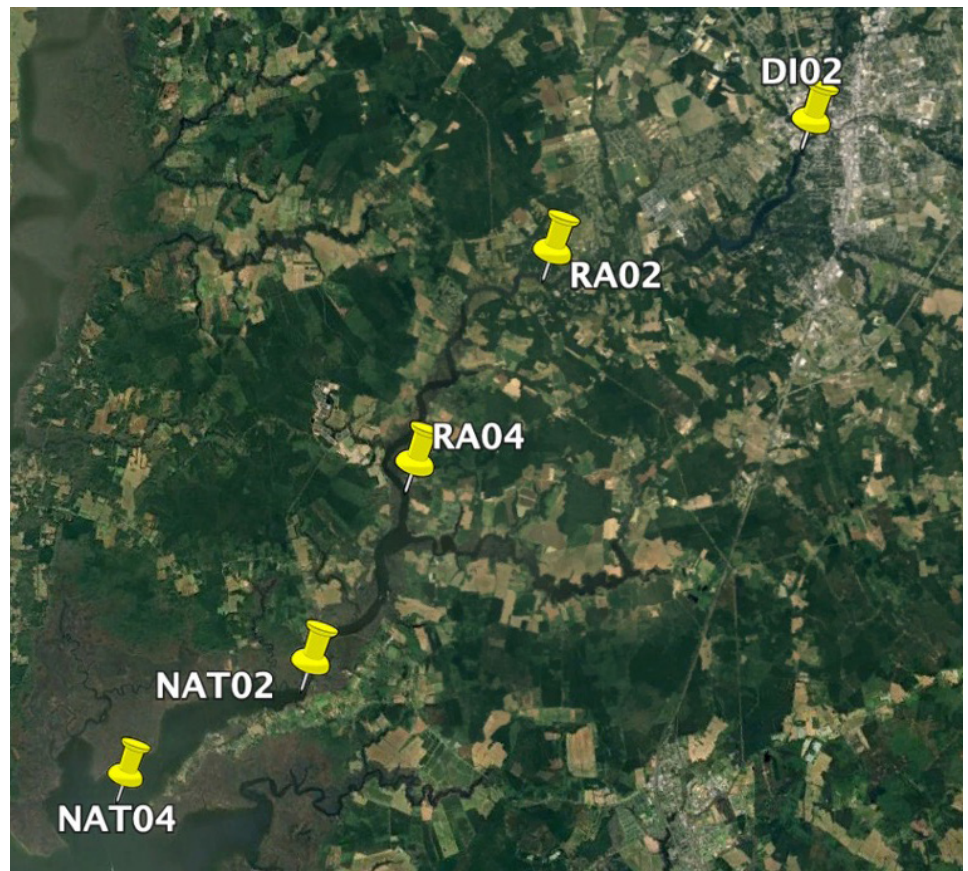


Figure 1. Sample collection sites used for analysis along the Wicomico River. Sites determined by majority land usage for that area: development influenced (DI), rural agriculture (RA), and natural (NAT).



Figure 2. Sample collection sites used for analysis along the Pocomoke River. Sites determined by majority land usage for that area: development influenced (DI), rural forested wetland (RF), mixed natural (MN), and rural agriculture (RA).

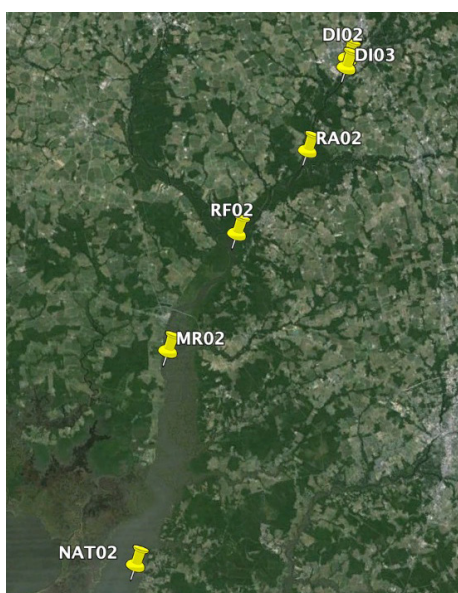


Figure 3. Sample collection sites used for analysis along the Nanticoke River. Sites determined by majority land usage for that area: development influenced (DI), rural forested wetland (RF), mixed rural (MR), and natural (NAT).

RF, and MN sites. The Nanticoke River contains sub-watersheds DI, RA, RF, MR, and NAT; in this study we analyze zooplankton from the DI, NAT, MR, RA, and RF sites. The Wicomico River contains sub-watersheds DI, RA, and NAT; in this study we analyze zooplankton from the DI, RA, and NAT sites.

COLLECTION

Zooplankton samples were collected at each site using a 200 μm pore plankton tow net towed behind a boat for five minutes upstream. A supplemental plankton pump was used at most sites that pumped 30-45 L of water from around one meter below the surface through collection filters. Liquid zooplankton samples were extracted from the plankton tow or filters using

de-ionized water and stored in Nalgene bottles and kept at 4°C until filtering.

ZOOPLANKTON SAMPLE PREPARATION

Zooplankton samples were filtered through 1000, 500, 210, 100, and 53 μm filters and kept within their size fractions. Each size fraction was then collected from the filters and most of the remaining water was extracted using vacuum filtration. The vacuum-filtered sample was then weighed to collect a wet weight before the sample was void of all water. Samples were then dried overnight in a drying oven and weighed to obtain a dry weight of the zooplankton.

Samples collected during the summer of 2022 were previously frozen upon collection and stored. Samples were thawed no more than two days before filtering and were filtered and processed the same way as summer 2023 samples.

STABLE ISOTOPE ANALYSIS PREPARATION

Dried samples were ground into a fine powder using a mortar and pestle and stored with proper labeling. Using 5 x 8 mm pressed tin capsules for Carbon and Nitrogen analysis, samples were weighed to ~1.000 mg and packaged for analysis. Using 4 x 6 mm pressed silver capsules for Hydrogen and Oxygen analysis, samples were weighed to ~0.100 mg and packaged for analysis. Samples were sent off to the Central Appalachian Stable Isotope Facility for analysis and additional samples were sent to the University of Delaware for Carbon and Nitrogen analysis. Samples were analyzed using a mass spectrophotometer and data were reported using δ notation and C:N ratios.

STATISTICAL ANALYSIS

Data was sorted based on parameters regarding watershed type, river identification, and size fraction for both 2022 and 2023 summer collection years. Data was plotted using R Studio to visually observe trends and one-way Analysis of Variance (ANOVA) test was run to determine any statistical significance between the parameters.

RESULTS

$\delta^{13}\text{C}$ AND $\delta^{15}\text{N}$ BY WATERSHED TYPE

Data were visualized using a biplot (Fig. 4) which compares $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ compositions at each watershed type across all three rivers. $\delta^{13}\text{C}$ for samples collected over 2022 ranged from -29.72‰ to -20.26‰, with an average composition of -25.31‰ across all watersheds. $\delta^{15}\text{N}$ values ranged from 7.74‰ to 11.24‰, with an average composition of 9.38‰. When comparing $\delta^{13}\text{C}$ and watershed type, there is a

statistical difference across all watersheds, with a p-value of $6.36e^{-16}$. There is also a statistical significance across all watersheds for $\delta^{15}\text{N}$, with a p-value of $8.06e^{-10}$. Average values for $\delta^{13}\text{C}$ by watershed are as follows; DI: -29.56‰, MR: -25.55‰, NAT: -21.11‰, RA: -23.17‰, and RF: -25.50‰. Average values for $\delta^{15}\text{N}$ by watershed are as follows; DI: 10.44‰, MR: 10.74‰, NAT: 8.04‰, RA: 8.56‰, and RF: 8.38‰. Six samples from two DI sites were analyzed, five samples from one MR site were analyzed, five samples from one NAT site were analyzed, three samples from one RA site were analyzed, and four samples from one RF site were analyzed.

$\delta^{13}\text{C}$ for samples collected over 2023 ranged from -32.94‰ to -21.00‰, with an average composition of -26.70‰ across all watersheds. $\delta^{15}\text{N}$ values ranged from 6.18‰ to 13.71‰, with an average composition of 10.02‰. Data were visualized using a biplot (Fig. 5) which compares $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ compositions at each watershed type across all three rivers. When comparing $\delta^{13}\text{C}$ and watershed type, there is a statistical difference across all watersheds, with a p-value of $4.06e^{-05}$. There is also a statistical significance across all watersheds for $\delta^{15}\text{N}$, with a p-value of 0.00173. Average values for $\delta^{13}\text{C}$ by watershed are as follows; DI: -28.35‰, MN: -23.86‰, MR: -25.29‰, NAT: -22.95‰, RA: -27.23‰, and RF: -29.87‰. Average values for $\delta^{15}\text{N}$ by watershed are as follows; DI: 9.91‰, MN: 6.98‰, MR: 11.41‰, NAT: 11.29‰, RA: 9.80‰, and RF: 10.95‰. Thirteen samples from three DI sites were analyzed, five samples from one MN site were analyzed, three samples from one MR site were analyzed, eight samples from two NAT sites were analyzed, fifteen samples from four RA sites were analyzed, and five samples from two RF sites were analyzed.

$\delta^{13}\text{C}$ AND $\delta^{15}\text{N}$ BY RIVER

Out of 6 sites that were sampled, 23 samples were analyzed in total during summer 2022, with fifteen samples from the Nanticoke and eight samples from the Wicomico River (Fig. 6). No Pocomoke River samples from this summer were analyzed for stable isotope analysis due to sample availability and time constraints. The relationship between $\delta^{13}\text{C}$ and river identity was statistically significant, with a p-value of $1.06e^{-06}$, and the relationship between $\delta^{15}\text{N}$ and river identity was also statistically significant, with a p-value of 0.000251. $\delta^{13}\text{C}$ values for the Wicomico River ranged from -23.87‰ to -20.26‰, with an average value of -21.88‰. $\delta^{15}\text{N}$ values ranged from 7.79‰ to 8.62‰, with an average value of 8.23‰. $\delta^{13}\text{C}$ values for the Nanticoke River ranged from -29.72‰ to -24.92‰, with an average value of -27.14‰. $\delta^{15}\text{N}$ values ranged from 7.74‰ to 11.24‰, with

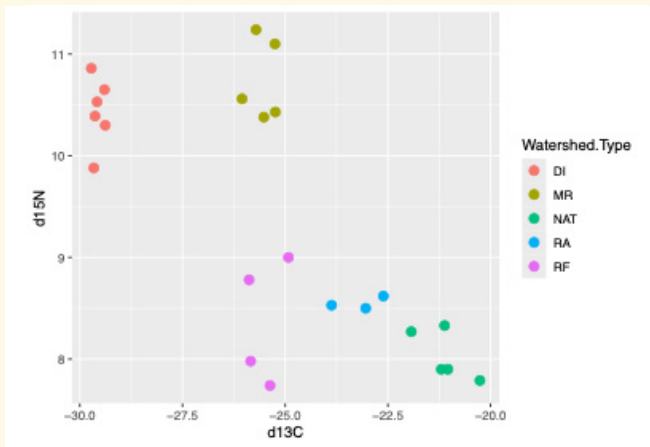


Figure 4. $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ biplot of 2022 zooplankton samples in relation to watershed type from all three rivers.

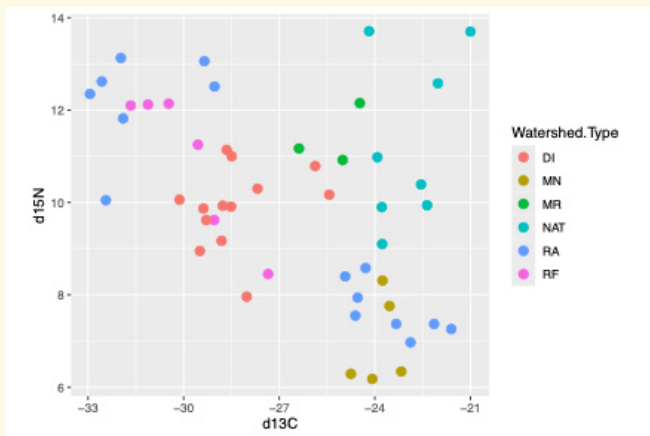


Figure 5. Sample collection sites used for analysis along the Pocomoke River. Sites determined by majority land usage for that area: development influenced (DI), rural forested wetland (RF), mixed natural (MN), and rural agriculture (RA).

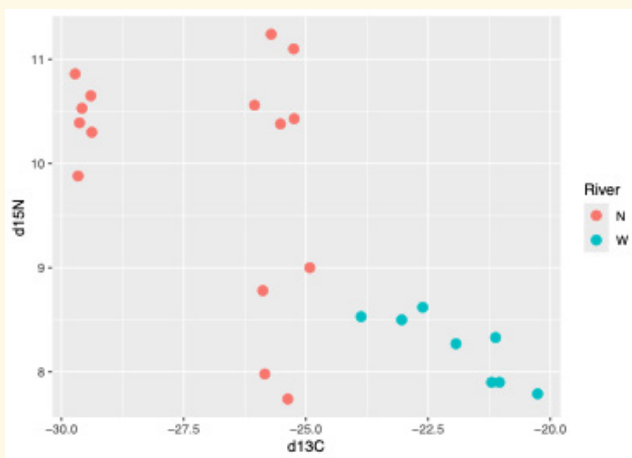


Figure 6. Sample collection sites used for analysis along the Pocomoke River. Sites determined by majority land usage for that area: development influenced (DI), rural forested wetland (RF), mixed natural (MN), and rural agriculture (RA).

an average value of 9.99‰.

Out of 13 sites sampled, 50 samples were analyzed in total during summer 2023, with 26 samples from the Nanticoke River, fifteen samples from the Wicomico River, and nine samples from the Pocomoke River (Fig. 7). The relationship between $\delta^{13}\text{C}$ and river identity was statistically significant, with a p-value of $4.72e^{-06}$, and the relationship between $\delta^{15}\text{N}$ and river identity was also statistically significant, with a p-value of $1.72e^{-05}$. $\delta^{13}\text{C}$ values for the Nanticoke River ranged from -32.95‰ to -22.02‰ , with an average value of -28.60‰ . $\delta^{15}\text{N}$ values ranged from 7.96‰ to 12.62‰ , with an average value of 10.85‰ . $\delta^{13}\text{C}$ values for the Wicomico River ranged from -30.13‰ to -21.60‰ , with an average value of -24.75‰ . $\delta^{15}\text{N}$ values ranged from 6.97‰ to 13.71‰ , with an average value of 9.67‰ . $\delta^{13}\text{C}$ values for the Pocomoke River ranged from -27.35‰ to -23.17‰ , with an average value of -24.52‰ . $\delta^{15}\text{N}$ values ranged from 6.18‰ to 8.45‰ , with an average value of 7.47‰ .

$\delta^{13}\text{C}$ AND $\delta^{15}\text{N}$ BY SIZE FRACTION

The relationship between $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ and size fraction was not statistically significant for 2022 nor 2023, but results were graphed for visualization (Fig. 8). In 2022, six samples of $53\ \mu\text{m}$ were collected and had $\delta^{13}\text{C}$ values ranging from -29.58‰ to -21.93‰ , with an average value of -25.98‰ . $\delta^{15}\text{N}$ values for this size fraction ranged from 8.27‰ to 11.1‰ , with an average value of 9.59‰ . Six samples of $100\ \mu\text{m}$ were collected and had $\delta^{13}\text{C}$ values ranging from -29.66‰ to -21.12‰ , with an average value of -25.76‰ . $\delta^{15}\text{N}$ values for this size fraction ranged from 8.33‰ to 11.24‰ , with an average value of 9.41‰ . Six samples of $210\ \mu\text{m}$ were collected and had $\delta^{13}\text{C}$ values ranging from -29.72‰ to -21.20‰ , with an average value of -25.71‰ . $\delta^{15}\text{N}$ values for this size fraction ranged from 7.74‰ to 10.86‰ , with an average value of 9.34‰ . Two samples of $500\ \mu\text{m}$ were collected and had $\delta^{13}\text{C}$ values of -26.05‰ and -21.04‰ , with an average value of -23.55‰ . $\delta^{15}\text{N}$ values for this size fraction were 7.90‰ and 10.56‰ , with an average value of 9.23‰ . Three samples of $1000\ \mu\text{m}$ were collected and had $\delta^{13}\text{C}$ values ranging from -25.24‰ to -20.26‰ , with an average value of -23.47‰ . $\delta^{15}\text{N}$ values for this size fraction ranged from 7.79‰ to 10.43‰ , with an average value of 9.07‰ .

In 2023, seven samples of $53\ \mu\text{m}$ were collected and had $\delta^{13}\text{C}$ values ranging from -32.44‰ to -24.29‰ , with an average value of -28.08‰ . $\delta^{15}\text{N}$ values for this size fraction ranged from 6.29‰ to 10.05‰ , with an average value of 8.93‰ . Six samples of $100\ \mu\text{m}$ were collected and had $\delta^{13}\text{C}$ values ranging from

-31.90‰ to -23.33‰, with an average value of -27.86‰. $\delta^{15}\text{N}$ values for this size fraction ranged from 6.18‰ to 11.82‰, with an average value of 9.12‰. Thirteen samples of 210 μm were collected and had $\delta^{13}\text{C}$ values ranging from -32.94‰ to -22.55‰, with an average value of -26.90‰. $\delta^{15}\text{N}$ values for this size fraction ranged from 6.97‰ to 13.06‰, with an average value of 10.37‰. Twelve samples of 500 μm were collected and had $\delta^{13}\text{C}$ values of -31.97‰ and -22.14‰, with an average value of -25.95‰. $\delta^{15}\text{N}$ values for this size fraction were 7.37‰ and 13.71‰, with an average value of 10.31‰. Twelve samples of 1000 μm were collected and had $\delta^{13}\text{C}$ values ranging from -30.47‰ to -21.00‰, with an average value of -25.84‰. $\delta^{15}\text{N}$ values for this size fraction ranged from 6.34‰ to 13.70‰, with an average value of 10.44‰.

DISCUSSION

The results from this study demonstrate an overall relationship between near-shore land usage and isotopic composition of zooplankton. Comprehensive analysis across two summers on the Nanticoke, Pocomoke, and Wicomico Rivers provide insights into how surrounding land profiles can impact the health of aquatic ecosystems and indicators of trophic relationships. Overall, a general trend across watershed types, size fractions, and river identity showed decreasing $\delta^{13}\text{C}$ with more depleted values and increasing $\delta^{15}\text{N}$ with more enriched values from 2022 to 2023. More data was collected and analyzed in 2023, however, and differences in sampling dates and seasonal variations (sampling in June vs August) could also impact the results. Increased sample analysis can also account for the larger ranges seen in 2023 data, and varying methods could also impact biomass collection at lower-size fractions.

$\delta^{13}\text{C}$ ANALYSIS

Photosynthetic plants are categorized as C3 or C4, depending on the pathway and enzymes utilized during this process. C3 plants, which use the enzyme RuBisCO to fix carbon dioxide, are more depleted in carbon isotopes with an average $\delta^{13}\text{C}$ of around -26.5‰, ranging from -20‰ to -35‰ (O'Leary, 1992). C4 plants, which use the enzyme PEP, are more enriched with an average $\delta^{13}\text{C}$ of -12‰, ranging from -9‰ to -19‰ (O'Leary, 1992). Most phytoplankton species are C3 plants, so these organisms are generally more depleted in the heavier carbon isotopes and have a more negative $\delta^{13}\text{C}$ value. Phytoplankton biomass increases significantly in riverine ecosystems during spring blooms due to increased fertilizer runoff from agricultural

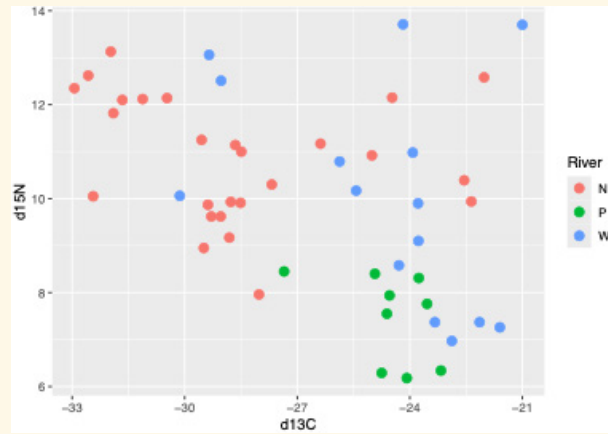


Figure 7. $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ biplot of 2023 zooplankton samples in relation to river.

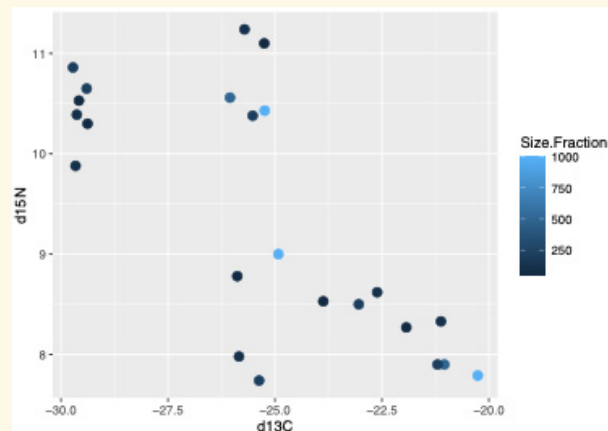


Figure 8. $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ biplot of 2022 zooplankton samples in relation to size fraction across all three rivers.

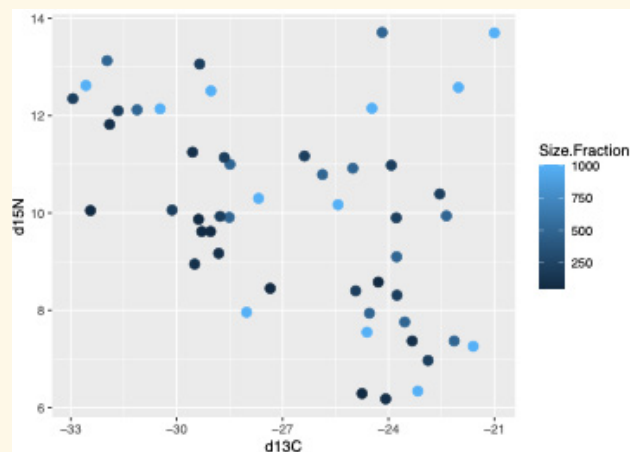


Figure 9. $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ biplot of 2023 zooplankton samples in relation to size fraction across all three rivers.

practices and these blooms show decreased $\delta^{13}\text{C}$ with values as low as -32‰ (Tunens et al., 2022).

Zooplankton generally increase in abundance during later summer months following the spring blooms, as they consume the readily available phytoplankton. Estuaries with ranges of salinity can show increased $\delta^{13}\text{C}$ values (-21‰ to -26‰) in mesohaline and polyhaline areas and decreased $\delta^{13}\text{C}$ values (-26‰ to -32‰) in areas with larger freshwater inputs (Fry 2002, Oczkowski et al., 2014). Open-ocean phytoplankton have been found to have an average $\delta^{13}\text{C}$ of -21‰, however areas with more autochthonous production have more enriched phytoplankton values, as high as -16‰ (Oczkowski et al., 2014). Phytoplankton represent the basis of aquatic food webs as they are primary producers, and they are found in the diets of zooplankton along with allochthonous organic material and bacteria, depending on size fractions (Taipale et al., 2016).

Samples collected at DI sites had some of the lowest $\delta^{13}\text{C}$ values, with both years averaging around -28‰ to -29‰. Highly depleted values could be indicative of increased consumption of C3 primary producers such as phytoplankton, which can bloom with increased nutrient inputs providing higher abundance of this diet item. Especially seen in 2022, other sites had more mid-range $\delta^{13}\text{C}$ values, staying around -25‰ to -21‰ on average. These values indicate that zooplankton are likely consuming diet items that are more enriched in ^{13}C as opposed to heavily depleted phytoplankton that come with algal blooms. $\delta^{13}\text{C}$ values by watershed type in 2023 are generally more depleted, with the lowest average being around -23‰, but the highest comprising almost -30‰ for the RF watershed. These more depleted values could indicate diet items consisting mostly of phytoplankton and show a slight switch in zooplankton consumption from the previous year. Depletion in the RF watershed from 2022 to 2023 by 4‰ could represent a higher abundance of phytoplankton in the system in 2023, specifically following spring blooms.

$\delta^{13}\text{C}$ data analyzed by river type was highly stratified in 2022, with no samples from the Pocomoke River analyzed due to sample and time availability. Clear trends can be identified between a more depleted Nanticoke River (-27.14‰ average), and a far more enriched Wicomico River (-21.88‰) for the samples analyzed from that year. Similar, but less coupled, trends can be seen for these two rivers in 2023 data, with the Nanticoke River generally more depleted in ^{13}C (-28.60‰ average) while the Wicomico is more enriched (-24.75‰). The Pocomoke River samples from this year are also generally more enriched than the Nanticoke,

with an average value of -24.52‰, which is very similar to the composition of the Wicomico River. With more samples collected from the Nanticoke River each year, this allows the data to have larger ranges, but also allows for more disparity of land usage along these multiple sites. Having more development and agricultural influenced sites analyzed for this river can also show the trend of depletion for these sites likely due to the abundance of phytoplankton in these areas.

Although not statically significant, analyzing the $\delta^{13}\text{C}$ of the size fractions can help build understandings of food web interactions between larger zooplankton and smaller zooplankton and phytoplankton. Since carbon isotopes generally do not fractionate with trophic level, having no significant difference between 1000 μm zooplankton and 53 μm zooplankton shows that while there is a difference in identity of primary producer diet items, it is likely driven by other influences such as watershed type or river location rather than differences in size alone. Diet item availability is a large driver in the compositions of ^{13}C , and that is likely the case when comparing composition from larger and smaller primary consumers.

$\delta^{15}\text{N}$ ANALYSIS

Organic-based fertilizers such as manure or compost tend to have higher $\delta^{15}\text{N}$ values of around 8‰ due to the preferential uptake of the lighter isotope which results in the heavier isotope fractionating out (Mie et al. 2022). Synthetic fertilizers used in most commercial farming operations have very low $\delta^{15}\text{N}$, likely due to nitrogen fixation preferring the lighter isotope and thus fractionating out ^{15}N (Mie et al. 2022). Human wastewater sourced from municipal wastewater treatment plants as well as sewage lines and septic tanks also impact the nitrogen composition of waterways. Wastewater can introduce large amounts of nitrogen compounds into waterways, one of the most prevalent being ammonia. Bacteria are a large part of the nitrogen cycle as they can fix nitrogen compounds into different forms, one of those being nitrifying bacteria that convert ammonia into readily available nitrates and nitrites. During this process, ^{14}N molecules are used up more readily, leaving behind enrichment of ^{15}N during nitrifying and denitrifying processes (Munksgaard et al. 2016). Areas which have large sewage and wastewater inputs have more enrichment of ^{15}N , and these values can get to 10-20‰ (Munksgaard et al. 2016).

$\delta^{15}\text{N}$ across watershed types increased by almost 1‰ from 2022 to 2023. These values are already relatively high compared to what is expected of analysis for trophic levels, where 0-3‰ is expected for organisms comprising

the lower levels, so these higher values are indicative of external forces influencing ^{15}N composition. Enriched $\delta^{15}\text{N}$ values are found primarily in DI sites in 2022, however in 2023 the DI sites had enrichment values on the lower end. MR values stayed consistently high between 2022 and 2023, while NAT, RA and RF sites all increased by anywhere from 1-3‰. These increases are likely due to more anthropogenic influences rather than increased trophic level feeding since there is a difference between compositions among different watershed types. Higher enrichment in the MR, NAT, and RF sites could likely be due to human wastewater inputs, as more rural areas typically have sewage systems or septic tanks that may be prone to leaking. Since human wastewater carries more enriched nitrogen, these higher levels found in zooplankton could be indicative of increased loading from rural residential areas. These areas may also be more populated with natural wildlife whose excretion could also impact $\delta^{15}\text{N}$.

When analyzed by river, 2022 saw similar trends in $\delta^{15}\text{N}$ as in $\delta^{13}\text{C}$ with more enrichment in the Nanticoke River (9.99‰ average) while the Wicomico River was more depleted in $\delta^{15}\text{N}$ (8.23‰ average). With more samples analyzed in 2023, the Wicomico River had an increase in enrichment in $\delta^{15}\text{N}$ with an average value of 9.67‰, and the Nanticoke River increased as well to 10.85‰ average. The Pocomoke River was generally depleted when compared to the other rivers, with an average of 7.47‰ and a far smaller range in values. Sites along the Nanticoke and Wicomico Rivers are also more heavily influenced by Perdue plants that are located at the top of these rivers and waste materials from these plants could be impacting these rivers both at these DI sites as well as further down the rivers due to water flow and transport. Since the Pocomoke does not have any large Perdue plants located near sample sites, this may be a reason why there is less enrichment found along this river. The Nanticoke and Wicomico Rivers also generally have more near-shore residents and businesses located closer to the river providing more opportunities for anthropogenic influences. The Pocomoke River is generally less anthropogenically influenced and may therefore have more depleted $\delta^{15}\text{N}$ due to autochthonous production with few outside inputs of nitrogen bearing materials.

Since $\delta^{15}\text{N}$ is often used for understanding trophic relationships, the assumption for these samples would be that the larger size fractions of zooplankton would have generally more enriched $\delta^{15}\text{N}$ signatures than the lower size

fractions. Since this is not the case, the $\delta^{15}\text{N}$ data shows that there is likely more influence from outside sources that are driving differences in nitrogen composition. Analysis of secondary consumers that would eat the zooplankton, such as planktivore fish, could provide a more comprehensive analysis of the food webs in these rivers, and would allow more insights onto the driver behind $\delta^{15}\text{N}$ differences. Having zooplankton of 53 μm size fraction showing the same composition of 1000 μm size fraction zooplankton indicates that anthropogenic influences are likely the main driver in $\delta^{15}\text{N}$ enrichment throughout these rivers.

CONCLUSIONS AND FURTHER RESEARCH

Analyzing stable isotope compositions of ^{13}C and ^{15}N for rivers along the Chesapeake Bay watershed can provide additional data and aid in the understanding of anthropogenic influences on water quality and aquatic ecosystem interactions. Differences in $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ among areas with varying predominant land usage have been determined, but further analysis can provide better insights regarding this correlation and how it may continue to change in the future. Additional abiotic influences and limited sample availability could have been limiting in this analysis, so further

expansion of understanding salinity, chlorophyll, and nutrient concentrations in the water as well as sampling for several more years could aid the findings of this study. Isotope analysis of larger organisms, such as fish that occupy higher trophic levels, could also provide a more comprehensive analysis of impacts to these systems. Stable isotope analysis of Hydrogen isotopes within zooplankton samples would also provide insights into terrestrial inputs into the system and is being analyzed for more information.

REFERENCES

- Close, H.G., & Henderson, L.C. (2020). Open-ocean minima in $\delta^{13}\text{C}$ values of particulate organic carbon in the lower euphotic zone. *Frontiers in Marine Science*, 7, 540165. doi: 10.3389/fmars.2020.540165.
- Davias, L. A., Kornis, M. S., & Breitburg, D. L. (2013). Environmental factors influencing $\Delta^{13}\text{C}$ and $\Delta^{15}\text{N}$ in three Chesapeake Bay Fishes. *ICES Journal of Marine Science*, 71(3), 689–702. doi: 10.1016/j.watbs.2022.10074.
- Fry, B. (2002). Conservative mixing of stable isotopes across estuarine salinity gradients: A conceptual framework for monitoring watershed influences on downstream fisheries production. *Estuaries* 25, 264–271. doi: 10.1007/BF02691313.
- Fry, B. (2006). *Stable Isotope Ecology*. Springer. doi: 10.1007/0-387-33745-8.
- Hashemi, F., Olesen, J.E., Hansen, A.L., Borgesen, C.D. & Dalgaard, T. (2018). Spatially differentiated strategies for reducing nitrate loads from agriculture in two Danish catchments. *Journal of Environmental Management*, 208, 77–91. doi: 10.1016/j.envman.2017.12.001.
- Irwin, N.B., Irwin, E.G., Martin, J.F., & Aracena, P. (2018). Constructed wetlands for water quality improvements: Benefit transfer analysis in Ohio. *Journal of Environmental Management*, 206, 1063–1071. doi: 10.1016/j.jenvman.2017.10.050.
- Maloney, K.O., Smith, Z.M., Buchanan, C., Nagel, A., & Young, J.A. (2018). Predicting biological conditions for small headwater streams in the Chesapeake Bay watershed. *Freshwater Science*, 37(4), 795–809. doi: 10.1086/700701.
- Mie, A., Novak, V., Franko, M.A., Bugel, S.G., & Laursen, K.H. (2022). Fertilizer type affects stable isotope ratios of nitrogen in human blood plasma—results from two-year controlled agricultural field trials and a randomized crossover dietary intervention study. *J Agric Food Chem*, 70(11), 3391–3399. doi: 10.1021/acs.jafc.1c04418.
- Munksgaard, N.C., Warnakulasooriya, K.N., Kennedy, K., Powell, L., & Gibb K.S. (2016). Enrichment of $^{15}\text{N}/^{14}\text{N}$ in wastewater-derived effluent varies with operational performance of treatment systems: implications for isotope monitoring in receiving environments. *Environmental Monitoring and Assessment*, 189(36). doi: 10.1007/s10661-016-5754-9.
- O'Leary, M.H., Madhavan, S., & Paneth, P. (1992). Physical and chemical basis of carbon isotope fractionation in plants. *Plant, Cell & Environment*, 15(9), 1099–1104. doi: 10.1111/j.1365-3040.1992.tb01660.x.
- Oczkowski, A., Markham, E., Hanson, A., & Wigand, C. (2014). Carbon stable isotopes as indicators of coastal eutrophication. *Ecological Applications*, 24(3), 457–466. doi: 10.1361.160.97.21.
- Peterson, B.J., & Fry, B. (1987). Stable isotopes in ecosystem studies. *Annual Review of Ecology and Systematics*, 18, 293–320.
- Reay, W. G. (2009). Water quality within the York River estuary. *Journal of Coastal Research*, S1(57), 23–39. doi: 10.2112/1551-5036-57.sp1.23
- Taipale, S.J., Vuorio, K., Brett, M.T., Peltomaa, E., Hiltunen, M., & Kankaala, P. (2016). Lake zooplankton $\delta^{13}\text{C}$ values are strongly correlated with the $\delta^{13}\text{C}$ values of distinct phytoplankton taxa. *Ecosphere*, 7(8), 1–22. doi: 10.1002/ecs2.1392.
- Tunens, J., Aigars, J., Poikane, R., Jurgensone, I., Labucis, A., Labuce, A., Liepina-Leimane, I., Busa, L., & Viksna, A. (2022). Stable carbon and nitrogen isotope composition in suspended particulate matter reflects seasonal dynamics of phytoplankton assemblages in the Gulf of Riga, Baltic Sea. *Estuaries and Coasts*, 45, 2112–2123. doi: 10.1007/s12237-022-01071-z.

ACKNOWLEDGMENTS

The author thanks Dr. Jennifer Nyland and Dr. Christina Bradley for their time, effort, guidance, and support over the course of this study, as well as Dr. Christopher Briand for his comments on this paper. This research was funded by the Guerrieri Foundation for the Undergraduate Henson Summer Research Program and the Henson Research Grant.

Patience

Momina Waheed

FACULTY MENTOR: Professor Jinchul Kim

ABSTRACT

Patience (2024) is a mixed-media on canvas painting measuring 36" x 24". It serves as an experimental exploration of the long-established social caste system and the practice of dowry within Southeast Asian culture. The artwork delves into the generational history of dowries, highlighting the obstacles and demands that women face. The title, *Patience*, symbolizes both the avoidance of conflict and the willingness to endure.

The piece tells the story of women's struggles when getting married, a narrative deeply rooted in Southeast Asian culture. They bear the responsibility of providing dowries for the groom and his family, a tradition that signifies not only economic strain but also emotional endurance. This artwork represents the artist's first foray into working with abstract forms using unconventional art materials such as fabric, thread, jewels, and golden leaf, which hold significant cultural value in our region.

The focal point of the piece is a woman adorned with a red scarf, a powerful symbol of ethnic identity and femininity. Her downcast gaze conveys a profound sense of loneliness, yet the crown she wears signifies her status as the queen of her household. The intentionally fragmented composition, akin to a broken mirror, reflects the overwhelming emotions experienced by women in these circumstances, while the scattered lines represent the desires and dreams that shape feminine life. The chromatic scheme was determined using warm tones to create a pleasant environment that evokes a range of complicated feelings, such as passion, love, rage, solitude, and happiness. The use of red fiber on the girl signifies beauty, a culturally significant color for brides that enhances their allure. Extending the fabric beyond the canvas emphasizes the lasting presence of beauty amidst the profound challenges faced by women in their lives.

Adding depth to the piece, the calligraphic word *sabar*, meaning patience in Malay written in gold leaf and covered with golden jewels. This element serves as a bridge between two



cultures, resonating both in Southeast Asia and globally. Below the word, some threads are glued together, representing the artist's efforts to maintain identity in the face of these cultural norms. Threads are only glued to the top, freely positioned with gravity. The flexible vertical form represents perfect balance against gravity, which symbolizes the artist's identity.

The artist's intent in depicting this subject is to offer a multifaceted perspective on their culture and the collective experiences of women within it. This objective is pursued through the fusion of diverse artistic mediums and the integration of innovative abstract elements.

By embracing this approach, the artist aims to experiment with new pathways in artistic expression and provide a contemplative analysis of the societal constructs influencing the contemporary world. They hope to celebrate how art can break down barriers and open up countless opportunities for cultural conversations, all with the goal of making the world a better place.

ACKNOWLEDGMENTS

The author thanks Professor Jinchul Kim for his support and mentorship throughout the development of this paper and artwork.

Bottled Up: Effects of Polystyrene Microplastics on Alcohol Dehydrogenase Kinetics and DNA Secondary Structure

John Todd

FACULTY MENTOR: Dr. Joshua Sokoloski

ABSTRACT

Microplastics consist of small particles of typically hydrophobic polymers. Their proliferation in the biosphere, especially marine life, has generated evidence for multiple negative health effects including cancer and neurodegenerative diseases. There is a need for more information on the mechanisms with basic biological functions behind these effects. This paper studies the effects of polystyrene microbeads on alcohol dehydrogenase at 0.001% (weight/volume) concentration, which reduced the maximum velocity by about 15%. The effects of polystyrene on DNA secondary structure of double helices and i-motifs were analyzed using Cy3/Cy5 FRET analysis and found to have a centralizing effect on FRET efficiency, and both positive and negative effects on thermostability of DNA structures. Finally, the ability of activated charcoal to lower the microplastic concentration of the bottled drinks Aquafina, Propel, and Starry was investigated using a polystyrene standard curve and found to effectively reduce the concentration of polystyrene microplastics to roughly 0.001% (weight/volume). The data indicates the possible mechanisms of negative health effects of microplastics through interaction with enzyme kinetics and polynucleotide structures. This paper also shows the effectiveness of activated charcoal filtration in reducing microplastic concentration. Future studies should be aimed at developing a library of effected enzymes and DNA structures that are affected by microplastics.

BACKGROUND

Microplastics are a common term for a wide range of small particles of plastic, ranging in size from millimeters to nanometers. Their chemical identity typically consists of carbon-based polymers such as polyethylene, polypropylene, and polystyrene (Bermúdez & Swarzenski, 2021). They originate from macro-scale plastics that physically break down yet are unable to enter the carbon cycle chemically. The proliferation of microplastics into ecosystems has grown drastically in recent years. Marine life in particular is thought to experience a wide range of negative health effects including neurological and reproductive dysfunction and cancer (Roy et al., 2022). In a study of 22 subjects, levels of microplastics in the blood were quantifiable in 77% of subjects (Leslie et al., 2022). These consisted mostly of polyethylene terephthalate, polyethylene, and polymers of styrene. While the documentation of the negative health effects of these microplastics grows, studies of how these particles affect biochemical processes become essential. This pilot study examines the effect that the presence of microplastics have on two fundamental aspects of biochemistry: enzymatic function and nucleic acid structure.

Enzymes are macromolecule catalysts used to drive thousands of reactions within the cell. Almost every cellular function has one or many enzymes specifically designed for it. The speed of enzymes is tightly regulated by many

mechanisms, such as inhibitors or translocation across organelle membranes. Depending on the enzyme involved, inhibition can cause major health problems. Famously, organophosphates were used as pesticides and slowly leaked into human diets where they inhibited the enzyme acetylcholinesterase (Hulse et al., 2014). This inhibition would lead to the build up of acetylcholine, a major neurotransmitter, and the development of multiple neurodegenerative symptoms. If microplastics were capable of enzyme interaction, similar enzymatic effects may cause unknown negative health effects. Here, I tested the effects of microplastics on the activity of alcohol dehydrogenase (ADH), an enzyme responsible for metabolizing ethanol in mammals.

The secondary structure of the nucleic acids DNA and RNA refers to the specific shapes and conformations formed on a local scale of RNA nucleotides, mainly driven by hydrogen bonds between complementary bases (Clancy, 2008). Secondary structures in DNA are related to promoter and enhancer marking, damage recognition, and more (McMurray, 1999). If microplastics affect the secondary structure and stability of RNA and DNA, the consequences to genetic function could be severe. In this study, I examined the effects of microplastics on the structure and stability of a small DNA double helix and a DNA i-motif, a four-stranded structure that forms from cytosine-rich sequences.

I also investigated the use of activated charcoal filtration to remove microplastics from

aqueous solutions. Activated charcoal systems are some of the most common commercial filtration systems for home use and were adopted for their ability to absorb chlorine and volatile organic compounds (Tetteh et al., 2024). They present a potentially ideal system for leaching microplastics from water systems as they use an absorption-based system of filtration, instead of size-based filtration. Their large surface area on the nanoscale drives their absorption mechanism.

The pervasiveness of microplastics poses health concerns across the biosphere. Their observed wide range of health effects combined with presence in human blood indicates a strong need for mechanistic understanding of microplastics on basic biological functions. Investigating the roles microplastics play in enzyme kinetics and DNA secondary structure could identify potential nanoscale interactions driving observed negative health effects. Additionally, exploring possible ways to reduce the concentration of microplastics through commonly available filtration such as activated charcoal offers new insights into methods of limiting exposure.

METHODS

ALCOHOL DEHYDROGENASE KINETICS

Methods for ADH kinetics analysis were derived from Silverstein (2016). Five kinetics analyses were conducted using 0%, 0.0002%, 0.0004%, 0.0010% polystyrene (% weight/volume [Wt/

Vol]) and 0.0005% SiO₂ as a control. Polystyrene and SiO₂ were both sourced from Sigma-Aldrich and were microbeads of sizes 3 and 5 μm respectively. Each kinetics analysis was performed in 0.25 mM oxidized nicotinamide adenine dinucleotide (NAD⁺), 20 mM trisaminomethane (Tris) pH 9, 17 nM ADH, and 0.0025% BSA in varying ethanol concentration from 0-0.3 M. Absorbance of each solution was measured at 340 nm for roughly 2 min, and initial velocities were found using Excel's LINEST() function. This absorbance tracks the reduction of the coenzyme NAD from its oxidized state (NAD⁺) to reduced state (NADH) during the oxidation of ethanol by ADH. The higher the absorbance at 340 nm, the more reaction has been catalyzed.

DNA STRUCTURE FRET ANALYSIS

I used the following DNA oligonucleotides (synthesized by Integrated DNA Technologies) as shown in **Table 1**.

Using 100 nM DNA stock solutions in 20 mM Tris pH 7.4 buffer, two sets of 100 μL solutions of 5 nM each of the complementary oligonucleotides were mixed. Controls consisted of just the Cy3/Cy5 labelled single strands. For each DNA sequence tested, a separate mix was made with 0.04% (Wt/Vol) polystyrene. These solutions were heated to 95° C for 2 min before cooling on the bench top for 10 min, then ice for 20 minutes. Then 10 μL of this annealed solution was diluted to 1 mL with 50 mM Tris pH 7.4. Two pairs of i-motif solutions were prepared in the same way, but one pair was diluted with 1 mM sodium acetate pH 4.6 and the other pair with 200 mM Tris pH 9.

Forster Resonance Energy Transfer (FRET) is a spectroscopic technique in which biochemists can measure through-space distances between labeled points on a macromolecule (Maes et al., 2017). To conduct these experiments, I labeled the 5' end of the sequences with the donor fluorophore Cy3 and the 3' end with the acceptor fluorophore Cy5. If you excite the donor fluorophore, some of that energy can be transferred to the acceptor so that they both emit light. This energy transfer is distance dependent: When the dyes are far apart, the donor emits more light than the acceptor; when they are close, the acceptor emits lighter than the donor. This assay can then detect when a single strand of DNA (where the ends can bunch close to each other) forms a duplex with a second strand (extending the distance between the donor and the acceptor).

After preparation of each solution, their fluorescence was determined by exciting the donor fluorophore (or Cy3) at 535 nm and measuring emission from 550-750 nm using a Shimadzu RF-6000 fluorimeter with temperature control. The FRET efficiency was measured by dividing the area of the acceptor peak by the sum of the areas of both donor and acceptor peaks.

ACTIVATED CHARCOAL REMOVAL OF MICROPLASTICS IN DRINKS

A standard curve was developed by measuring the fluorescence in Nile Red at different polystyrene concentrations from 0.0010-0.00833% (Wt/Vol). Nile Red is known to increase in fluorescence in response to higher concentration of hydrophobic substances like polystyrene microbeads (Sekar &

Periasamy, 2003). All samples had a Nile Red concentration of 0.084 mg/mL, and a control with no polystyrene was used to account for autofluorescence of isolated Nile Red. Then the fluorescence of each sample was measured with an excitation of 460 nm and emission of 641 nm. They were fit to standard curve equations until one was found to have the highest R², which is a measure of a model's quality. The best found was a logarithmic equation of $y = 16217\ln(x) + 115155$ with an R² of 0.9983.

The drinks Aquafina, Starry, and Propel were sourced from plastic bottles. In this experiment, 250 mL of each bottle was boiled down to concentrated volumes of 136, 84, and 94 mL respectively. Then I ran the concentrate through 7 mL of activated charcoal in a chromatography column and collected the filtrate. The dye Nile Red only has high fluorescent intensity when in a hydrophobic environment such as the one present on the surface of a microplastic. Thus, I can use Nile Red fluorescence intensity to measure the presence of microplastics in aqueous solutions. The beverages both before and after filtration were mixed with the dye Nile Red to form a solution with 91.7% stock drink/ concentrate/filtrate by volume and 0.084 mg/mL Nile Red. For each preparation with Nile Red, one without Nile Red was prepared as a control. Then a negative control of just deionized water with 0.084 mg/mL Nile Red was prepared along with a positive control of 0.017% polystyrene and 0.084 mg/mL Nile Red. The fluorescent emission of these samples was then measured with a Tecan M Plex microplate reader. Then they were fit to the standard curve equation of $y = 16217\ln(x) + 115155$ to find their concentration.

TABLE 1. DNA Oligonucleotides Used in FRET-Based Experiment and Their Sequences.

Name	Sequence
BaseFRET	5' Cy3 GCC GTA AAA ATG CCG Cy5Sp 3'
BaseComplement	5' CGG CAT TTT TAC GGC 3'
i-motif	5' Cy3 CCC TAA CCC TAA CCC TAA CCC TAA CCC T Cy5Sp 3'

RESULTS

ALCOHOL DEHYDROGENASE KINETICS

A Michaelis-Menten plot displays the kinetics of an enzyme at different substrate concentrations. ADH is an enzyme that reduces NAD⁺ to NADH and oxidizes ethanol into acetaldehyde. While keeping all concentrations the same, except for the substrate, ethanol, the rate or initial velocity (V_0) of the enzyme can be found. In this experiment, V_0 was determined by finding the change in absorbance at 340 nm, as NADH has an absorbance peak there but NAD⁺ does not. The Michaelis-Menten plot for ADH activity in the presence and absence of microplastics is shown in **Figure 1**. As the ethanol concentrations approach 0.05 M ethanol, the V_0 starts to level off into a near horizontal trend. This point describes the maximum velocity (V_{max}) where the enzyme is fully saturated with substrate at all active sites and cannot process it any faster. Some inhibitors work by effectively disabling entire enzymes, lowering the total amount of active sites, which lowers the V_{max} . The highest concentration of polystyrene appears to have done just that. Enzyme catalysis is also defined by a value called the Michaelis constant (K_m), defined as the concentration at which the initial velocity is half of the V_{max} . The K_m is useful for examining the saturation point of the enzyme. A higher K_m indicates more substrate is needed to reach V_{max} than an enzyme with a lower K_m . The K_m for the two highest concentrations of polystyrene appears to have been raised.

SiO₂ beads have similar volume and mass to polystyrene beads, except they are glass and not considered plastics. The chemical identity of polystyrene and SiO₂ are distinct, yet their physical properties are similar. This allows us to examine if any changes in kinetics are due to the chemical identity of polystyrene or the physical properties of microbeads. The Michaelis-Menten plot of ADH in the presence of SiO₂ is very similar to the control (**Figure 2**). There are some differences in the medium concentrations, but the small and large concentrations form very similar plots. It is normal for fluctuation in V_0 to occur near or at the V_{max} . This indicates the changes seen in the previous graph are not due to the physical identity of the polystyrene beads, and rather their chemical identity as microplastics.

DNA STRUCTURE FRET ANALYSIS

The FRET efficiency in this experiment describes the distance between two fluorophores attached to the 3' and 5' ends of an oligonucleotide. The higher the FRET efficiency, the closer the two fluorophores are, in turn making the ends of the DNA closer as well (Maes et al., 2017). The rise

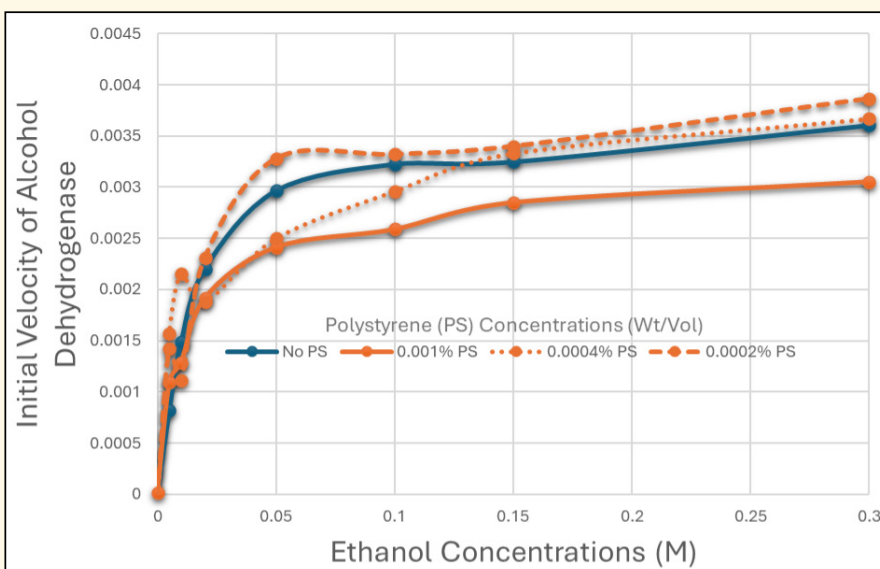


Figure 1: Michaelis-Menten Plot of Alcohol Dehydrogenase (ADH) Kinetics With Different Polystyrene Concentrations (% Weight/Volume)

Note. All initial velocities were measured by calculating change in NADH detected through 340 nm absorbance in 0.25 mM NAD⁺, 20 mM Tris pH 9, 17 nM ADH, and 0.0025% BSA.

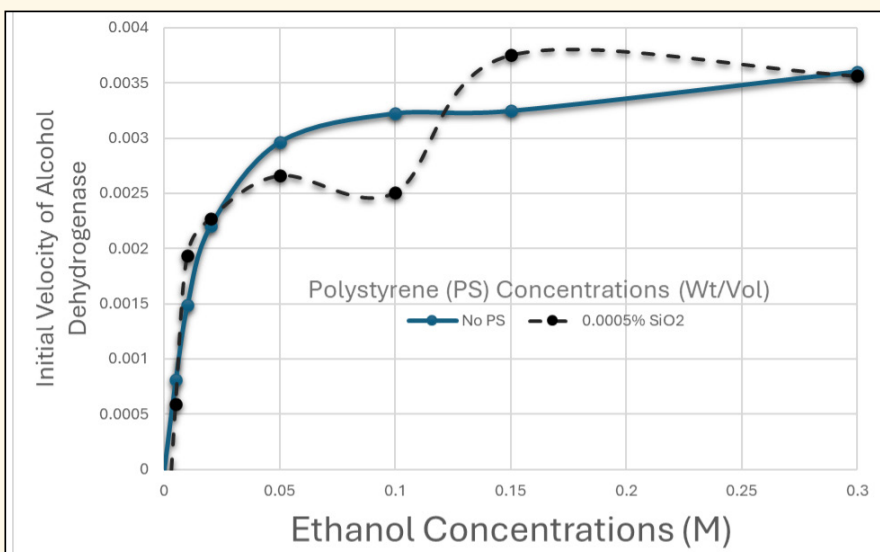


Figure 2: Michaelis-Menten Plot of Alcohol Dehydrogenase (ADH) Kinetics With Different Polystyrene Concentrations (% Weight/Volume)

Note. All initial velocities were measured by calculating change in NADH detected through 340 nm absorbance in 0.25 mM NAD⁺, 20 mM Tris pH 9, 17 nM ADH, and 0.0025% BSA.

in FRET efficiency near higher temperatures is due to the breaking of hydrogen bonds within the base pairs, which would cause the duplex to separate back into single strands. **Figure 3** shows the results for the BaseFRET duplex. The raised FRET efficiency of DNA in presence of polystyrene at lower temperatures indicates some structural

change in DNA. This change in structure seems to cause DNA ends to be further apart on average than they would without polystyrene. This data may indicate that the presence of polystyrene reduced the amount of DNA duplex that was successfully annealed, leaving some DNA still as single strands. The median FRET efficiency can

also be used to indicate a melting temperature, the higher of which indicates higher thermostability. The presence of polystyrene raised this melting temperature slightly, indicating a higher thermostability for the DNA structure that did form in its presence. Such increased stability may be due to the duplex interacting with the surface of the plastic bead. If structural changes are occurring in DNA, this could lead to errors in translation and regulation. The i-motif is a secondary structure of polynucleotides formed from an intercalated C-quadruplex (Abou Assi et al., 2018). It has functions in regulatory domains of DNA and unknown roles in RNA functions. The stabilization of the i-motif is pH dependent and relies on the protonation of cytosines. The lower pH conditions as shown in **Figure 4** allow the formation of the i-motif and reflect a much higher FRET efficiency than in high pH conditions where the i-motif is unstable. This indicates the fluorophores on the end of each strand were much closer when forming the structure. The presence of polystyrene beads had differing effects depending on pH. When stable at low pH, polystyrene appeared to lower FRET efficiency at low temperatures, but at higher temperatures, presumably when the motif began to unfold, the FRET efficiency ended up being higher than the sample without polystyrene. This is seen again in the pH conditions where the i-motif is unstable, and polystyrene had continuously higher efficiency through all temperatures. The i-motif appears to have increased stability and higher melting point in presence of polystyrene. There was no effect on stability with polystyrene presence in high pH conditions as the secondary structure of the i-motif was unable to be formed; as such, there is no melting point.

ACTIVATED CHARCOAL REMOVAL OF MICROPLASTICS IN DRINKS

To quantify the concentration of microplastics within different samples of real drinks, a standardized curve needed to be established for comparison. Nile Red is a chemical known to change fluorescent behavior depending on hydrophobic content, including microplastics, within a sample (Sekar & Periasamy, 2003). This change in fluorescence with polystyrene concentration fits a logarithmic curve. Polystyrene is just one of the possible polymers of styrene, one of the most commonly found microplastic contaminants found in biological samples (Leslie et al., 2022). It is important to note the only microplastic controlled for here was polystyrene and real samples may contain a diverse matrix of microplastics with differing effects on Nile Red fluorescence. This makes precise quantification

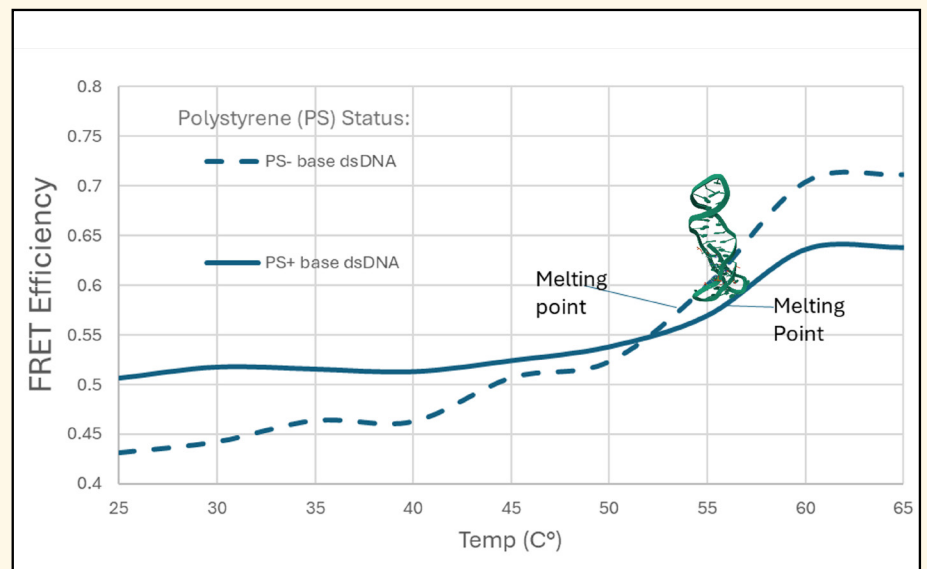


Figure 3: Difference in FRET Efficiency From 25°-65° C of Cy3/Cy5-Labelled Double-Stranded DNA With and Without Polystyrene.

Note. FRET efficiency calculated through the ratiometric method using peak areas. Oligonucleotide length was 15 nucleotides long and polystyrene content was 0.0001% (Wt/Vol).

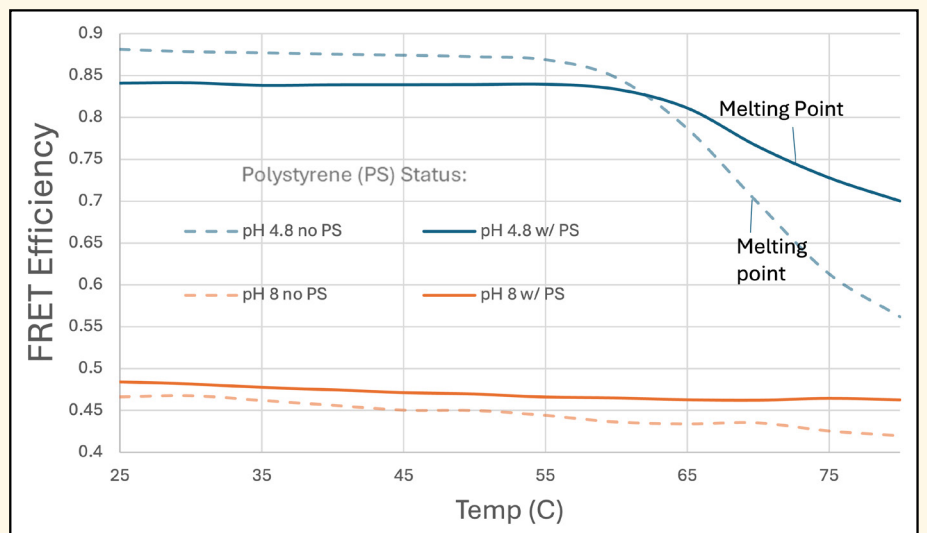


Figure 4: Difference in FRET Efficiency From 25°-80° C of I-motif Based on Polystyrene Presence

Note. With ideal pH for motif formation (blue) and unideal pH for motif formation (orange). The polystyrene concentration when present is 0.0001% (Wt/Vol). There is a 3D display of the i-motif in the top right corner of the graph (705E PDB) (Serrano-Chacón et al., 2021).

difficult, but at the very least, fluorescence of Nile Red stands as a useful tool for examining gross changes in microplastic concentration.

Using the same Nile Red concentration as used in the standardized curve, the fluorescence of Nile Red was used to assess the ability of activated charcoal to lower concentrations

of microplastics within a sample. The levels of fluorescence in Propel were much higher than either drink. One limitation is the matrix of hydrophobic materials within each drink sample would have differing effects on Nile Red, which was difficult to control for, as seen with the growth in fluorescence in Aquafina

following filtration, which must be due to compounds other than polystyrene present in activated charcoal. However, all Aquafina levels of fluorescence were very low, so contaminants would have strong effects only in very small concentrations of microplastics. The Propel and Starry drinks both follow the pattern of increased fluorescence following concentration and reduced fluorescence following filtration. Propel had a much stronger relative loss in fluorescence following filtration, which might be related to its much higher absolute fluorescence.

The concentrations of each drink and their forms reflects the fluorescence in **Figure 6**, with Propel being the highest. The lowest levels of all drinks struggled to get lower than 0.001% (Wt/Vol) of polystyrene. Though, these exact numbers could reflect a mixture of polymers of styrene instead of pure polystyrene.

DISCUSSION

ALCOHOL DEHYDROGENASE KINETICS

The analysis of ADH kinetics displayed an inhibitory effect of polystyrene microbeads on enzyme function. The highest concentration of polystyrene (0.0010% Wt/Vol) had a lowered V_{max} . This indicates the microplastics were interfering with the enzyme's maximum catalytic activity, suggesting the number of active sites were decreased. These negative effects on enzyme activity were proportional to the concentration of polystyrene with decreased concentrations approaching control levels of catalytic activity. Interestingly, SiO_2 microbeads did not significantly affect ADH kinetics. The physical similarities between SiO_2 microbeads and polystyrene microbeads suggests the observed inhibitory effects of polystyrene are connected to its chemical properties, which are not shared with SiO_2 . Future analysis of the roles physical identity and chemical identity play in inhibition should control for both concentration and microbead size. Future analysis could also benefit from a diverse composition of enzymes examined. This could offer a fuller understanding of the implications of microplastic effects on enzymatic activity and potential health effects.

DNA STRUCTURE FRET ANALYSIS

The use of FRET to analyze effects of polystyrene on DNA structure indicated that polystyrene microbeads affect the structure and thermodynamic stability of DNA secondary structure. Polystyrene exhibited an observed centralizing effect on FRET efficiency, where high base FRET efficiencies were reduced

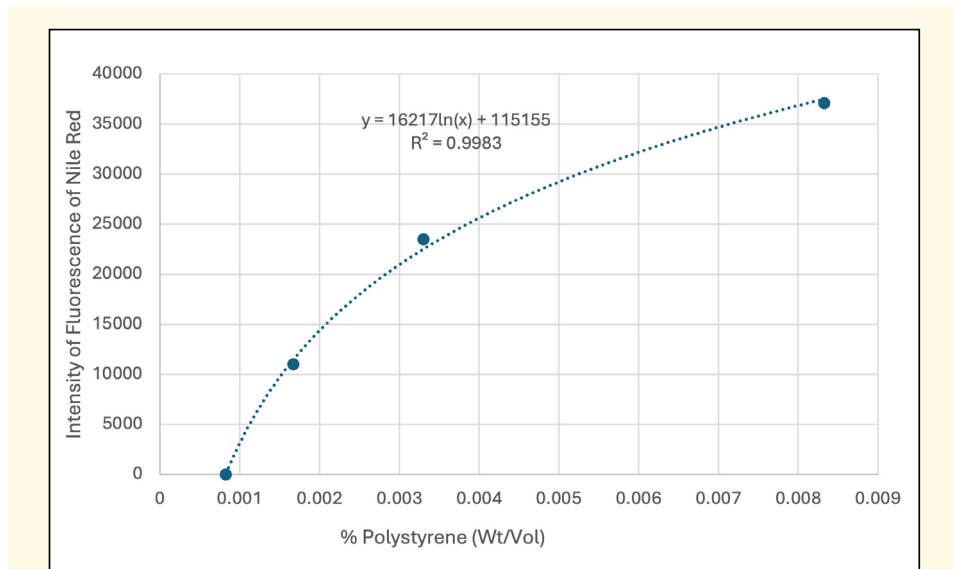


Figure 5: Standardized Curve of Fluorescence of Nile Red at Different Polystyrene Concentrations.

Note. Fluorescence emission measured at 641 nm following excitation at 460 nm. Each sample contained a Nile Red concentration of 0.083 mg/mL and was corrected for isolated Nile Red autofluorescence. Found to have a logarithmic fit of $y = 16217\ln(x) + 115155$ with an R^2 of 0.9983.

and low base efficiencies were increased. This suggests the changes forced upon DNA structure by polystyrene are dependent on the DNA's structure in absence of polystyrene (its base form). The main role of DNA secondary structure outside of the double helix is regulatory (McMurray, 1999). Changes in these structures, like the i-motif examined, could result in degenerative diseases or cancer. This analysis also has many implications for RNA functions. While the instability of RNA makes it much more difficult to analyze directly, the structural similarities between RNA and DNA allow for semi-accurate extrapolation. RNA secondary structure has a much more diverse range of roles to play compared to DNA and effects on RNA secondary structure could result in negative health effects relating to ribozyme kinetics, transcript translocation, splicing, and more (Clancy, 2008). Future analysis is needed on the effects of polystyrene on thermodynamic stability in longer polynucleotide strands and more diverse secondary structures like hairpins.

ACTIVATED CHARCOAL REMOVAL OF MICROPLASTICS IN DRINKS

Examining the ability of activated charcoal to remove microplastics within bottled drink revealed extreme effectiveness up to a certain concentration. Once the polystyrene concentration had reached around 0.001% (Wt/Vol) the activated charcoal filter had no

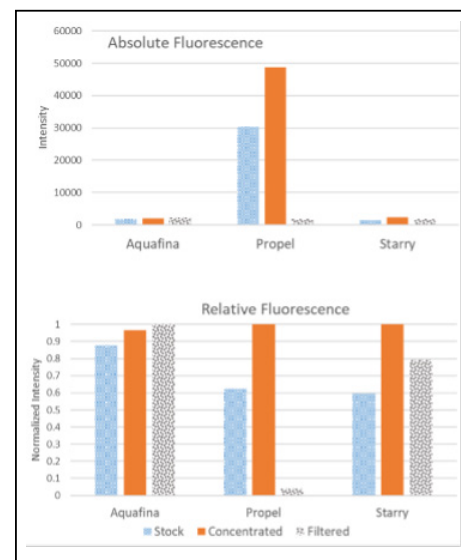


Figure 6: The Absolute and Relative Difference of Nile Red Fluorescence in Three Different Bottled Drinks in Their Stock Form and Following Sequential Concentration and Filtration.

Note. The three drinks tested were Aquafina, Propel, and Starry in their stock form, and their concentrations were roughly 1.8x, 3.0x, and 2.7x respectively. Their concentrated forms were put through 7 mL of activated carbon to gather their filtrate. The absolute fluorescence reflects the intensities of emission measured at 641 nm following excitation at 460 nm. The relative fluorescence reflects the fluorescence of the form of a drink divided by the maximum intensity within the forms of that drink. Each sample contained a Nile Red concentration of 0.084 mg/mL and was corrected for isolated Nile Red autofluorescence.

effects on reduction. Filtration systems rarely are capable of eliminating the presence of all contaminants, so this is expected. Future goals of analysis could examine larger filtration systems beyond the 7 mL of activated charcoal. While it is ideal that activated charcoal is capable of reducing high levels of microplastics, there is obviously no filters between bottled drinks and their consumer. Activated charcoal straws are currently available for consumers in products like Lifestraw, which have changed advertising from focusing on wilderness survival to protection from microplastics (LifeStraw). However, a much more feasible option is switching from plastic bottles to endlessly recyclable aluminum alternatives (Mackenzie, 2019). Overall, though, the capabilities of activated charcoal filters to reduce microplastic concentration is promising, especially considering their prevalence in almost every home water filtration system.

In this study, polystyrene was seen to exhibit inhibitory effects on ADH activity, and these effects on ADH appeared to be caused by the chemical identity of polystyrene as a hydrophobic microbead. The secondary structure of DNA was examined using FRET efficiency, and polystyrene concentration was seen to interact with DNA structure and its thermostability. The analyses of enzyme kinetics and polynucleotide stability provide possible mechanistic explanation for observed negative health effects of microplastics, including degenerative diseases and cancer. In addition, activated charcoal was demonstrated to lower the concentration of polystyrene to a level around

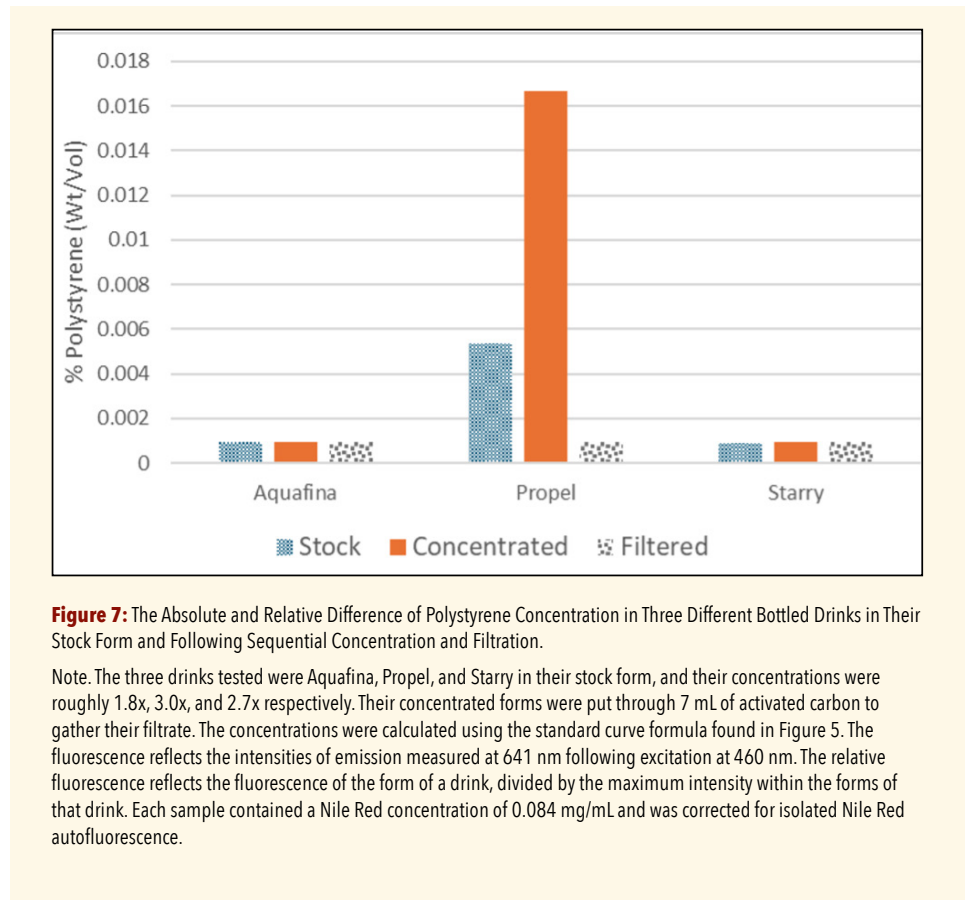


Figure 7: The Absolute and Relative Difference of Polystyrene Concentration in Three Different Bottled Drinks in Their Stock Form and Following Sequential Concentration and Filtration.

Note. The three drinks tested were Aquafina, Propel, and Starry in their stock form, and their concentrations were roughly 1.8x, 3.0x, and 2.7x respectively. Their concentrated forms were put through 7 mL of activated carbon to gather their filtrate. The concentrations were calculated using the standard curve formula found in Figure 5. The fluorescence reflects the intensities of emission measured at 641 nm following excitation at 460 nm. The relative fluorescence reflects the fluorescence of the form of a drink, divided by the maximum intensity within the forms of that drink. Each sample contained a Nile Red concentration of 0.084 mg/mL and was corrected for isolated Nile Red autofluorescence.

0.001% (Wt/Vol). Further research should focus on enzyme kinetic analysis of a range of enzymes and structural analysis of longer DNA double helices and more DNA secondary structures. These initial investigations indicate

that microplastics interrupt some of the most basic and key biological mechanisms and should be further explored.

REFERENCES

- Assi, H. A., Garavís, M., González, C., & Damha, M. J. (2018). I-Motif DNA: Structural features and significance to cell biology. *Nucleic Acids Research*, *46*(16), 8038–8056. <https://doi.org/10.1093/nar/gky735>
- Bermúdez, J. R., & Swarzenski, P. W. (2021). A microplastic size classification scheme aligned with universal plankton survey methods. *MethodsX*, *8*, 101516. <https://doi.org/10.1016/j.mex.2021.101516>
- Clancy, S. (2008). *RNA Functions* | *Learn Science at Scitable*. *Www.nature.com*. <https://www.nature.com/scitable/topicpage/rna-functions-352/#:~:text=The%20central%20dogma%20of%20molecular>
- Hulse, E. J., Davies, J. O. J., Simpson, A. J., Sciuto, A. M., & Eddleston, M. (2014). Respiratory Complications of Organophosphorus Nerve Agent and Insecticide Poisoning. Implications for Respiratory and Critical Care. *American Journal of Respiratory and Critical Care Medicine*, *190*(12), 1342–1354. <https://doi.org/10.1164/rccm.201406-1150CI>
- Leslie, H. A., J. M. van Velzen, M., Brandsma, S. H., Vethaak, D., Garcia-Vallejo, J. J., & Lamoree, M. H. (2022). Discovery and quantification of plastic particle pollution in human blood. *Environment International*, *163*(107199), 107199. <https://doi.org/10.1016/j.envint.2022.107199>
- LifeStraw. (n.d.). Our technology. LifeStraw Water Filters & Purifiers. <https://lifestraw.com/pages/our-technology>
- Mackenzie, W. (2019, September 2). Will aluminium cans replace plastic bottles? *Forbes*. <https://www.forbes.com/sites/woodmackenzie/2019/09/02/will-aluminium-cans-replace-plastic-bottles/>
- Maes, T., Jessop, R., Wellner, N., Haupt, K., & Mayes, A. G. (2017). A rapid-screening approach to detect and quantify microplastics based on fluorescent tagging with Nile Red. *Scientific Reports*, *7*(1). <https://doi.org/10.1038/srep44501>
- McMurray, C. T. (1999). DNA secondary structure: A common and causative factor for expansion in human disease. *Proceedings of the National Academy of Sciences*, *96*(5), 1823–1825. <https://doi.org/10.1073/pnas.96.5.1823>
- Roy, P., Mohanty, A. K., & Misra, M. (2022). Microplastics in ecosystems: their implications and mitigation pathways. *Environmental Science: Advances*, *1*(1), 9–29. <https://doi.org/10.1039/d1va00012h>
- Sekar, R. B., & Periasamy, A. (2003). Fluorescence resonance energy transfer (FRET) microscopy imaging of live cell protein localizations. *The Journal of Cell Biology*, *160*(5), 629–633. <https://doi.org/10.1083/jcb.200210140>
- Serrano-Chacón, I., Mir, B., Escaja, N., & González, C. (2021). Structure of i-Motif/Duplex Junctions at Neutral pH. *Journal of the American Chemical Society*, *143*(33), 12919–12923. <https://doi.org/10.1021/jacs.1c04679>
- Silverstein, T. P. (2016). The Alcohol Dehydrogenase Kinetics Laboratory: Enhanced Data Analysis and Student-Designed Mini-Projects. *Journal of Chemical Education*, *93*(5), 963–970. <https://doi.org/10.1021/acs.jchemed.5b00610>
- Tetteh, I. K., Issahaku, I., & Tetteh, A. Y. (2024). Recent advances in synthesis, characterization, and environmental applications of activated carbons and other carbon derivatives. *Carbon Trends*, *14*, 100328. <https://doi.org/10.1016/j.cartre.2024.100328>

ACKNOWLEDGMENTS

The author thanks Dr. Joshua Sokoloski for their help as mentor with this paper.

Corporate Social Responsibility in Latin America and the Caribbean: Motivation for Implementation

Gibelle Beaujon

FACULTY MENTOR: Professor Lauren Hill

ABSTRACT

Latin American and Caribbean nations face many urgent challenges, including political corruption, pollution, income inequality, and slow economic growth. Primary data from the World Meteorological Organization's State of Climate Report in Latin America and the Caribbean reveals the severity of the problems in Latin America and the Caribbean. A leading cause of these challenges is the lack of corporate social responsibility (CSR) in the region. CSR refers to the economic, legal, social, and environmental responsibilities to all stakeholders. Research reveals the factors contributing to the gap in CSR in Latin America and the Caribbean, the origin and benefits of CSR, and the importance of motivating companies in the region to implement CSR. However, there is limited research suggesting an effective strategy to motivate corporate officials in Latin America and the Caribbean to implement CSR. Therefore, this paper argues that the United Nations should initiate a policy to incentivize Latin American and Caribbean firms to adopt CSR training programs. This will allow businesses to tackle the environmental and socioeconomic challenges that the regions are facing, facilitate comfortable and motivating work environments, and support economic growth in these regions.

Keywords: corporate social responsibility, policy integration, training programs, Latin America, the Caribbean

INTRODUCTION

An estimated 56 million people in Latin America and the Caribbean will suffer from undernourishment in 2030, according to the World Meteorological Organization's State of the Climate Report in Latin America and the Caribbean (2022, p. 20). In addition to food insecurity, Latin American and Caribbean countries are facing challenges such as increasing air pollution, environmental safety, income inequality, and poverty. Thanetsunthorn (2021) found that all these challenges can be minimized with the implementation of corporate social responsibility (CSR) globally. CSR refers to the environmental, legal, social, and economic responsibilities that businesses have towards all stakeholders. Stakeholders are individuals or groups who are interested or affected by the company's decisions including stockholders, employees, consumers, suppliers, communities and legal institutions. In other terms, CSR is the company's responsibility to increase economic growth and the standard of living for employees and the rest of society (Thanetsunthorn, 2021). CSR practices focus on community development, environmental sustainability, green production, economic growth, social commitment, and creating a healthy and motivating work environment.

Though there is significant research on CSR in general, there is limited discussion of CSR in Latin America and the Caribbean. Hawes and Young (2019) found that a major obstacle of implementing CSR is corporate officials' perception that CSR will negatively impact their companies. Other major obstacles to implementing CSR in Latin America and the

Caribbean are impression management and greenwashing (Shah, 2011; Sansores-Guerrero & Navarrete-Marneou, 2024). Impression management is using CSR as a front to improve brand image without actual implementation of its practices. Similarly, greenwashing is a public relations strategy used to mislead consumers to believe that the company is working to improve sustainability (United Nations).

The limitation of CSR in Latin America and the Caribbean is preventing the nations in these regions from improving the environmental and socioeconomic issues they face. However, there is limited research to suggest an effective method of motivating corporate officials in Latin America and the Caribbean to integrate CSR practices into their organizations. To improve corporate officials' perceptions of CSR and to alleviate the negative effects of the environmental and socioeconomic issues in Latin America and the Caribbean, the United Nations should initiate a policy to facilitate CSR training programs in Latin American and Caribbean firms.

HISTORY OF CORPORATE SOCIAL RESPONSIBILITY

The history of CSR is complex, and the definition and practices of CSR have evolved over time. Thanetsunthorn (2021) and Jeet et al. (2020) found that CSR refers to the legal, economic, social, ethical, and environmental responsibilities of businesses to all stakeholders regardless of profit maximization. Therefore, companies practicing CSR take responsibility for how their business decisions affect the environment, their employees, consumers, stockholders, and society. Amodu (2017) found

discrepancies in the origin of CSR, but most scholars agree that the concept was created in the United States in the mid 20th century. Amodu (2017) continued that CSR evolved from the first idea that charity and gift giving are the main practices of CSR to the various economic, legal, and discretionary expectations that businesses face. The definition and applications of CSR have evolved over time to several responsibilities that companies have to all stakeholders.

Many variations of CSR models have emerged with differing correlations between CSR and corporate financial performance. Jeet et al. (2020) found that while some models emphasize shareholder primacy and the importance of working to maximize profits of shareholders, others emphasize a much-needed balance between adhering to both shareholder and stakeholder interests. Shareholder primacy is a theory that the interests of shareholders should be prioritized over the interests of employees, consumers, the community, and the environment. Jeet et al. (2020) described an example of a model that prioritizes profit maximization: the Neoclassical model. According to Lashgari (2004), the Neoclassical model suggests that CSR should be used to maximize profit because corporate officials should focus on the economic growth of the company. The Neoclassical model can be used by corporate officials to improve their company financially without considering the potential effects the business decisions will have on other stakeholders. As a result, corporate officials can practice CSR without needing to improve standard of living or adhering to the numerous responsibilities referred to in the definition of CSR.

In contrast to the Neoclassical model, Jeet et al. (2020) stated that an example of a model that prioritizes the balance between shareholders and stakeholders is the Stakeholder-view model. Branco and Rodriguez (2007) found that the Stakeholder-view model obligates companies to improve society by taking the interests of all parties affected by their decisions into account. By using the Stakeholder-view model, corporate officials can make business decisions that positively affect the community where they operate, making all stakeholders effected by the company's decisions a priority and displaying the Stakeholder-view model's theoretical efficiency. The difference in the priorities of the Neoclassical and the Stakeholder-view models suggests that there is no standardization of a CSR model worldwide.

While there is limited research on the specific CSR theories that are used from country to country, there is research regarding the differences in prioritization of CSR responsibilities between some developed and developing nations. Gajadur (2022) found that medium to large organizations in Africa that are typically multinational companies place a higher emphasis on the ethical, social, and environmental responsibilities such as healthcare, global climate change, and prevention of child labor since the investors are usually wealthier. Baughn et al. (2007) also found that social, ethical, and environmental responsibilities were the most prevalent in North America, somewhat prevalent in Europe, and the least prevalent in Asian countries such as Sri Lanka. However, there are also discrepancies in the level of CSR awareness within these regions. For example, Ramasamy and Ting (2004) argued that there was less reported CSR awareness in Malaysia than in Singapore and although Sri Lankan organizations implemented social initiatives, Rathnasiri (2003) found that organizations in Sri Lanka weren't aware of CSR. The lack of standardization of the use of CSR models allows corporate officials to implement any version of CSR that they believe is applicable for their organization.

LIMITATIONS OF CSR IMPLEMENTATION IN LATIN AMERICA AND THE CARIBBEAN

CSR is lacking in Latin America and the Caribbean due to numerous factors. Torres-Baumgarten and Yucetepe (2009) argued that the interests of shareholders and stakeholders are more difficult for corporations to balance in developing countries, which is one of the main practices in CSR. Torres-Baumgarten and Yucetepe (2009) continued that the cause of the difficulty to balance shareholder and stakeholder interests is that corporations feel more pressure to put a higher emphasis on stakeholder interests because of the lack of generosity from the wealthy individuals, those who could be

shareholders, in developing nations. The lack of generosity stems from the speculation of the legitimacy of the wealth of those individuals. The imbalance causes developing countries such as the Latin American and Caribbean nations to significantly struggle with implementing CSR, thus limiting the support towards the socioeconomic and environmental challenges they face. Prioritizing shareholders and profit maximization can negatively affect other stakeholders because responsibilities towards the environment, employees, consumers, and society will be neglected. However, if stakeholders are the only priority of the business, there will be limited funds available to sustain the business and production. This difficulty in balancing shareholder and stakeholder needs is causing a lack of CSR in Latin America and the Caribbean.

Additionally, large multinational companies are a contributor to limited CSR in Latin America and the Caribbean. Torres-Baumgarten and Yucetepe (2009) found that some of the largest American multinational companies have limited social initiatives in Latin America and the Caribbean. For example, in 2006, Exxon Mobile distributed \$2.4 million to the Latin American region out of the \$139.4 million allocated for community development worldwide. Therefore, Exxon Mobile distributed the least amount of money and resources (1.7% of the total budget) towards community development worldwide to the Latin American region compared to the U.S., Africa, Asia/Pacific region, Europe, and the Middle East. Similarly, Torres-Baumgarten and Yucetepe (2009) found that Chevron donated 4% of \$90.8 million for community development worldwide to the Latin American region. Consequently, Chevron donated 96% of the funds for community development worldwide to regions such as North America, Eurasia, Africa, the Middle East, and Europe. By providing limited funding to the Latin American and Caribbean communities, large multinational companies are neglecting their social responsibility, and the responsibility of businesses who practice CSR includes social responsibility.

Furthermore, multinational companies have limited reporting of their CSR activities in Latin America and the Caribbean. Torres-Baumgarten and Yucetepe (2009) found that some large multinational companies are not reporting their implementation of CSR in the Latin American region. For example, Bank of America allocated \$200 million to community development in 2006. However, their reports make no reference to resources allocated to the Latin American region, only resources given to U.S. communities. Bank of America and other multinationals' limited reporting suggests that some multinationals are not practicing CSR in Latin America and the Caribbean. Like Bank of America, American multinationals could be limiting their

implementation of CSR in Latin America and the Caribbean due to their high prioritization of their home markets. Additionally, the limited reporting of CSR narrows the ability of scholars to accurately analyze the implementation of CSR in these regions. Without the information necessary to draw an accurate conclusion, scholars become limited when reporting their findings. Moreover, multinational companies should have a responsibility to improve community development and report their uses of CSR in the home and foreign markets in which they operate. Limited reporting and CSR implementation suggests that multinationals are contributing to the lack of CSR in Latin America and the Caribbean.

In addition, the funds multinationals used to support social development in Latin America and the Caribbean are crucial. Shah (2011) found that Caribbean hotels that are affiliated with multinational chains have more uniform environment management systems than those without affiliations. Shah (2011) continued that multinationals improve the attitudes of the staff in the Caribbean markets on environmental sustainability. The research suggests that multinationals can motivate corporate officials to practice CSR by improving their perceptions on areas of CSR, such as environmental sustainability. The improvement of their attitudes towards environmental sustainability is particularly beneficial due to the environmental impacts that the Latin American and Caribbean nations face caused by climate and weather-related events. Additionally, the Caribbean firms can improve the efficiency of their management systems from the knowledge that multinationals provide based on their experience and technology, saving time and money. The positive effect of multinationals on management systems and the perceptions of corporate officials in Latin America and the Caribbean shows the vitality of the funds and participation of multinationals in these regions.

Though the significance of CSR by multinational companies in Latin America and the Caribbean is recognizable, there is a major obstacle preventing multinationals and local businesses from doing so: corporate officials using CSR to improve brand image without legitimate implementation through impression management and greenwashing. Impression management and greenwashing are public relations methods where companies mislead the public to believe that they are operating ethically and improving sustainability. The United Nations found that greenwashing tactics include overemphasizing the environmental impact of a minor change made by the company, claiming that they are reaching net zero carbon emissions without a credible plan in place, prioritizing one environmental impact while neglecting others, or purposely omitting information

about the company's operations. An example of greenwashing is if a company claimed to increase the recyclable content of their product by 30%, but only increasing it by 4% to 5%. Greenwashing undermines the purpose of CSR by neglecting the social and ethical responsibilities of CSR.

Hawes and Young (2019) argued that corporate officials in China practiced impression management by reporting the implementation of CSR policies in their firms to look as if they were adhering to Chinese legislation. Jeet et al. (2020) found other examples where organizations use CSR for the company to be viewed as charitable or to reduce tax liability with donations to social initiatives. The research suggests that corporate officials are not using CSR for its intended purpose: to improve the quality of life of society members and stakeholders within the firm. Specifically in the Caribbean, Shah (2011) found that hotels in the region only referenced corporate environmental responsibility policies as a greenwashing strategy. Greenwashing can hurt a company's credibility if discovered because consumers and other businesses will recognize the dishonesty of the firm. Corporate officials believe that CSR can be used to improve their brand image, reduce tax liability, or to appear as if they are following governmental legislation. The use of CSR for impression management limits the effectiveness and motivation of CSR practices.

SOCIOECONOMIC AND ENVIRONMENTAL CHALLENGES

Latin American and Caribbean nations are struggling with environmental safety and air pollution, emphasizing the need for CSR. According to the State of Climate Report in Latin America and the Caribbean from the World Meteorological Organization (2023), over 10 million people in these regions suffered from almost 80 reported meteorological, hydrological, and climate-related events in 2022. To put this in another perspective, the US provided over 9 billion dollars to help support the communities that were affected by these events. Additionally, the IPCC's AR6 Synthesis report (2023) states that these climate and weather-related events are causing increasing displacement in Latin America and the small islands of the Caribbean. The State of Climate Report in Latin America and the Caribbean states that the communities in these regions are struggling with elevated levels of poverty, income inequality and food inflation. According to the World Bank, about 26% of the Latin American and Caribbean population (169 million people) live on less than \$6.25 per day. Specifically, the small Caribbean islands are expected to be more vulnerable to these challenges in 2024. This suggests that measures need to be taken to minimize the effects of the environmental and socioeconomic challenges

that countries in Latin America and the Caribbean are facing.

An efficient measure that can be taken to minimize the negative effects of climate change is the integration of CSR in Latin American and Caribbean businesses. According to Thanetsunthorn (2021), CSR can minimize the devastating effects of the environmental and socioeconomic challenges that the regions are experiencing. CSR can alleviate the negative effects of such challenges by promoting green production, sustainable development, and social equality. For example, according to Aqualactra's Consolidated Annual Report (2012), Aqualactra's wind farms accounted for 20% of the energy demand on Curacao in 2012 and the company plans to expand the wind farm to meet a higher energy demand. Aqualactra is the government-owned utility company in Curacao which practiced CSR by promoting the use of wind energy instead of fossil fuels that contribute to climate change. Since Aqualactra is practicing CSR by expanding the wind farms, greenhouse gas emissions will be reduced in the country, therefore minimizing the cause and impacts of climate change. Aqualactra's use of CSR to build and expand its wind farms is an example of how practicing CSR can minimize the island's contribution to climate change. The ability of CSR to improve the negative effects of climate change and natural disasters demonstrates why the issue of CSR is vital.

Similarly, Procter and Gamble (P&G), a multinational consumer goods company, improved the standard of living for the poorer community in Venezuela by providing more affordable access to products and stable job opportunities (Peinado-Vara, 2005). P&G conducted research on consumption habits and distribution channels in the poorer communities in Venezuela after discovering that they were a potential market for consumer goods. The company found that it needed to approach these communities through the same creative ways they use to meet their needs instead of adjusting their individual products. For example, P&G found creative ways to make its products more affordable and accessible for the poor: selling diapers in bulk to lower the cost per unit for customers and creating a hairstyling center to promote the use of its products and to create more stable jobs for the low-income communities by teaching them hairstyling skills. As a result, P&G provided job opportunities for the poorer communities and provided easier and more affordable access to products and services while marketing the use of its products and progressing the development of the company. Therefore, CSR can be used to improve the standard of living of low-income communities, lessen income inequality and poverty levels.

Another reason implementing CSR in these regions is important is the connection

between CSR and corruption. According to Transparency International (2017), half of the people surveyed in these regions believed that officers in their governmental institutions were mostly or entirely corrupt. For example, the CIA's World Fact Book states that Venezuela's current President, Maduro, secured his second term in the fraudulent 2020 election and has placed restrictions on freedom of speech and the press, limiting the social trust between the government and the people. Venezuela has been under authoritarian leadership since 1999 when Hugo Chavez became President and took control of several branches of government. Schneider (2023) also found that there are other authoritarian states in Latin America including Nicaragua, Cuba, and the failed state of Haiti. In addition to authoritarian states, there are eight other hybrid or flawed Latin American governments that have evidence of corruption and low political activity.

Additionally, Peinado-Vara (2005) found that poorer consumers in Colombia used illegal means to obtain electricity because they did not trust their governmental institutions due to unfair legal framework in the energy market for the poorer community. Thanetsunthorn (2021) found that CSR can counteract the negative effects of corruption by establishing and reinforcing social trust, as well as providing aid towards public services. Peinado-Vara (2005) found that Union Fenosa, a multinational company who entered the Colombian energy market, worked with central and local authorities to create a fair tariff system and provide safe and legal electricity for poor communities who were accessing their electricity illegally. Union Fenosa increased the trust of the consumers with central and local authorities while also raising awareness for more fair legal frameworks for the energy market in Colombia. The research suggests that people in these regions distrust their governmental institutions, and they believe that corruption levels are high in their countries. CSR can be used by these governmental institutions to establish and maintain social trust, mitigating the negative effects of corruption. Therefore, the ability of CSR to mitigate the negative effects of corruption suggests the importance of implementing CSR.

UNITED NATIONS POLICY AND ITS VIABILITY

Because their ability to influence many nations from the region and their sustainable development goals, the United Nations (UN) should initiate a policy in Latin America and the Caribbean to motivate the implementation of CSR to improve the environmental and socioeconomic issues. According to the UN's Sustainable Development Group, there are 33 Latin American and Caribbean nations that are members of the UN in 2023. In addition to those 33 nations, 14 independent Caribbean territories

are Associate Members of the Commission. Therefore, UN policy will be able to reach and influence almost 50 nations (a large majority) in the Latin American region. In addition to the UN's influence on Latin America and the Caribbean, the UN has several sustainability development goals that they are trying to achieve. Creating a policy that will allow Latin American and Caribbean firms to implement CSR will help to achieve several of those goals including "no poverty, good health and well-being, gender equality, clean water and sanitation, reduced inequalities, affordable and clean energy," and more (United Nations). Hence, the UN should adopt the proposed policy to influence several Latin American and Caribbean nations, and to work towards achieving their sustainability goals.

Due to the influence of the UN on the Latin American region, the UN should initiate a policy where local Latin American and Caribbean firms facilitate CSR training programs. Multinational companies should be encouraged to implement and improve the reporting of social initiatives in these regions because they provide a unique, global perspective of CSR to the foreign markets where they operate, as well as a more advanced infrastructure to perform and share their expertise with local organizations. On the other hand, local firms are more equipped to address regional needs because of their experience and integration into the region's community and culture, but have a weaker infrastructure, especially in the Latin American and Caribbean region (Sansores-Guerrero & Navarrete Marneou, 2024; Peinado-Vara, 2005). Therefore, multinational companies should aid the training programs of local companies to provide the most effective CSR training and practices to ensure successful CSR initiatives. This approach was successful in Colombia where the multinational firm, Union Fenosa, collaborated with local enterprises on a CSR initiative to "measure usage, collect payments, and provide customer and repair services" for safe and affordable electricity in the poorer communities of Colombia (Peinado-Vara, 2006).

Specifically, the CSR training programs need to include a holistic approach, which refers to the use of the region's history and cultural background to appeal to the employees receiving training. Jeet et al. (2020) found that using a holistic approach was effective in India and that corporate officials were motivated to use their resources in benefit of the public. The holistic approach will also help with the solution's viability because Hawes and Young (2019) found that the holistic method will allow employees to better understand the benefits of CSR beyond maximizing profitability. Peinado-Vara's (2005) research in Latin America and the Caribbean found evidence through market research of local communities for a need to address the challenges these nations are facing in a holistic

way. The deeper understanding of the practices and benefits of CSR will motivate corporate officials to implement CSR by acknowledging how CSR can benefit the company, diverse ways CSR can be implemented, and the ways that the lack of CSR affects the communities where they operate. Specifically, it may motivate corporate officials to integrate CSR into their organizations and reduce greenwashing and impression management. Due to the training from the proposed UN policy, corporate officials will become more likely to implement CSR in their organizations.

In addition to the use of the holistic approach, the practice of CSR should be standardized to ensure that the effective implementation of CSR is based on the importance of balancing shareholder and stakeholder interests. In India, Jeet et al. (2020) found that the CSR model that has allowed them to improve their adoption of CSR practices significantly is the combination of the ethical and statist model. The ethical model invites the idea of an interconnected relationship between the business world and society while the statist model includes government support of corporate philosophy and a clear definition of CSR in management principles and labor regulations. These models suggest an appropriate balance between shareholder and stakeholder interests by putting an emphasis on the relationship between the business and society. Notably, the statist model also provides governmental support for CSR by clearly defining the term and its practices in management and legislation. The standardized use of the combination of the statist and ethical model may minimize the confusion that corporate officials face when implementing CSR, making it easier to practice.

Furthermore, the positive impact of education in the implementation of CSR suggests that CSR training is a viable solution. Shah (2011) found that multinationals who educate the local staff of the foreign nation where they operate on environmental sustainability positively affected the attitudes of the local staff towards the topic. This suggests that education can motivate and/or improve the attitudes of employees towards CSR. With improved attitudes and perceptions, the likelihood of the implementation of CSR increases. Additionally, The National Report of Curacao (2014), a report from Curacao's national government, stated that CSR education and sustainability development was needed at all levels of education as well as training programs and continuous environmental governance. This suggests that the nations' governments recognize the need for training in CSR and would be receptive to a policy initiating the facilitation of CSR training in their nations' companies. Thus, the positive correlation between education and the implementation of CSR as well as the recognized need for CSR training suggests viability of the proposed UN policy.

Moreover, CSR training may improve corporate officials' perceptions that CSR minimizes the overall profitability of the company. Hawes and Young (2019) found that managers in Chinese corporations did not want to adopt environmentally cleaner production practices because there was an absence of economic incentive, and they feared that implementing CSR would negatively affect their overall profitability. The research suggests that corporate officials believe that CSR will negatively affect the company financially, thus suggesting that financial incentive are needed to compensate for CSR's negative effects on profitability.

However, Shah (2011) and Peinado-Vara (2005) found that investing in CSR practices and initiatives can financially benefit the company. Shah (2011) found that a large Jamaican hotel made about 190% return on their investment only in the first two years after implementing an environment management system. Additionally, Peinado-Vara (2005) found that Union Fenosa, a company who entered the Colombian energy market, increased their revenues by 60% (\$2.91 million) by providing safe, legal, and affordable access to electricity to the poorer communities—a market that wasn't considered profitable—after the company found that almost 2 million people had illegal access to their electricity. The research suggests that corporate social responsibility does not negatively affect a company's profitability and that it can financially benefit the company. The knowledge that companies have high return on investment when adopting CSR practices can act as the financial incentive that corporate officials are seeking. Through CSR training, corporate officials will become more aware of the benefits of CSR, including its ability to improve the financial performance of the company, motivating them to integrate CSR practices.

CONCLUSION

In addition to fixing the negative perceptions of it, the implementation of CSR can also improve several environmental and socioeconomic issues in Latin America and the Caribbean. Practicing CSR can mitigate the negative effects of climate change, corruption, poverty, and income inequality. In response to this evidence, the UN should initiate a policy where multinational and local firms in these regions facilitate CSR training programs. Multinational and local organizations should both be encouraged to improve their CSR implementation and collaborate to address the cultural and regional needs of these communities. The CSR training would improve the negative perceptions that corporate officials have of CSR and motivate them to implement sustainability practices. The increased implementation of CSR will help to improve the effects of climate change, reduce income inequality, reinforce social trust between legal

institutions and the people, and improve the standard of living of lower income communities. These improvements can be achieved by CSR through its practices such as green production, providing stable job opportunities, making products more affordable, collaborating with central and local authorities to improve the legal frameworks for certain industries and more.

Future research could suggest how the UN could become aware of the proposed solution and how specific industries in Latin America and the Caribbean can benefit from the implementation of CSR. Additional research could reveal the applicability of the solution in other regions. Without the effective integration of CSR into Latin American and Caribbean companies, climate and

weather-related events will continue to increase in frequency and intensity, mortality rates of the climate and weather-related events will grow, work environments can be un motivating and inefficient, and levels of undernourished people will increase in these regions.

REFERENCES

- Amodu, N. (2017). Regulation and enforcement of corporate social responsibility in corporate Nigeria. *Journal of African Law*. 61 (1), 105-130. <https://doi.org/10.1017/S0021855317000018>
- Aqualectra (2012). *Consolidated Annual Report 2012*. www.aqualectra.com/wp-content/uploads/2019/05/Aqualectra_Annual_Report_2012.pdf. Accessed 3 Nov. 2023.
- Baughn, C.C., Bodie, N.L. & J.C. McIntosh (2007). Corporate social and environmental responsibility in Asian countries and other geographical regions. *Corporate Social Responsibility and Environmental Management*. 14(4):189-205. <https://doi.org/10.1002/csr.160>.
- Branco, M. C. & Rodriguez, L. L. (2007). Positioning stakeholder theory within the debate on corporate social responsibility. *Electronic Journal of Business Ethics and Organization Studies*. 12 (1), 5-15. https://www.researchgate.net/publication/228703111_Positioning_stakeholder_theory_within_the_debate_on_corporate_social_responsibility
- United Nations. (n.d.). Greenwashing – the deceptive tactics behind environmental claims. United Nations. <https://www.un.org/en/climatechange/science/climate-issues/greenwashing>
- Hawes, C. & Young, A. (2019). The Dao of CSR: Towards a holistic Chinese theory of corporate social responsibility. *European Journal of East Asian Studies*. 18, 165-204. <https://doi.org/10.1163/15700615-01802003>
- Intergovernmental Panel on Climate Change (2023). Climate Change 2023. AR6 Synthesis Report. <https://www.ipcc.ch/report/ar6/syr/>.
- Jeet, V., Aspal, P. K., & Nazneen, A. (2020). Study of models of corporate social responsibility and sustainable development. *International Journal of Technology Management and Sustainable Development*. 19(3), 317-334. https://doi.org/10.1386/tmsd_00029_1
- Lashgari, M. (2004). Corporate governance: Theory and practice. *The Journal of American Academy of Business*. 5 (1/2), 46-51. https://www.researchgate.net/publication/265988857_Corporate_Governance_Theory_and_Practice
- Ministry of Health, Environment and Nature, the Office of Foreign Relations, and other Contributors (2014). National Report Sustainable Development Curacao. 1-27. [https://sustainabledevelopment.un.org/content/documents/1114599National%20Report%20Curacao%202014%20Sustainable%20Development%20FINAL%20\(July%202014\).pdf](https://sustainabledevelopment.un.org/content/documents/1114599National%20Report%20Curacao%202014%20Sustainable%20Development%20FINAL%20(July%202014).pdf).
- Peinado-Vara, E. (2006). Corporate Social Responsibility in Latin America. *The Journal of Corporate Citizenship*. 21, 61–69. <http://www.jstor.org/stable/jcorpcti.21.61>
- Poverty rate. (n.d.). *World Bank*. <https://www.worldbank.org/en/topic/poverty/lac-equity-lab1/poverty/head-count>
- Ramasamy, B. & H.W. Ting (2004). A comparative analysis of corporate social responsibility awareness. *Journal of Corporate Citizenship*. 13 (13).
- Rathnasiri, H. (2003). Corporate social responsibility practices of Sri Lankan private sector: An exploratory study. *Sri Lanka Journal of Management*. 8(3-4):95-228.
- Sansores-Guerrero, E., & Navarrete-Marneou, E. (2024). Corporate social responsibility in Latin America: Trends and challengers. *IntechOpen*. doi: 10.5772/intechopen.1005131
- Schneider, M. L. (2023). How to stop the increasingly authoritarian slide in Latin America. *Center for Strategic and International Studies*. <https://www.csis.org/analysis/how-stop-increasingly-authoritarian-slide-latin-america>
- Shah, K., U. (2011). Strategic organizational drivers of corporate environmental responsibility in the Caribbean hotel industry. *Policy Science*. 44, 321-344. DOI 10.007/s11077-011-9130-x
- Thanetsunthorn, N. (2022). Corruption and social trust: The role of corporate social responsibility. *Business Ethics, Environment & Responsibility*. 31, 49-79. <https://doi.org/10.1111/beer.12380>
- The World Factbook - The World Factbook*. (n.d.). <https://www.cia.gov/the-world-factbook/>
- Torres-Baumgarten, G., & Yucepete, V. (2009). Multinational firms' leadership role in corporate social responsibility in Latin America. *Journal of Business Ethics*. 85 (1), 217-224. <https://jstor.org/stable/40294834>.
- Pring, C. (2017). Transparency International: the global coalition against corruption. (n.d.). People and corruption: Latin America and the Caribbean. https://images.transparencycdn.org/images/2017_GCB_AME_EN.pdf
- United Nations. (n.d.). UNSDG|UN in action – RCP: Latin America and the Caribbean. *United Nations*. <https://unsdg.un.org/un-in-action/rcp-latin-america-and-caribbean?tab=countries-listing>
- United Nations. (n.d.-a). The 17 goals |sustainable development. *United Nations*. <https://sdgs.un.org/goals>
- World Meteorological Organization (WMO). (2023). State of the Climate in Latin America and the Caribbean. (1322). *WMO*. <https://library.wmo.int/idurl/4/66252>.

ACKNOWLEDGMENTS

The author thanks Professor Lauren Hill for her mentorship and for her assistance in developing this research paper. The author additionally thanks Professor Lauren Hill, Dr. Andrew Martino and Dr. Viktoria Basham for their support in presenting this paper at the 2023 Northeast Regional Honors Conference.

Vigilant

Makayla Bounds

FACULTY MENTOR: Professor Jinchul Kim

ABSTRACT

"Vigilant" is an oil on canvas painting measuring 40" x 30" that illustrates the true strength of youth.

The figure in "Vigilant" glares at the viewer. They are not in a position of comfort or trust. They turn away and stare at the viewer with a palpable sense of disdain, which reflects the emotional struggle they are experiencing.

The subject of the piece is the artist's sister, who was around the age of thirteen when the reference photo was taken. Currently, she is fifteen with the same attitude. The incorporation of the glare is intentional, anyone who has a relative at this age has seen this look. A look of annoyance.

Adolescence is hard. Combating hormones with social pressures and familial difficulties, life can feel overwhelming. When one is a child, solutions are provided by the guardian, burdens are shared, and things feel simple. When one is an adult, one is meant to bear one's own burdens and find one's own solutions, and nothing is entirely peaceful. Being a teenager can feel like a bridge between the two, allowing anxiety and fear to take root. A common issue is the dismissal of very serious issues by adults. The artist's sister personally struggles with depression which was frequently downplayed due to her age. The piece captures the moment when one starts making decisions for themselves for their own self-preservation.

Much of the painting has a predominant deep purple tone, intended to display darker aspects of life, such as stresses, difficulties, and other negative emotions. Young people generally struggle a great deal with their feelings as they navigate the complexities of their own development and rationality. When faced with adversity, an individual will typically do one of two things: succumb to their hardships or put up their guard. The purple envelops the figure, symbolizing the gradual corruption of the spirit.

This dark tone is broken by bright, vividly colored windows of space, representing the happier aspects of life. They juxtapose the



darkness, turning the background into a twisted checkerboard of living.

The presence of plant life is also depicted within the piece and can be interpreted as a symbol of the choice to grow and keep pursuing life despite its hardships. The deep green color signifies the vitality and strength of the figure.

The term "vigilant" refers to keeping a watchful eye for any possible dangers or difficulties. The piece is titled "Vigilant" to understand and explain the emotional response that some may have to developmental hardships.

The work should heighten the viewer's awareness of struggles that affect the current youth, in addition, displaying the strength they still contain.

ACKNOWLEDGMENTS

The author thanks Jinchul Kim for his help in reviewing and enhancing this paper. His help and attention have been a consistent source of support for the author and their creative journey.

Folklore of the Fallen Woman: Private Storytelling in Victorian Dramatic Poetry

Sophie Detorie

FACULTY MENTOR: Dr. Viktoria Basham

ABSTRACT

Dramatic poetry published by Victorian women is an underappreciated and understudied example of how women have always adapted and defined their own unique forms of art and have been overlooked as artists and scholars that contributed to the development of literary and storytelling techniques. The goal of this essay is not only to establish that Victorian dramatic poetry was a uniquely feminine genre, but also explore why the style of dramatic poetry that defined it as a distinctly feminine genre of poetry was an extension of Victorian women developing their own private methods of telling stories. This paper compares techniques commonly used in female-authored dramatic poetry and women's folklore that scholars (Jordan & de Caro, 1986; Hillard, 2014; Radner & Lanser, 1987; Sackett, 1964) have identified as being similar. The most notable similarities are the use of metaphors, separation of speaker from subject, and that the message of dramatic poetry and women's folklore are often direct responses to societal treatment of women, manifesting in the 'fallen women' figure. Although women have been historically stripped of their voices by male dominated literary and arts cultures, they created their own methods of private storytelling; one example of which is Victorian dramatic poetry. The unique folklore surrounding Victorian women's work permeates through literary history more than scholars have explored thus far.

Keywords: Dramatic Monologue, Dramatic Poetry, Fallen Woman, Folklore, Victorian Women, Women's Folklore

FOLKLORE OF THE FALLEN WOMAN: PRIVATE STORYTELLING IN VICTORIAN DRAMATIC POETRY

Victorian dramatic poetry written by women is an overlooked example of how women have adapted and defined their own unique forms of storytelling. Consequently, they often have been overlooked as artists and scholars who contributed to the development of literary and storytelling techniques. Scholars (Jordan & de Caro, 1986; Hillard 2014; Radner & Lanser, 1987; Sackett, 1964) have often pointed to the similarities between female-authored poetry and folklore in order to understand the methodology and development behind private meanings of both. Victorian poets often referenced folklore in their metaphors or imagery, and most dramatic poetry had narrative similarities to folktales (Radner & Lanser, 1987), as folktales were becoming popularized at the same time women were becoming more prominent poets and authors. Ellis (2002) elaborated on this synchronization by claiming "A fascination with myth and legend was, of course, one of the defining features of Victorian poetics" (p. 388). Though fascination and reference to folklore was common in Victorian era literature, female-authored dramatic poetry in particular has the most in common with folklore because female Victorian poets adapted poetry to be their own private way of storytelling with similar methods to how women created their own versions of folklore. In addition, studying the similarities between female authored poetry and female folklore traditions can provide a deeper understanding regarding how women

have maintained their own private methods of storytelling and how they contributed heavily to the development of storytelling genres, which has been largely ignored by scholars who have studied folklore and literature. Dramatic poetry was a method of storytelling used by Victorian women because it gave them a level of privacy needed to express themselves in a public literary world.

VICTORIAN WOMEN'S CLAIM ON THE DRAMATIC MONOLOGUE

The genre of dramatic poetry, also known as the dramatic monologue, is defined by Morgan (2020) as "any work that is spoken by a single character who is not the poet and in which the revelation of character is an important rhetorical goal, if not always the primary one" (p. 202). Dramatic poetry typically utilizes the identities of the narrator and audience that are separate from the poet to build a narrative. Poetry written this way is often about one or multiple characters going through an inner struggle or conflict, and usually focuses on the topic of identity. The identity that gets developed relies less on relationships between characters and more on the identities of the narrator, subject, and audience (Mermin, 1995, p. 151). This genre places the struggle of the subject into a private setting between subject and audience (Brown, 1995, p. 89), which almost completely cuts out the author. The dramatic monologue is a very uniquely Victorian form of poetry and draws attention to the differences of speaker and subject (Mermin, 1995, p. 151). This separation provided the female poet with an ambiguity that allowed her to

express her mind behind the metaphorical curtain created by the dramatic monologue structure. The ambiguous nature of dramatic poetry makes it a private method of expression that takes place in the minds of the audience, not in a public sphere that potentially places the female poet at risk of a social scandal (Brown, 1995, p. 89).

The separation between a poem's message and its author was crucial because women have historically been constricted on what they could and could not say due to societal expectations (Radner & Lanser, 1987, p. 413), especially in the Victorian age. Even as women were becoming more prominent published authors, they were limited in what they were allowed to write. Subjects had to be socially acceptable for a female poet to address. Most female poets "suffered galling constraints on their freedom to move beyond domestic seclusion" (Mermin, 1995, p. 149). Domestic life was the standard expectation of middle-class women, so if a female author wanted to be published, any work she wrote had to be deemed socially acceptable and conform to Victorian standards and views of women. It is important to establish that this constraint applies primarily to middle and upper class educated white women because they are the demographic that had the time and resources to write or publish. The dramatic poetry style allowed Victorian women to present themselves as two-sided, split between a desire to write and the actions expected of them to live domestic lives (Brown, 1995, p. 104). Because of these limits and restrictions, female poets had to appeal to gendered expectations whilst still expressing themselves within their work.

Women could not always express messages directly because it was not safe for them to do so (Radner & Lanser, 1987, p. 413). The dramatic monologue allowed them to express themselves secretly because it “dramatized female speakers, not female poets in anything that might be mistaken for their own voices” (Mermin, 1995, p. 151). In other words, because of the separation of author from subject, which the style of dramatic poetry is known for, poets could create distance between themselves and their work, should the subject of the poem be deemed inappropriate by Victorian society. Upper class women of the time were expected to stay home and have children while their husbands went out, worked, and socialized. The Victorian age is defined by a resurgence in very strict Anglo-Christian values, which included the social taboo of women discussing certain topics such as sexuality, equality, and sociopolitical issues. An example of such would be poet Christina Rossetti’s brother discouraging her from publishing her poem *Under the Rose*, which was about an unwed mother and her child, because he deemed that subject to be unsuitable for a woman to address (Leighton, 1989, p. 115). Female poets had to write as disconnected from the non-socially accepted subject as possible, hence the adoption of dramatic monologues that separated the author from speaker. Leighton (1989) explained that to a Victorian audience, “Moral contamination, contrary to all the facts, is transmitted only from woman to woman, even when one of them is an imaginary creation” (p. 115). Men did not face the same level of contamination of character if they wrote on taboo subjects that women did. Even when writing fiction, an expressed message could reflect negatively on the female poet, damaging her reputation and credibility.

Female poets lived quite different experiences than male poets of the time, causing women to develop different writing styles than their male counterparts (Gardiner, 1981, p. 348). Female identity is not as stationary as male identity; it constantly changes and shifts (p. 353), while the nature of identity itself is “neither unified nor static” (Brown, 1995, p. 105). This makes the “richness and flexibility of the dramatic monologue” (Morgan, 2020, p. 205) an ideal medium for female expression because women could adapt the style to fit their own agendas. Mermin (1995) claimed that the dramatic monologue was a way for Victorian poets to “counter and control the poetic objectification of women” (p. 151) in a male dominated world. Women were so often the object of poetry that writing them as a subject instead was revolutionary. Some scholars argue that

dramatic poetry should not be deemed a female dominated genre because prominent male poets such as Robert Browning and Alfred Tennyson wrote in the same style and had just as much of an impact on its development (Mermin, 1995, p. 149). While it may be true that male poets were also impacted by writing constraints brought on by the rigid gender division of Victorian society (Mermin, 1995, p. 149), they had different experiences and social expectations than women, and as a result, their poetry was not as secretive. Even though men and women both wrote dramatic poetry, women needed the ability to camouflage behind the ambiguity that dramatic poetry provided out of a need for survival in the literary world – men did not. In addition, dramatic poetry was a way for women to communicate with a female audience in such a way that a male audience would not wholly understand, which gave the genre a female uniqueness.

Victorian female poets embraced dramatic poetry as an ideal method to represent the female experience through their work (Brown, 1995, p. 102). Not only were female writers writing about themselves, but they were also writing about and for other women. Mermin (1995) claimed that female poets placed themselves “in a poetic tradition in which women write to one another instead of being written about by men: a world ... in which identities keep threatening to merge” (p. 149). Because women were writing for other women, they identified and spoke about topics that only women could fully relate to. They also gave an unrepresented group a unified voice to speak about their oppression. According to Ellis (2002), poet Eliza Keary’s collection of poems titled *Little Seal Skin and Other Poems*, published in 1874, had a female audience in mind because her work centered on the struggle of women and identified with speakers who had no voice to speak for themselves (p. 389). Additionally, because of the double-sided narrative that a dramatic monologue has, the reader is forced to analyze the relationship between the author and speaker, leading different audiences to draw different conclusions (Morgan, 2020, p. 205). This further suggests that women were writing a certain way to incorporate private themes that could be understood by other women. Victorian female poets reinvented and adapted this genre of poetry to better represent the struggles experienced by themselves alongside a female audience.

COMMONALITIES BETWEEN FOLKLORE AND DRAMATIC POETRY

Women also adapted other artforms, such as folklore, to tell their own stories. The adaption of folklore by women most closely resembles

the adaptation of the dramatic monologue as there are many similarities between women’s folklore and Victorian women’s dramatic poetry. Jordan and de Caro (1986) established that just as oral folklore has been adapted and changed by different cultures, time periods, and societal needs, women also adapted folklore for themselves out of a need to project a female perspective into the world that was not through the eyes of men (p. 502). Poetry itself is not a female-dominated artform, just as the broad scope of folklore itself is not a female-dominated artform, but women have taken storytelling methods from both and adapted them slightly. Female folklorists who told oral tales had different motivation for telling them than their male counterparts did; therefore, their performance and use of tales differed (Jordan & de Caro, 1986, p. 502).

Within a female narrative, there are often concealed messages that men would not readily understand, written by women for the purposes of communicating to other women (Radner & Lanser, 1987, p. 412). Indirect messages in women’s stories then would be understood by the female audience because women could read between the lines and draw different conclusions than a male audience (Morgan, 2020, p. 205). Gardiner (1981) explained that “Many women writers feel that women remember what men chose to forget” (p. 358), which suggests then that if a female artist, be it poet or folklorist, has created a story about something only a woman would experience, then men would fail to understand the true meaning of that work. Radner and Lanser (1987) established that “in the creations and performances of women ... one can often find covert expressions of ideas, beliefs, experiences, feelings and attitudes that the dominant culture... would find disturbing or threatening” (p. 100). This observation lends itself to the theory that women have often had private or unique versions of their culture’s stories that were only understandable by other women, with Victorian dramatic poetry being one prime example of this private world of female storytelling. Female folklore also differed from male folklore because it took place in a private setting, as female storytelling often did (Jordan & de Caro, 1986, p. 509).

Ambiguity of voice is another key similarity between poetry and folklore (Sackett, 1964, p. 304), and ambiguity has been established as a characteristic of dramatic poetry that benefited female poets due to the anonymity it provided them. Radner and Lanser (1987) established that a frequent use of metaphor is one point of similarity between folklore and poetry which “may create both distance and

ambiguity" (p. 419). Hillard (2014) claimed that folklore possesses an anonymous feminine voice – anonymity that is refined in the dramatic monologue (p. 165). Not only were female poets taking inspiration from folklore, but they were also incorporating similar methods of storytelling to female folklorists that gave their work a unique feminine voice. Radner and Lanser (1987) refer to these methods as "coding" and define it as "the adoption of a system of signals- words, forms, signifiers, of some kind- that protect the creator from the dangerous consequences of directly stating particular messages" (p. 100). Dramatic poetry allowed female poets to address certain topics that had been deemed socially inappropriate for them to write about. Brown (1995) stated "unlike prominent men poets, numerous nineteenth century women poets took contemporary social situations and issues for their subjects, frequently focusing on female protagonists and the position of women" (p. 91). Furthermore, Jordan and de Caro (1986) established that the image of women in folklore stories created by women within a given society is often a response to that society's position of women (p. 502). One common topic in dramatic poetry is the expectations of women in Victorian society and female identities that collide because women are more complicated than society at the time allowed them to be. Poets like Christina Rossetti and Augusta Webster explored a dual sided female identity in several of their works, often using female subjects to do so.

"FALLEN WOMEN" AND FOLKLORE WITHIN DRAMATIC POETRY

It would be irresponsible to write a paper about Victorian dramatic poetry without addressing the fallen woman figure due to its reoccurrence as a theme throughout the genre. The trope of a fallen woman emerged in the Victorian age in reference to prostitution but grew to represent any woman who was deemed morally corrupt by Victorian society's standards (Leighton, 1989, p. 110). According to Leighton (1989) "To fall, for a woman, is simply to fall short," and any woman was susceptible to moral failing because "for the Victorians the fallen woman is a type which ranges from the successful courtesan to the passionate adulteress, from the destitute streetwalker to the seduced innocent, from the unscrupulous procuress to the raped child" (p. 111). This was a common theme found in dramatic poetry, as becoming a fallen woman was almost as much of an expectation for Victorian women as becoming a wife was because of the incredibly strict social expectations of the era. As Leighton explained, it was very easy for a Victorian woman

to 'fall' due to a wide range of possible social sins that included being a sex worker, rape victim, or even just a woman in love. While the fallen woman was a topic that would not have been inappropriate for women to discuss, presenting women in a way that did not adhere to Victorian ideals was not acceptable – unless that woman was suffering or being compared to another woman that did uphold the Victorian expectations of domesticity and purity. Leighton (1989) explained that "Most of the fallen women who play any prominent role in nineteenth century literature are only variations on the real theme" (p. 122). While a protest of the fallen woman was a key element of many dramatic poems, the real theme is a battle between societal expectations placed upon Victorian women and their efforts at meeting them.

Victorian literature was obsessed with the idea of two conflicting sides; one pure and good, the other tainted and evil. This theme can be spotted in famous Victorian works such as *Dr. Jekyll and Mr. Hyde* or *A Picture of Dorian Gray* – but the subject of double-sided identities applies best to the work of female poets trying to represent a complicated and torn self. Leighton (1989) wrote "The very nature of womanhood is split by a mirror stage, mandated by man's law" (p. 123). Gendered expectations in the Victorian age were suffocating, and if women became published poets, they often had to bend somewhat to the expectations that women would not write about inappropriate topics to be taken seriously, hence the adoption of a subject separate from themselves in their poetry. Thus, a common theme found in dramatic poetry written by women is a struggle between expectation and desire; the expected self versus the true self. Gardiner (1981) asserted that "Because of the continual crossing of self and the other, women's writing may blur the public and private and defy completion" (p. 355). This is where the fallen woman appears, serving as an amalgamation of every morally wrong thing a woman could do or desire, she represents the secret, morally corrupt side of womanhood. She is the mythical being of Victorian women's poetry – a figurehead for female poets to hide behind whilst they privately protested the very society that created her. Born out of an economic need to turn to sex work, abuse, or any deviation from a pure, pious wife and mother, a fallen woman was created when any woman broke social norms, intentionally or not. As Leighton (1989) stated, the focus on a fallen woman was often just a diversion from the real subject (p. 122). Often in works that feature a fallen woman, she is accompanied by another woman or figure that is uncorrupted and pure; this other character typically serves as

the reflection of the fallen woman to highlight her moral failing in the eyes of Victorian society. There are two poets whose work exemplifies the private, folkloric world of female dramatic poetry – Augusta Webster and Christina Rossetti.

Augusta Webster was prominent dramatic poet and associate of Christina Rossetti who wrote dramatic monologues that featured a fallen woman by separating herself from the body of her work. One of Webster's poems published in 1870 titled *The Castaway* is clearly about prostitution – it is a monologue directly from the mouth of a fictional fallen woman who is reflecting on her life and the society that shaped it (Leighton, 1989, p. 121). As a result of the ambiguous nature of dramatic poetry, the line between the two opposing identities of pure and fallen becomes unclear and the poem is submerged into a private sphere of fiction, one that allowed Webster to speak about men's role in the perpetuation of prostitution. This established the idea that women could be victims of an oppressive society. Another one of Webster's poems, titled *A Woman Sold*, also addresses fallen womanhood and "works to deny the notion of female essence or of an opposition between 'pure' and 'fallen' 'natures'" (Brown, 1995, p. 97). Though the fallen woman is at the center of this poem, the real theme explores how Victorian expectations and ideals of purity perfection suffocated women. Any perceived flaw could brand them as 'fallen' women and ruin their reputations. Webster established, though, that women are dual-sided and do not fit into such broad characterizations as "pure" or "fallen" (Brown, 1995, p. 97).

Christina Rossetti was another poet whose work featured themes of folklore and fallen women. Hillard (2014) claimed that Rossetti's poem *Goblin Market* written in 1859 "seeks to reinstate the fairytale as the artisan produce of female storytelling, by writing a poem mindful of antecedents, both poetic and folkloric" (p. 154). In the poem, fruit is offered to two sisters by goblinlike creatures. After one sister indulges the goblins by accepting the fruit, she is unable to return home, which Hillard (2014) noted as mirroring characters becoming trapped in a magical land in folktales after accepting food from magical creatures (p. 158). By using folkloric elements, Rossetti reinforced her poem's credibility and pushed her work further into a fictional realm. This allowed her to separate herself from her work, which as previously discussed, is a key element of dramatic poetry. Ellis (2002) wrote "Myth can also offer the sort of ambiguity of meaning with which *Goblin Market* abounds and is therefore a relatively safe material to use for addressing transgressive

topics" (p. 397). One of the topics addressed in *Goblin Market* is that women are often led into moral failing by men, yet the full blame for the moral failure falls on the shoulders of the woman who did not know better. Rossetti could not clearly state that message because of the potential stain on her reputation, but the sexual inuendoes underneath a blanket of folkloric imagery within *Goblin Market* paint a picture of a woman led to temptation by deceitful men; not the other way around. Laura, the sister that accepts the fruit, becomes a fallen woman because of offerings given to her by male goblins. Her sister Lizzie, who did not accept any fruit, serves as her literary opposite, the pure and uncorrupted half that saves Laura from fully falling in the end. Rossetti paints *Goblin Market* as a narrative of sisterhood, a story in which women save each other from moral failure, while also emphasizing that Laura is a victim of the male goblins because her descent into fallen womanhood only begins once she sees the fruit the goblins offer her – not after she accepts it (Hillard, 2014, p. 156). This is another example of dramatic poetry mirroring female folklore, as Jordan and de Caro (1986) established that presenting women as victims was a unique characteristic that separated it from men's folklore (p. 511). Dramatic poetry served a sort of

folklore for Victorian women, as it was a unique method of storytelling that focused on themes that primarily women would understand.

CONCLUSION

Folklore and female-authored dramatic poetry share many points of similarity that have been underrepresented in research. By studying the similarities between female authored poetry and female folklore traditions, scholars can find a deeper appreciation regarding the importance of how women have maintained their own private methods of storytelling, along with their contributions to the development of storytelling genres. Women have been ignored as artists and scholars that contributed to the development of artforms, literature, and folklore. Just as any study of Victorian poetry would be incomplete without praising the work of women, the study of folklore is equally as incomplete without acknowledging the adaptations made by women. The resilience and perseverance of women sharing their own stories has been ignored and overlooked for too long, therefore more research still needs to be conducted into the development of female folklore. Jordan and de Caro (1986) explained that when two versions of a folktale are available, scholars have historically chosen the male version to conduct research on (p. 501).

This claim supports that women have consistently been denied the acknowledgment they deserve within the field of folklore studies.

Additionally, studying the similarities between female authored poetry and female folklore traditions can provide a deeper understanding regarding how women have historically maintained their own private methods of storytelling. Folklore gave women a medium with which to create their own stories, just as dramatic poetry written by Victorian woman may be able to "identify those who have no language through which to express their oppression; they explore the means by which this denial of voice is achieved, by whom and for what purposes; and they also suggest how myth may enable the voiceless to speak about their lives" (Ellis, 2002, p. 389). Conducting more research into female artforms begins with acknowledging that women have consistently refused to be fully voiceless, and that they have impacted the development of art and literature from behind the scenes for as long as humans have told stories. Though their contributions may often have been private, women have woven their own unique voices into the pages of literary and folk history whilst demanding they be heard; even if it is just by one another.

REFERENCES

- Brown, S. (1995). Determined heroines: George Eliot, Augusta Webster and closet drama by Victorian women. *Victorian Poetry*, 33(1), 89. <https://www.jstor.org/stable/40002522>
- Ellis, P. (2002). Radical myths: Eliza Keary's Little Seal-skin and other poems (1874). *Victorian Poetry*, 40(4), 387. <https://www.jstor.org/stable/40002352>
- Gardiner, J. K. (1981). On female identity and writing by women. *Critical Inquiry*, 8(2), 347-361. <http://www.jstor.org/stable/1343167>
- Hillard, M. (2014). *Spellbound: The fairytale and the Victorians*. The Ohio State University Press.
- Jordan, R. A., & de Caro, F. A. (1986). Women and the study of folklore. *Signs*, 11(3), 500-518. <http://www.jstor.org/stable/3174007>
- Leighton, A. (1989). "Because men made the laws": The fallen woman and the woman poet. *Victorian Poetry*, 27(2), 109-127. <http://www.jstor.org/stable/40002337>
- Mermin, D. (1995). 'The fruitful feud of hers and his': Sameness, difference, and gender in Victorian poetry. *Victorian Poetry*, 33(1), 149. <https://www.jstor.org/stable/40002526>
- Morgan, M. R. (2020). The angry woman's case against the mask lyric: Or redefining the dramatic monologue. *Victorian Studies*, 62(2), 201-207. <https://doi.org/10.2979/victorianstudies>
- Radner, J. N., & Lanser, S. S. (1987). The feminist voice: Strategies of coding in folklore and literature. *The Journal of American Folklore*, 100(398), 412-425. <https://www.jstor.org/stable/540901>
- Sackett, S. J. (1964). Poetry and folklore: Some points of affinity. *The Journal of American Folklore*, 77(304), 143-153. <https://www.jstor.org/stable/537563>

ACKNOWLEDGMENTS

The author thanks Dr. Viktoria Basham for all her encouragement while writing and revising this paper. This work would not exist without her continued support, in addition to support from the author's roommate Katie Guevara, a Writing Center tutor who spent countless hours revising this work with her.

Secrets of the Squirrels in the Sky: How the Moon Shapes Flying Squirrels' Behavior

Ashley Gernert

FACULTY MENTOR: Dr. Angela Freeman

ABSTRACT

Moonlight illumination changes the activity of nocturnal species by affecting predation, foraging, and communication habits. The southern flying squirrel, *Glaucomys volans*, is a small, nocturnal, arboreal species, and therefore, we predicted they would change their activity levels on nights with more moonlight illumination. Activity of flying squirrels was assessed by placing 160 baited traps at four different sites in the Pocomoke State Forest in Salisbury, Maryland, from 2022 to 2023 over 83 trapping nights. The number of flying squirrels captured was noted each day in the field to account for activity. Moonlight illumination data was collected at a later date from a U.S. Navy website. Although it has been found that small prey species are less active during full moons, flying squirrels were not more active on nights with less moonlight illumination compared to nights with high moonlight illumination. It is possible that flying squirrels' activity stays constant even amidst changes in moonlight illumination due to the need to find food and communicate as well as having sufficient places to hide from predators. The data support that flying squirrels' behavior is unaffected by moonlight variance.

INTRODUCTION

Decisions on priorities are an important part of the animal world that leads to species survival.

In nature, animals experience situations where they must decide what to prioritize at that moment. These tradeoffs often determine the fate and fitness of the animal and can include both known and unknown variables for the animal. For instance, animals often must choose between going to an area they extensively use for finding food or traveling to a new area where the presence and quantity of food is unknown (Fridell & Litvaitis, 1991). More often than not, finding and keeping energy is seen as one of the most important priorities because it allows the animals to move, mate, and continue to find food. Additional priorities include caring for offspring and communicating with other individuals to aid in survival. Next, resources like food and shelter often determine where an animal lives or how far it moves. However, predation risk can sway some of the decisions made by prey species. For instance, predation risk can lead to smaller animals hiding and being less active during certain times when predators are most active (Clarke, 1983). Moonlight might change the decision making of animals because predators are more active and can see more with the increased light (Clarke, 1983), but moonlight might also make some resources more visible to the prey species (Perea et al., 2011). These decisions are also dependent on an animal's life stage: If the animal is on its own for the first time, it may be looking for shelter and food; if it is mating season, the animal may be looking for a partner and then a place to build its nest or burrow; and if the animal has offspring, it might prioritize looking for food.

Observations of an animal's behaviors in its natural habitat are hard to achieve, and

this is exacerbated when the animal is small, nocturnal, and arboreal such as the southern flying squirrel, *Glaucomys volans*. The flying squirrels are small mammals weighing "50-150 grams" (Kohler et al., 2019). They often live in hardwoods like beeches, oaks, and hickory trees with an abundance of these squirrels living near dead trees (Cotton & Parker, 2000). These flying squirrels consume nuts from the trees around them and various insects (Meyer & Rush, 2024). It is known that they are predators to bird nests (Meyer & Rush, 2024). Meanwhile, their main predators include snakes, owls, foxes, and bobcats (Borgo et al., 2006; Rudolph et al., 2009).

The moonlight predation theory states small prey animals are less active on nights with high moonlight illumination as most predators are more active during this time due to the ease of detecting prey in light. For example, deer mice (*Peromyscus maniculatus*) explored areas fully under dim light but stayed close to shelter under full lights, while short-eared owls (*Asio flammeus*) not only increased hunting in high moonlight, but also their success rate increased (Clarke, 1983). Therefore, flying squirrels should in theory decrease their activity due to the increased moonlight in order to be safe from nocturnal predators. It has also been demonstrated that flying squirrels use olfactory senses to determine the presence of predators based off marked territory. More often than not, flying squirrels decide to spend nights in woodpecker roost boxes away from predator scents and markings (Borgo et al., 2006). However, even in these sheltered areas, flying squirrels are still preyed upon as rat snakes are a common predator to woodpecker roost boxes (Steele & Yi, 2020).

Flying squirrels have specific feeding strategies and behaviors that allow them to

be located close enough to a food source but have other options nearby. Their home ranges are centered around hardwood trees that often produce nuts, like hickory and oak trees. Females decide to reside near more dead trees while males reside in areas abundant with plenty of food sources. Home ranges are chosen not only for a location with adequate shelter, but also available food (Fridell & Litvaitis, 1991). The flying squirrels are able to use their memory of the environment around them to locate specific food sources and often retrieve the food to hoard around the area. However, they often do not share food hoards with other nestmates, so every individual needs to find food (Winterrowd, 2008). In different seasons, squirrels tend to consume and hoard different nuts based off the food sources available to them. In warmer months, acorns are eaten, and hickory nuts are saved for the colder months (Thomas & Weigl, 1998). The scatterer-hoarder method allows for a mutualistic relationship between the trees and the squirrels. The squirrels obtain food while the trees get to produce offspring by unused hoard stocks, seemingly making this an innate behavior that every flying squirrel utilizes (Steele & Yi, 2020).

Communal nesting is used by many unrelated flying squirrels especially during the colder months and breeding seasons. Grouping together allows for the flying squirrels to keep warm all winter long and then have the possibility of breeding to create offspring that will live within the nest for some time after birth. Communal nesting among flying squirrels tends to peak during breeding seasons, like March to April and August to September (Reynolds et al., 2009). The males often leave after these breeding seasons (Layne & Raymond, 1994). Communal nests allow for some safety from

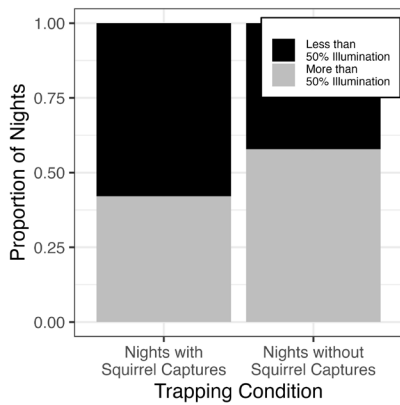


Figure 1: Trapping Nights With and Without Capture at Differing Levels of Moonlight Illumination

Note. Moonlight illumination levels are split between greater than 50% and less than 50% illumination.

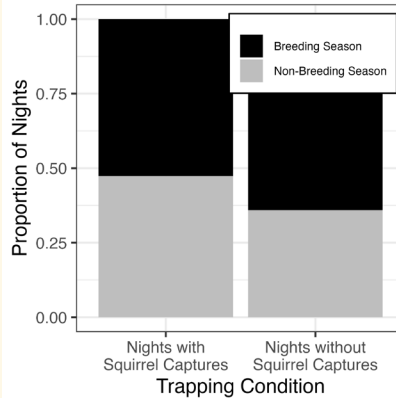


Figure 2: Trapping Nights With and Without Capture in Breeding and Non-Breeding Seasons

Note. Squirrels caught on nights in breeding and non-breeding seasons. Both seasons are included.

predators as more individuals can be alert, and plenty of potential mates increase the chances of producing the fittest offspring.

We set to test our hypothesis that flying squirrels change their activity in cohort with the changing moonlight. We further hypothesized that if squirrels change their activity, they are more active at specific times of year. Therefore, the aim of this study is to determine whether flying squirrel activity changes at different lunar illuminations by measuring the number of squirrels captured in traps and the associated moon illumination.

METHODS

ANIMAL AND EQUIPMENT

All work with animals was approved by the Salisbury University IACUC (162), and permits from the Department of Natural Resources were obtained for access to state forest lands and trapping activities. Grids of 40 spots, 8x5 m each, 10 m apart, were made in various forest locations in Salisbury, Maryland, and a part of the Pocomoke State Forest. Sherman folding traps were baited with a mixture of

equal parts of creamy peanut butter and rolled oats. Forty baited traps were set affixed to trees at approximately 3 m high in the afternoons or evenings on days when rain probability was low. We prioritized good weather to reduce mortality during trapping. Each day when traps were set or checked for squirrels, the weather and air temperature was recorded. Traps were assessed the following morning to see if they were closed and if a flying squirrel was caught or not. If no traps were closed and the next day had clear weather, the traps would be left open and checked again the following morning. If a flying squirrel was trapped, the date and time, temperature, trap location and number, sex, weight, anogenital distance, and hind foot length were noted. Then, the squirrel was tagged with a standard ear tag unless it was already tagged. If a squirrel was recaptured, we similarly recorded date, time, location, as well as weight and the tag number prior to release.

MOON ILLUMINATION AND WEATHER

The lunar illumination and moon phase were collected after trapping from the Astronomical Applications Department of the U.S. Naval

Observatory website (Astronomical Applications Department, n.d.). Every night where traps were set was put into the website for Salisbury, Maryland, and the lunar illumination and moon phase were recorded.

STATISTICS

We treated the data in two ways. First, we fit a zero-inflated model (Zeileis et al., 2008) to determine if illumination percentages and breeding season (separately and in combination) affected the number of squirrels captured, using the `pscl` package in the software R (Jackman, 2024). Breeding seasons were defined as January to April and June to August. We then conducted a chi squared test to determine if capturing or not capturing squirrels was predicted by illumination. We split the data into two categories: when the moon was more than half full versus half full or less.

We then separated out non-capture data to determine if the number of squirrels captured was affected by illumination or temperature using linear models. We set the significance level (a) at 0.05.

RESULTS

The zero-inflated model showed that illumination, breeding season, and the combination of both did not significantly affect capture (illumination: $z = 0.090$, $p = 0.928$; **Figure 1**, breeding season: $z = -1.018$, $p = 0.309$; **Figure 2**, illumination*breeding season: $z = 0.563$, $p = 0.573$; binomial model with logit link, Log-likelihood -70.26 for 8 degrees of freedom).

The chi-square test did not find that illumination (more or less than 50%) affected whether squirrels were captured or not ($X^2 = 0.89$, $df = 1$, $p = 0.34$; **Figure 3**).

The moon illumination percentage did not affect the number of squirrels captured ($R^2 = 0.057$, $F(1, 17) = 1.026$, $p = 0.33$; **Figure 4**, **Table 1**, **Figure 1**). Similarly, temperature did not affect the number of squirrels captured ($R^2 = 0.058$, $F(1, 17) = 1.05$, $p = 0.32$).

DISCUSSION

We have shown that southern flying squirrels do not change their activity level due to changes in

TABLE 1. Capture Numbers Based on Moonlight Illumination.

	50% illumination or less	More than 50% illumination
Caught Squirrels	11 days	8 days
No Captures	27 days	37 days

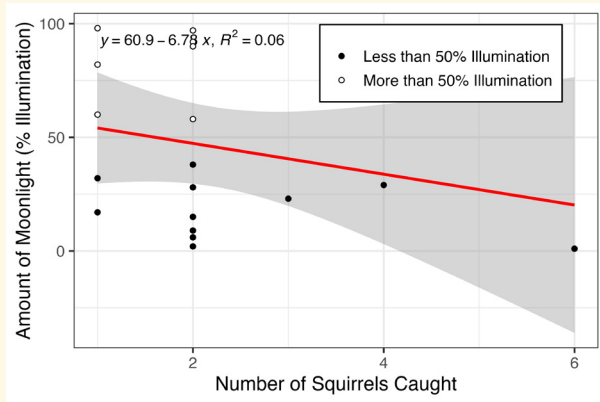


Figure 3: Number of Captures in Different Amounts of Moonlight Illumination

Note. The amount of moonlight and the number of squirrels caught. Zero-inflated model where the red line is the correlation between the two variables.

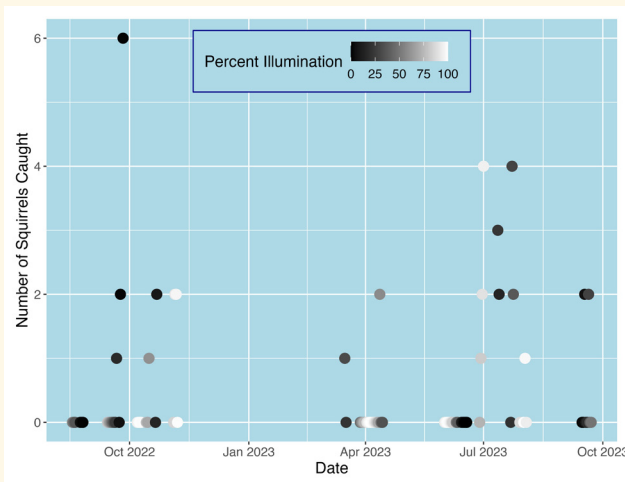


Figure 4: Monthly Squirrel Captures in Different Moonlight Illuminations

Note. Number of squirrels caught each month with the corresponding moonlight illumination. The moonlight illumination is in a gradient based off the percentage (lighter dots represent more moonlight and darker dots represent less).

moonlight illumination. Squirrel activity, which was assessed by the number of squirrels caught, did not change with breeding seasons, weather conditions, or temperature. This contradicts many past studies suggesting that smaller prey species are less active during nights with higher moonlight illumination due to predators (Clarke, 1983; Taylor et al., 2023). On one hand, this may imply the threat of predation was not great enough to outweigh the benefits of foraging for food; on the other, however, the overall presence of known predators to flying squirrels in the area of the study was not monitored, so in theory, the lack of change in flying squirrel activity amidst moonlight could possibly be due to a small predator population as opposed to the

need for food. Additionally, these flying squirrels could potentially have had proper coverage and protection, similar to other small prey species that continue to be active in higher moonlight illumination when cover is available (Perea et al., 2011).

Continuous activity, irrespective of the moonlight illumination, seems to be more common in nocturnal rodents that have competition over resources. One study supports our results that some nocturnal rodents are active no matter the moonlight illumination in order to obtain their required food and shelter needs (Upham & Hafner, 2013). In the areas the flying squirrels were caught for our study, there is the possibility of competition over resources

with deer mice (*Peromyscus maniculatus*) and titmice (*Baeolophus bicolor*) since they were also frequently captured within the traps. It also suggests these species have similar food preferences that can explain the flying squirrels' constant desire and need to gather food at night rather than hide from predators.

Breeding seasons seem to increase co-nesting behavior and thus should decrease the activity of the southern flying squirrels no matter the moonlight illumination. We found that activity levels did not change even at peak breeding season as we consistently caught the same number of squirrels. Therefore, for the tradeoff between staying in a nest and mating versus finding food, it appears that finding food for energy is more important to the flying squirrels.

Weather and temperature are also factors to consider in mammal activity level as to keep warm, smaller mammals need to co-nest and stay close to their nests. While we found no change in activity levels based on temperature or weather, we did not conduct trapping throughout the winter or harsh weather days or take into account cloud coverage. Cotton and Parker (2000) found that northern flying squirrels greatly reduced their activity level in cold and severe weather, as did Suzuki and Ando (2017) with Japanese flying squirrels (*Pteromys momonga*). In these cases, for the tradeoff between going to retrieve a food cache versus conserving energy until the conditions are better, conserving energy is chosen. It is possible that weather and temperature conditions do play a role in increasing or decreasing flying squirrels' activity level that was not observed in our study; however, in the forests our study was conducted in, the temperatures never get as low as seen in these other studies, which could explain the southern flying squirrel's continuous activity level no matter the weather or temperature.

In order to understand why flying squirrels remain active at night no matter the moonlight illumination, we will have to address all the abiotic and biotic factors in the current environment. Therefore, monitoring known predators and competitive species, determining how squirrels access the available food, and continuing the study into winter months would help to uncover if there are other reasons as to why the flying squirrels are unresponsive to the changes in moonlight illumination. Nevertheless, this study demonstrates that southern flying squirrels continue to be active irrespective of the moonlight illumination. However, further study is needed to understand why this is occurring and what other factors might change flying squirrel activity.

REFERENCES

- Astronomical Applications Department. (n.d.). *Complete sun and moon data for one day*. Retrieved May 9, 2024, from https://aa.usno.navy.mil/data/RS_OneDay
- Borgo, J. S., Conner, L. M., & Conover, M. R. (2006). Role of predator odor in roost site selection of southern flying squirrel. *Wildlife Society Bulletin*, 34(1), 144–149. <https://www.jstor.org/stable/3784946>
- Clarke, J. A. (1983). Moonlight's influence on predator/prey Interactions between short-eared owls (*Asio flammeus*) and deermice (*Peromyscus maniculatus*). *Behavioral Ecology and Sociobiology*, 13, 205–209. <https://doi.org/10.1007/BF00299924>
- Cotton, C. L., & Parker, K. L. (2000). Winter activity patterns of northern flying squirrels in sub-boreal forests. *Canadian Journal of Zoology*, 78(11), 1896–1901. <https://doi.org/10.1139/z00-137>
- Fridell, R. A., & Litvaitis, J. A. (1991). Influence of resource distribution and abundance on home range characteristics of southern flying squirrels. *Canadian Journal of Zoology*, 69(10), 2589–2593. <https://doi.org/10.1139/z91-365>
- Jackman, S. (2024). *pscl: Classes and methods for R developed in the Political Science Computational Laboratory*. Sydney, Australia. R package version 1.5.9. <https://github.com/atahk/pscl>
- Kohler, A. M., Olson, E. R., Martin, J. G., & Anich, P. S. (2019). Ultraviolet fluorescence discovered in New World flying squirrels (*Glaucomys*). *Journal of Mammalogy*, 100(1), 21–30. <https://doi.org/10.1093/jmammal/gyy177>
- Layne, J. N., & Raymond, M. A. V. (1994). Communal nesting of southern flying squirrels in Florida. *Journal of Mammalogy*, 75(1), 110–120. <https://doi.org/10.2307/1382242>
- Meyer, R. T., & Rush, S. A. (2024). Southern flying squirrel (*Glaucomys volans*) diet composition in red-cockaded woodpecker (*Dryobates borealis*) groups in Mississippi and Alabama. *Food Webs*, 39. <https://doi.org/10.1016/j.fooweb.2024.e00346>
- Perea, R., González, R., San Miguel, A., & Gil, L. (2011). Moonlight and shelter cause differential seed selection and removal by rodents. *Animal Behaviour*, 82(4), 717–723. <https://doi.org/10.1016/j.anbehav.2011.07.001>
- Reynolds, R. J., Fies, M. L., & Pagels, J. F. (2009). Communal nesting and reproduction of the southern flying squirrel in Montane Virginia. *Northeastern Naturalist*, 16(4), 563–576. <https://doi.org/10.1656/045.016.n406>
- Rudolph, D. C., Schaefer, R. R., Pierce, J. B., Saenz, D., & Conner, R. N. (2009). Texas ratsnake predation on southern flying squirrels in red-cockaded woodpecker cavities. *Southeastern Naturalist*, 8(2), 41–46. <https://doi.org/10.1656/058.008.s208>
- Steele, M. A., & Yi, X. (2020). Squirrel-seed interactions: The evolutionary strategies and impact of squirrels as both seed predators and seed dispersers. *Frontiers in Ecology and Evolution*, 8. <https://doi.org/10.3389/fevo.2020.00259>
- Suzuki, K. K., and Ando, M. (2017). Seasonal changes in activity patterns of Japanese flying squirrel *Pteromys momonga*. *Behavioural Processes*, 143, 13–16. <https://doi.org/10.1016/j.beproc.2017.08.003>
- Taylor, P., Swan, M., Sitters, H., Smith, A., & Di Stefano, J. (2023). Small mammals reduce activity during high moon illumination under risk of predation by introduced predators. *Scientific Reports*, 13(1). <https://doi.org/10.1038/s41598-023-37166-1>
- Thomas, R. B., & Weigl, P. D. (1998). Dynamic foraging behavior in the southern flying squirrel (*Glaucomys volans*): Test of a model. *The American Midland Naturalist*, 140(2), 264–270. <https://www.jstor.org/stable/2426943>
- Upham, N. S., & Hafner, J. C. (2013). Do nocturnal rodents in the Great Basin Desert avoid moonlight? *Journal of Mammalogy*, 94(1), 59–72. <https://doi.org/10.1644/12-MAMM-A-076.1>
- Winterrowd, M. F. (2008). The group-nesting and food-hoarding behaviour of the southern flying squirrel, *Glaucomys volans*. *Current Science*, 95(7), 877–881. <https://www.jstor.org/stable/24103183>
- Zeileis, A., Kleiber, C., & Jackman, S. (2008). Regression models for count data in R. *Journal of Statistical Software*, 27(8). <http://www.jstatsoft.org/v27/i08/>

ACKNOWLEDGMENTS

The author thanks Dr. Freeman for all her help and support in creating this paper and all the knowledge she has passed down about southern flying squirrels. The author also thanks the entire Squirrel Team for helping to collect the data used in this paper. This work was supported by the NSF BRC-BIO grant 2217434.

Cats, Witches, and Demons: The Role of the Animal Familiar in the English Witch Trials

Lydia Loftus

FACULTY MENTOR: Dr. Viktoria Basham

ABSTRACT

While scholars have previously explored the role of the animal familiar during the English witch trials (1300s-1850), they have not analyzed how familiars served as the missing link between witches and their victims. Peer-reviewed research has found that the familiar was scapegoated to be viewed as the witches' demonic companion and was held responsible for executing devious acts such as crop damage, sickness, or natural disasters. Given that an explanation was needed for how a witch cursed their victims from afar, I argue that the popular imagination reinvented the idea of the animal familiar to serve as the conduit between the witches and their victims. As my research has indicated, people feel the need to explain what they do not understand, especially when threatened by an unfamiliar force; the supernatural serves as a tool to fill in the voids in human knowledge. Thus, the familiar served as a much-needed scapegoat during the witch trials, so that those who felt threatened by the presence of witchcraft could regain a sense of control upon the witches' conviction. To the best of my knowledge, this point has not been discussed by scholars. This new example draws a logical link between familiars and the supernatural to explain the inexplicable and contributes to the understanding of the relationship between witches and familiars in the English witch trials.

Keywords: animal familiars, witch trials, witchcraft, scapegoating, supernatural

INTRODUCTION

The belief in the supernatural rituals of pagan witchcraft has been used by the collective popular imagination over cultures and time periods as society's attempt to understand inexplicable misfortunes and to restore the perceived notion of health, balance, and harmony within society. Research has shown that popular imagination draws from the supernatural to understand what is unknown so that one can balance their emotional equilibrium that was disrupted by an unfortunate event (Perkowski, 1989). The animal familiar – the witches' demonic companion – is one instance of the popular imagination drawing from the supernatural to help restore the disrupted emotional equilibrium supposedly caused by witchcraft. Scholars such as Parish (2019) and Sax (2009) have discussed the role of the animal familiar as the crucial intersection between the interactions of humans and mystical animals. During the English witch trials from the 1300s to 1850, the familiars were held responsible for malicious acts such as crop damage, sudden illness, or unfavorable weather, leading to conviction of the witch (Parish, 2019; Sax, 2009; Wilby, 2000). While scholars such as Parish (2019) and Sax (2009) have developed their own explanations of the role of the familiar, I argue that the popular imagination reinvented the idea of the witches' companion to serve as the supernatural force that was the missing link between the witch – the villain – and their

victim. The familiar served as the much-needed explanation that showed how witches cursed and harmed their victims. This research paper aims to draw attention to a new perspective of how the popular imagination used the supernatural, in this case the familiar, to explain the inexplicable and restore the lost sense of community health by placing the blame onto the witch and her loyal companion.

WHAT IS AN ANIMAL FAMILIAR?

The animal familiar has been known as the witches' companion since before the 13th century, with Parish (2019) and Sax (2009) describing them as serving as the contact between the witch and devil, and thus the demonic nature of witchcraft and familiars. The companions have been described as a sort of fairy and were usually common domestic animals like cats and dogs, but could also be mice, toads, and even insects (Parish, 2019; Purkiss, n.d.). The most well-known animal familiar is the black cat: the animal we all know to avoid on Halloween because of its reputation of being the witch's demonic companion. Parish (2019) found that many trial records indicate that the familiar took the form of a spirit as the devil or a demon when it presented itself to the witch as an intermediary.

The first recorded use of the familiar as a scapegoat was in the 1590s, when the idea of the English witch had emerged to be a poor, old woman who had a short temper and usually had a lame eye. Some found it illogical that an older

woman could do magic, so they concluded that it must be the witch's familiar that was doing the work of the devil (Purkiss, n.d.). As documented in trial records, the encounter between the witch and familiar consisted of the familiar offering relief from a witch's suffering in exchange for demonic actions such as selling one's soul to the familiar or renouncing their Christian faith (Wilby, 2000). Trials that included familiars reached a peak in the 16th and 17th century, with the familiars blamed for harmful acts such as crop failures, diseases, illness and any other mysterious event that required explaining (Lambert, 2021).

THE ANCIENT ANIMAL FAMILIAR

The history of the animal familiar is quite complex because familiars have appeared in many folkloric phenomena and it is therefore extremely difficult to identify where the tradition of familiars stems from (Sax, 2009). Many scholars such as Mircea Eliade, Joseph Campbell, and James George Frazer identified the ideas of shamanism as the explanation to the origins of the familiar. Shamanism – one of the oldest forms of healing – can be defined as any ritual practice that uses psychedelic substances to alter a person's perception of reality in order to access the spiritual world (Winkelman, 2013). Universal practices of Shamanism would use transformation into a Shamans' animal familiar to help expand innate human mental conceptualization. Sax (2009) explained that the

other possible origins of the familiar include the familiars as the animal mascots to the Greek and Norse gods in the ancient world. It is believed that they served as helpers to deities such as Zeus, Athena, Artemis and Apollo, and served the Norse gods Odin and Thor. Other interpretations have the familiar serving as the mascots of pagan deities possessed by the devil, or that they were patrons of Christian saints. The main claim by Sax (2009) is that despite the exact origins of the familiar, the magic between humans and animals has always been present throughout human and mystical history. Therefore, the familiar can be interpreted as a left-over component of ancient folkloric and pagan phenomena.

Alternatively, Parish (2019) argued that the familiar served as the essential intersection between learned, popular beliefs and demonology, and claimed that the familiar established certain attitudes to the relationship and interaction between humans and animals. While the familiar served as the central intersection between the population and witchcraft, the familiar also represented the missing element that connected the witch to the victim through supernatural forces. The differing scholarly perspectives suggest that the function of the animal companion relates not so much to the familiar serving as a missing link in an information gap, but it functions as the ever-present mystical intersection between popular and traditional beliefs within demonology. These differing scholarly perspectives suggest that familiars are a left-over component of ancient pagan and shamanistic beliefs that were pushed into demonology by Christian belief supports my argument that the idea of the animal familiar was revived by the popular imagination during the English witch trials. My argument adds an additional perspective proposed to the function of the familiar as an idea revitalized and perpetrated by the collective populace to serve as the identified gap in knowledge in how a witch afflicted their victim.

TRIALS WITH FAMILIARS

The first witch to be legally charged with possessing a familiar was Dame Alice Kyteler of Kilkenny, Ireland, in 1324, and was accused of having sexual intercourse with a demon to acquire the power of sorcery (Sax, 2009, Williams, 1994). Scholars describe the usage of familiars as a "peculiarly English phenomenon," with there being no record of the usage of familiars during the Salem witch trials (Parish, 2019, p. 3). Trials including familiars did not begin to trend until the mid-1500s, almost two centuries after the first recorded case that used a familiar as the basis for conviction. The first

English trial that mentioned familiars was in 1530 in Somerset, but the Essex trials of 1566, 1579, and 1582 were the most prominent in featuring familiars in England. In 1566, Elizabeth Francis of Chelmsford was prosecuted for possessing a familiar in the form of a cat named "Satan." Elizabeth confessed that she kept her familiar in a basket and fed it bread and milk and asked for a wealthy man as well as sheep in her pasture; the animal agreed to both of her demands (Sax, 2009).

By 1604, the English Statute of Witchcraft was passed, making "it a felony to consult, covenant with, entertain, employ, feed or reward any and wicked spirit to or for any intent or purpose" (Sax, 2009, p. 319). The trial of Rose Cullender and Amy Duny in 1662 included a familiar in the form of an insect that allegedly forced a child to swallow a nail, causing the child to throw a crying fit before vomiting the nail (Parish, 2019). Due to the association between the insect familiars and the witches, Cullender and Duny were convicted of witchcraft on the basis of the possession of a familiar. Purkiss (n.d.) explained that the familiar derives from a "popular underworld of ideas and tales" (para. 16), showing how vague or mysterious the explanations of the witch and familiar could be. While the familiar is argued to be a left-over component of demonology, the idea was revived by the popular imagination during the time of the English Witch trials to provide a reason to convict a witch.

IMPACT OF THE FAMILIAR ON THE ENGLISH WITCH TRIALS

What was the motive behind scapegoating the familiar as the supernatural force that committed the crimes? After the English Statute of Witchcraft was passed, accusations reached a peak in the 17th century, with 16,474 people prosecuted and over 7,000 people convicted and executed from 1300 to 1850 (Lambert, 2021; McCarthy, 2019; Purkiss, n.d.). It is important to recognize the correlation between the peak of witchcraft accusations in the 17th century and the passing of the English Statute of witchcraft in 1604 because it provides evidence that the familiar was needed in order to legally prosecute a witch. Keith Thomas (1971) explained in his book, *Religion and The Decline of Magic*, how the English Statue of Witchcraft "meant that evidence of [a] relationship with evil spirits or animal familiars was technically sufficient to secure the judicial condemnation of an accused person, regardless of whether or not he or she had harmed anyone" (p. 443). The English Statute of Witchcraft of 1604 made it possible to blame the familiar for the devious acts and at the same time convict a

person of witchcraft, thus making the familiar the necessary scapegoat in the conviction of the witch.

INTO THE IRRATIONAL SPHERE

Inexplicable events such as diseased crops and natural disasters were attributed to supernatural forces and witchcraft and were often seen as actions performed by familiars on behalf of the devil. Perkowski (1989) provided insight on why humans are driven to scapegoat using the supernatural in his book *The Darkling: A Treatise on Slavic Vampirism*:

When man is stricken with unforeseen, uncontrollable, and incomprehensible physical disaster and attendant emotional disturbance, the burning questions: Why did it happen? How did it happen? Who is responsible? – press the search for answers into the irrational sphere. Carriers and consumers of folk beliefs perpetuate them on the conscious level as if for entertainment, but they are therefore always at hand even for non-believers and surely for agnostics to try as a last resort. The hope that leads to these actions then is fulfilled at least emotionally. Some sort of balance is restored. The folk beliefs provide a culturally prescribed set of actions to promote a return to emotional equilibrium at a time of extreme emotional stress and turmoil. (p. 151-152)

The irrational sphere as described by Perkowski (1989) is the supernatural, which is used to explain phenomena that cannot be understood in a logical, rational sense. The irrational sphere refers to any unknown force that explains the inexplicable, with some scholars arguing that the same concept could also be applied to examples of the belief in Greek gods or the concept of heaven (Bering, 2006). The irrational sphere, the supernatural, certain types of lore, and arguably religion, are all used by people to help understand unknown forces that serve as explanations for the inexplicable. By this, the supernatural and the irrational sphere can be used interchangeably. The concept of the supernatural was and still is used to search for answers in the irrational sphere to make sense of the practice witchcraft so that the general population can try to return to a perception of control and emotional equilibrium. The imagination turns to the supernatural to explain inexplicable events within its own logical bounds. By this, the familiar and the supernatural serve as a filler in an information gap that explained how a witch was able to curse their victim, with the companion serving as the missing link between the witch and their victim.

SCAPEGOATING FOR CONTROL, BALANCE, AND HARMONY

The term scapegoat comes from a story in the book of Leviticus in the Bible, describing a goat that was used by the Israelites to carry their sins away into the desert (Rothschild et al., 2012). The psychological study by Rothschild et al. (2012) observes two motivations for scapegoating: the first is to allocate feelings of guilt by transferring blame onto another person in order to reduce one's own feelings of guilt. The second motivation – and in the case of animal familiars – is to scapegoat to maintain or regain a sense of personal control. Rothschild et al. (2012) and Boyer (2022) speak about how focalizing responsibility is the main strategy for restoring perceived control because the scapegoat can be easily understood, clearly identified, and held accountable for what needs blame. Through the scapegoating of the familiar, the general populace could regain a sense of personal control because the identification of the familiar helped motivate an attempt to eradicate the practice of witchcraft.

A third motivation of scapegoating theorized by Rothschild et al. (2012) explains that “people’s perception of control is threatened by their awareness that multiple sources of hazard are spread diffusely throughout their environment, because this implies that their well-being and even existence is subject to the influence of indifferent and indeterminate forces” (p. 1150). The indeterminate force of witchcraft was viewed as hazardous by those who did not practice it. The general populace felt that their environment was threatened by the practice of witchcraft and associated pagan practices with the devil, which served as justification for the persecution of witches. Because of previous associations between animal familiars and the devil, the role of the evil spirit was placed onto the familiar. The vilification of pagan practices created a falsely perceived threat that was utilized by the popular imagination to justify the persecution of witches.

THE ANIMAL FAMILIAR AS A SCAPEGOAT

The familiar serving as the scapegoat and as the witches’ demonic companion was perpetrated by popular belief and witness testimony through the pamphlets and ballads that were used as

news during the witch trials (Parish 2019). Rothschild et al. (2012) described a scapegoat as being “perceived as possessing both the ability and the malicious intent necessary to deliberately cause the threatening outcome that needs to be explained” (p. 1149). Because of the spiritual relationship between the familiar and devil, it could be easily imagined that the familiar could have both the capability and vicious intent to harm, thus making it a viable scapegoat. While the women were the ones on trial for witchcraft, the responsibility of the act was focalized onto the familiar as the supernatural force inflicting harm.

Previous scholars such as Boyer (2022) have discussed the witch as a scapegoat, but it is evident that both the familiar and the witch were scapegoated as the agent of harm to those around them. The familiars as the supernatural element inflicting harm made it easier to convict a witch because of the close relationship between the alleged witches and their pets. The familiar as a scapegoat aligns with the claims made by Perkowski (1989) and Rothschild et al. (2012) where a person identifies or creates a scapegoat after an emotionally disturbing event so that they can regain their own sense of control. The inexplicable events, like crop damage and random illness, disturbed the general population’s emotional equilibrium and made them feel unsettled and threatened by the act of (what was perceived to be) witchcraft, so to maintain control over their environment the collective populace manipulated the narrative of the familiar to be the ones responsible for the devious acts so that the disrupted emotional equilibrium could be balanced and restored.

The main motive for scapegoating the familiar and naming it as the element that connected a witch to their victim was for the conviction of the witch. This came from the perception that the familiar’s only purpose on this earth was to inflict harm on humans and was utilized by the witch for those reasons (Purkiss, n.d.; Wilby, 2000). The conviction of the witch was also most important in eradicating the threatening presence of demonic practices from England and surrounding areas. With those who practiced witchcraft prosecuted and convicted, the threatened emotional equilibrium of the

collective was perceived to be restored and balanced.

CONCLUSION

The animal familiar was an idea reinvented by the popular imagination so that the blame for the devious crimes could be placed onto another creature with a feasible explanation in the context of the supernatural and witchcraft. Once the familiar had been established as the scapegoat, the anxiety from the threatening presence of witchcraft was relieved after the witch had been convicted. With the unknown of how a witch cursed their victim identified, the collective’s emotional equilibrium was restored. The familiar played an important role in the conviction of the witch, as it served as a filler in the information gap that became the connection between the witch and their victim. The familiar as the supernatural force provided an explanation in the realm of folklore as the entity responsible for the demonic acts. The blaming of the familiar helped the collective popular imagination restore its emotional equilibrium; it provided an explanation for what people did not understand. Once the gap had been identified, people felt more in control of themselves and therefore the emotional disturbance was eliminated. The conviction of the witch came from the perception that the familiar’s only purpose on this earth was to inflict harm on humans and was used by the witch for those reasons (Purkiss, n.d.; Wilby, 2000).

This added perspective of the function of the animal familiar aligns with the already existing scholarly opinion that the supernatural and folklore were and are used by people when balance and harmony need to be restored. Scholars have previously discussed the role of the familiar but have not analyzed the familiar serving as the missing element linking the witch to their victim. One possible reason that could have contributed to the popular imagination reviving the idea of the familiar could have been the belief system of a specific population that felt threatened by the presence of witchcraft, namely the Christian populace. This intriguing idea is beyond the scope of this paper and may be developed in future research on the role of witchcraft in the popular imagination.

REFERENCES

- Bering, J. (2006). *The cognitive psychology of belief in the supernatural*. *American Scientist*, 94(2). <https://doi.org/10.1511/2006.58.142>
- Boyer, P. (2022). *Why we blame victims, accuse witches, invent taboos, and invoke spirits: A model of strategic responses to misfortune*. *The Journal of the Royal Anthropological Institute*, 28(4), 1345-1364. <https://doi.org/10.1111/1467-9655.13826>
- Lambert, T. (2021) *A history of the witch trials in Europe*. *Local Histories*. https://localhistories.org/a-history-of-the-witch-trials-in-europe/#google_vignette
- McCarthy, N. (2019). *The death toll of Europe's witch trials*. *Statista*. <https://www.statista.com/chart/19801/people-tried-and-executed-in-witch-trials-in-europe/#main-content>
- Parish, H. (2019). "Paltriv vermin, cats, mice, toads, and weasils": *Witches, familiars, and human-animal interactions in the English witch trials*. *Religions*, 10(2). <https://doi.org/134.10.3390/rel10020134>
- Perkowski, J. L. (1989). *The Darkling: A Treatise on Slavic Vampirism*. (pp. 151-152). Slavica Publishers, Inc.
- Purkiss, D.A (n.d.). *A journey into witchcraft belief*. *English Heritages*. <https://www.english-heritage.org.uk/learn/histories/journey-into-witchcraft-beliefs/>
- Rothschild, Z. K., Landau, M. J., Sullivan, D., & Keefer, L. A. (2012). *A dual-motive model of scapegoating: Displacing blame to reduce guilt or increase control*. *Journal of Personality and Social Psychology*, 102(6), 1148-1163. <https://doi.org/10.1037/a0027413>
- Sax, B. (2009). *The magic of animals: English witch trials in the perspective of folklore*. *Anthrozoös*. <https://doi.org/10.2752/089279309X12538695316068>
- Thomas, K. (1971). *Religion and the decline of magic*. New York: Scribner.
- Wilby, E. (2000). *The witch's familiar and the fairy in early modern England and Scotland*. *Folklore (London)*, 111(2), 283-305. <https://doi.org/10.1080/00155870020004648>
- Williams, B. (1994). *The sorcery trial of Alice Kyteler*. Wordwell Ltd. <http://www.jstor.org/stable/27724208>
- Winkelman, M. (2013). *Shamanic cosmology as an evolutionary neurocognitive epistemology*. *International Journal of Transpersonal Studies*. 32(1), 79-99. <http://dx.doi.org/10.24972/ijts.2013.32.1.79>

ACKNOWLEDGMENTS

The author thanks Dr. Viktoria Basham for her support and mentorship with this research project and the Clarke Honors College for their support.

The Burden of Time

Daijah Richardson

FACULTY MENTOR: Professor Jinchul Kim

ABSTRACT

The *Burden of Time* is a 24"x30" oil on canvas painting completed in 2023 as a form of self expression. This surreal work is an emotionally charged exploration of the artist's personal battle with time and its profound impact on her subconscious mind. *The Burden of Time* vividly depicts the overwhelming moments of stress, depression, and trauma that are deeply engrained in the human experience. It breathes life into the human psyche, a realm that grapples with life's obligations while racing against a relentless deadline.

The composition depicts time as an immovable, grey figure of melancholy and torture at the intersection between the lower and upper portions of the canvas. In the lower section, a figure trapped in an hourglass represents that feeling of being overwhelmed and helpless, as if prepared to drown in the constant flow of time's movements. To the right of said figure, the viewer observes time's hand manipulating a feminine being into submission. This represents the human psyche as a simple puppet to life's circumstances; this powerless feeling takes away a person's autonomy and sense of self, as if one has no control over their own lives, bodies or emotions.

However, on the bottom left of the canvas, a stairwell brightly illuminates the passage out of this dungeon of despair. Although it is not an easy feat to escape the darkest parts of one's mind, it is possible with hope and determination. In the composition, hope is depicted by the nude figure climbing up the mountainous terrain towards the sun on the horizon. The nude male



symbolizes vulnerability and exhaustion to life's unfortunate circumstances, yet he perseveres through the pain. He grows stronger despite the burdens upon his back or the relentless flow of time that passes him by without a moment's rest. *The Burden of Time* challenges the viewer to question whether they'll allow life to overwhelm

and control them, instead of choosing to strive towards a beautiful tomorrow upon the horizon.

ACKNOWLEDGMENTS

The artist thanks Professor Jinchul Kim for his guidance and encouragement within the painting studio.

Eating Disorders in Transgender and Gender Non-Conforming Communities

Bee Watts

FACULTY MENTOR: Dr. Kara French

ABSTRACT

Eating disorders disproportionately affect transgender and gender non-conforming (TGNC) individuals as opposed to their cisgender counterparts. Common causes of eating disorders in TGNC individuals are minority stress due to discrimination and trauma, gender dysphoria and lack of access to gender-affirming treatment, and safety concerns and the need for presenting as their preferred gender identity, also known as passing. Eating disorders have one of the highest mortality rates, and when added to the high suicide rates in TGNC communities, there are countless unnecessary deaths every year from undiagnosed and untreated eating disorders. There has been a recent increase in recognition of eating disorders and the availability of resources, but they are often inaccessible. This leaves many to suffer in silence due to the difficulty of receiving life-saving care. With appropriate resources and support, many can recover from their eating disorders and live normal, healthy lives. If eating disorder treatment facilities were more accessible and available to all demographics, and legislation was passed requiring insurance companies to cover eating disorder treatments, then individuals with eating disorders would have greater opportunities for recovery.

Keywords: eating disorders, transgender, gender non-conforming, gender dysphoria, gender-affirming care, discrimination, minority stress, intersectionality

INTRODUCTION

While eating disorders affect approximately 28.8 million Americans at some point in their lives, 18% of transgender people report having an eating disorder diagnosis, whereas 1.8% of cisgender females and only 0.2% of cisgender males reported eating disorder diagnoses (Duffy et al., 2019). An eating disorder (ED) is a behavioral condition characterized by severe and persistent disturbances in eating behaviors and associated with distressing thoughts and emotions (American Psychiatric Association, n.d.). As of the most recent version of the DSM, the DSM-V-TR, there are eight recognized eating disorders all with varying diagnostic criterion. The DSM, or Diagnostic and Statistical Manual of Mental Disorders, is a book used by professionals as a guide to diagnose mental disorders. Despite the high number of people who will suffer from an eating disorder at some point in their lives, one of the most vulnerable demographics are transgender and gender non-conforming individuals (National Eating Disorders Association, n.d.).

Transgender and gender non-conforming (TGNC) individuals are people who do not identify with their assigned gender at birth. According to the American Psychiatric Association (n.d.), transgender is an umbrella term for people whose gender identity, gender expression, or behavior does not conform to that typically associated with the sex to which they were assigned at birth. For individuals who do not feel like they align with the binary of male or female, there are also identities of gender expansive, genderqueer, and gender

non-conforming (It Gets Better, n.d.). Eating disorders disproportionately affect individuals in the transgender and gender non-conforming communities.

PREVALENCE

While there is no singular answer as to why people develop eating disorders, there are a few common causes for TGNC individuals. One of the most common causes of the development of an eating disorder in TGNC individuals is from struggling with gender dysphoria (GD), formerly known as gender identity disorder (Flores et al., 2021; Strandjord et al., 2015). In the DSM-V, gender dysphoria is described as a marked incongruence between one's experienced/expressed gender and assigned gender. In TGNC individuals that were assigned female at birth (AFAB), engaging in restrictive behaviors can result in weight loss which can significantly reduce protrusion of breasts and hips, or take away their menstrual cycle (amenorrhea). These are all things that can make it easier to pass – that is, to successfully present as a male – thus decreasing the severity of the gender dysphoria one is struggling with. The study completed by Feder et al. (2017), found that trans males experience nineteen times the risk of having a restrictive ED compared to cisgender females. Additionally, trans females faced ten times the amount of risk. Despite the significantly greater risk that TGNC individuals face when it comes to eating disorders due to GD, medical interventions like hormone therapy and surgery have been shown to improve GD which can also improve ED behaviors as well (Flores et al., 2021;

Strandjord et al., 2015).

For many male-to-female individuals, they face significantly more of the societal pressures that many cisgender women in our society also face. Many transgender women feel that “passing” as a cisgender woman is important and that they must meet societal standards as much as possible due to safety concerns or to not be misgendered (Monteiro & Poulakis, 2019). In a press release from the Williams Institute at UCLA School of Law (2021), it was reported that transgender people experienced violence at a rate of 86.2 victimizations per 1,000 people compared to 21.7 per 1,000 people among cisgender people. The rates of victimization are so high for transgender individuals that researchers have advised policymakers to enact “more effective and necessary policies at the local, state, and federal levels to protect people based on their gender identity and gender expression” (Flores et al., 2021). By effectively presenting as a cisgender woman, it decreased the likelihood of experiencing victimization directly as a result of being transgender.

Minority stress refers to the unique stressors and challenges experienced by minority groups, in this case, transgender and gender non-conforming individuals. For nearly all TGNC individuals, minority stress is a major factor and eating disorders are a form of coping. Minority stressors can have both internal and external conditions. External stressors consist of things like discrimination, violence, and prejudice whereas internal stressors are things like expectations of rejection and discrimination, concealment of minority identity (i.e., trans

identities), and internalizations of negative dominant cultural attitudes, beliefs, stereotypes, and values (Hoy-Ellis, 2023). For individuals that are struggling with different internal or external stressors, regardless of gender identity, food may be a way that they find control or a way to cope.

INTERSECTIONALITY

Despite many of the existing stereotypes and beliefs about eating disorders, they disproportionately affect minorities. Some of the most common myths about eating disorders are that they only affect young girls and women, only people in smaller bodies have eating disorders, and that eating disorders are strictly about food (Barkosky, n.d.).

A study from 2019 found that Hispanic/Latina/o, Black/African American, and Asian Americans are more likely to engage in disordered eating behaviors than their white counterparts (Simone et al., 2022). In the United States there is societal value placed on the lightness of skin color, which can also lead to increased levels of body dissatisfaction and eating disorder behaviors among people of color (Parker et al., 2022). That said, people of color are still only half as likely to be diagnosed and to receive treatment for their eating disorder (Sonneville & Lipson, 2018).

While eating disorders have a strong significance in minority groups, treatment facilities are often not accessible for many that need that help. According to the American Psychological Association (n.d.), in the United States, 39% of African American children and adolescents and 33% of Latino children and adolescents are living in poverty, which is more than double that of non-Latino, white, and Asian children and adolescents. It was also reported that minority racial groups are more likely to experience multidimensional poverty than their white counterparts. For individuals living in poverty that also have eating disorders, treatment options are extremely limited, and depending on the severity of the eating disorder, nonexistent. A study looking at insurance claims found that in the United States for an inpatient hospitalization for anorexia, the average length of stay was around 50 days and cost around \$97,200, which is an estimate of approximately \$1,355 per day (Toulany et al., 2015). For someone without insurance, there is little hope of affording this significant cost. Even for people with insurance, treatment may not be feasible. Some have begun to question the ethics of insurance coverage in eating disorders as many insurance companies will stop covering treatment services before full weight restoration, despite the other studies showing that patients discharged at lower BMIs

had significantly higher rates of readmission (Tamargo, 2022; Frostad et al., 2022; Castro et al., 2003).

CLINICAL CONSIDERATIONS & TREATMENT APPROACHES

Eating disorders often present with other co-occurring disorders. In the TGNC community, some of the most common co-occurring disorders are disorders like major depressive disorder, generalized anxiety disorder, bipolar disorder, borderline personality disorder, and substance use disorders. While treating an eating disorder, it is crucial to treat the co-occurring disorders as well.

Depression is a common, but serious, mental disorder that negatively affects how one feels, thinks, acts, and perceives the world (American Psychiatric Association, n.d.). In a study by Wanta et al. (2019), looking at mental health diagnoses in electronic health records reported that in the transgender population, 31% had a major depressive disorder diagnosis, whereas in the control population, or cisgender population, 4.8% had a major depressive disorder diagnosis (Wanta et al., 2019). A survey from the Trevor Project (n.d.) also found that more than 2 in 3 trans and nonbinary youth report symptoms of major depressive disorder.

Anxiety disorders are another common occurrence in trans individuals. Anxiety disorders consist of generalized anxiety disorder, panic disorder, and phobic disorders, all of which have higher rates in TGNC populations. It is very common for both trans and cisgender people with eating disorders to present with an anxiety disorder and depression along with their eating disorder. That said, trans people face higher risks of depression and anxiety for different reasons. For many trans individuals, the reasons and causes are often factors like facing discrimination, stigma, microaggressions, and reduced access to care (UPMC Western Behavioral Health, 2023). Anxiety and depression symptoms can often be reduced or resolved through medication and/or different forms of therapy.

Some other common co-occurring disorders are bipolar disorder, borderline personality disorder (BPD), and substance use disorders (SUDs). Bipolar disorder causes extreme mood swings including emotional highs (hypomania or mania) and lows (depression). The 2019 study looking at mental health diagnoses in trans people compared to cisgender people found that 11% of trans people had a bipolar disorder diagnosis compared to only 1.3% of cisgender people had one (Wanta et al., 2019). Substance use disorders are disorders in which someone engages in substance use that causes distress

and/or impairs their life. A substance can be defined as a drug that has addiction potential. Any substance from caffeine to sedatives and benzodiazepines can lead to a substance use disorder. Dopamine releasing substances like caffeine, alcohol, cannabis, barbiturates, etc., can lead to addiction as they all activate the reward center of your brain and produce feelings of pleasure (Cleveland Clinic, n.d.). TGNC individuals are more susceptible to developing SUDs because of the psychological stress linked to their gender identity, which also leads to disorders like anxiety and depression, and substances are often a means of trying to control the painful feelings that come along with those disorders (WebMD, 2022).

Borderline personality disorder is significantly more prominent in trans individuals but there is debate surrounding the legitimacy of these diagnoses. BPD is characterized as someone having a long-term pattern of unstable or explosive emotions, which can also result in impulsive actions, having self-image issues, and chaotic relationships with others. The legitimacy of BPD diagnoses is questioned due to part of the diagnostic criteria including "unstable self-image and struggles with identity or sense of self" (National Education Alliance for Borderline Personality Disorder, n.d.). Trans individuals often inherently face struggles with their self-image and identity. Being trans means that someone's gender identity differs from the sex they were assigned at birth, and depending on where they are in their journey, TGNC individuals will struggle with their self-image. Wanta et al. (2019) reports that 3.1% of trans individuals had a BPD diagnosis compared to only 0.09% of cisgender people having one.

Due to the overlap between many psychiatric disorders and being transgender, there are often discrepancies when it comes to diagnosing. There are a number of existing stereotypes that people with eating disorders or professionals treating eating disorders still believe and fall victim to. One of the biggest stereotypes that people, including medical professionals, fall into is that you can tell someone has an eating disorder by the way that they look. Statistics from the National Association of Anorexia Nervosa and Associated Disorders (n.d.) reported that less than 6% of people with eating disorders are medically diagnosed as underweight. That means that if we were to follow strictly whether someone is underweight, 94% of people would go undiagnosed (National Association of Anorexia Nervosa and Associated Disorders, n.d.). Additionally, it was found that people in larger bodies are actually at a higher risk of developing an eating disorder in their lives, and among the

people in larger bodies, the higher the BMI, the higher the risk of developing an eating disorder (National Association of Anorexia Nervosa and Associated Disorders, n.d.).

Another reason eating disorders often go undiagnosed is because of the belief that they are not serious disorders. Depending on the source, eating disorders have the highest or second highest mortality rate of all psychiatric disorders (South Carolina Department of Mental Health, n.d.; National Association of Anorexia Nervosa and Associated Disorders, n.d.; Eating Disorders Coalition, n.d.; National Eating Disorders Association, n.d.). Apart from the complications from eating disorders causing early deaths, suicide and suicidal behaviors are highly prevalent in individuals with eating disorders. A study by Smith et al. (2018) reported that suicide is the second leading cause of death among individuals with anorexia nervosa, and that suicidal behavior is elevated in individuals with bulimia nervosa and binge eating disorder in comparison to the general population.

HEALTHCARE ACCESS

There are a variety of factors that come into play when someone is seeking treatment for an eating disorder. When it comes to looking for places that also largely work with TGNC individuals, or are willing to accept TGNC individuals, the list of options becomes relatively short, especially depending on the level of care needed. While more facilities are becoming inclusive in accepting TGNC individuals many are still lacking appropriate methods of gender affirming care and knowledge of TGNC experiences from providers. For TGNC individuals, it is not uncommon to come across providers that completely disregard their transgender identity or make false assumptions. In a study by Duffy et al., (2016), about 11% of participants who disclosed having a transgender identity faced having their self-identification disregarded. Additionally, some participants reported the providers using inappropriate pronouns for the individual:

I have been regularly misgendered over the course of my treatment. It's kind of par for the course by now, but it's still really upsetting. Even my therapist doesn't really understand how to use my pronouns and has referred to me as "girl" and "daughter," despite the fact I've come out to her.

For many with eating disorders, body image concerns can often be a culprit and body image work can be effective. Virtually all eating disorder programs do some form of body image work, but for those whose eating disorder is largely based on gender dysphoria, typical body image work,

which is meant to improve one's relationship with their body, is not going to work the same for someone struggling with gender dysphoria. Another respondent from the Duffy et al., (2016), study stated "my eating disorder would never, ever have eased up as it did if I hadn't been able to transition and thus have the experience of liking and identifying with my body in that way first."

AFFIRMATIVE THERAPY AND GENDER AFFIRMING CARE

The lack of affirmative therapy and gender affirming care is typically not due to ill intentions but comes instead from a place of ignorance. A study by Cusack et al. (2022), focused on four different themes on how gender was incorporated into eating disorder treatment in a helpful manner. The first of the themes was looking at processing gender dysphoria. The theme of focusing on gender dysphoria was only integrated into the treatment of about 19% of the participants. Participants in the study reported that discussing their gender dysphoria also allowed them to find new strategies to alleviate disordered eating symptoms:

When my providers have been able to understand how my trans identity is connected to my eating disorder, we've been able to talk about finding alternative solutions and addressing body image holistically. (White, genderqueer/fluid, 28)

We talked about why I used my eating disorder to try to minimize gender dysphoria. My therapist encouraged me to get a binder to help me feel more comfortable in my body without my ED. (White, woman, 33)

A second theme was normalizing gender diversity. In our society, what is considered to be normal is cisgender female or cisgender male. Normalizing gender diversity can be as simple as asking someone's preferred name and pronouns. Fifteen percent of participants reported the theme of normalizing gender identity as being present in their eating disorder treatment. Participants often felt validated and that they were in a safe place which ultimately made them feel more comfortable bringing up their gender issues (Cusack et al., 2022).

Unpacking gender role expectations was another theme that TGNC participants felt was helpful in their eating disorder treatment, specifically in non-binary gender identities like genderqueer and genderfluid. When there were conversations about internalized expectations that one has for themselves, some found that the expectations they have internalized may actually come from being raised as a gender that they do not identify with (Cusack et al., 2022).

The final theme focused on in the Cusack et al. (2022) study was the therapist's characteristics and identity. When individuals come in with a stigmatized or minority identity, they tend to rely on identity cues to determine how their identity will be valued (Philip & Maimon, 2023). A non-binary individual, someone who does not identify as either male or female, reported that them and their dietitian have talked a lot about when he [the dietitian] started testosterone, it greatly impacted his hunger and energy which lead to the client feeling safe to open up and come up with an appropriate solution when going through the same situation.

Recovering from an eating disorder can exacerbate gender dysphoria, therefore the clinicians working with TGNC individuals need to be knowledgeable and educated on how to help TGNC patients cope with their gender dysphoria that does not have to do with diet or exercise (McGregor et al., 2023).

FUTURE DIRECTIONS

While there is more existing literature than expected, there are still gaps in the literature and in what research has been done. A lot of the research focused on AFAB individuals (trans men, genderqueer, genderfluid, nonbinary) and not so much on individuals that were assigned male at birth (AMAB), which could also be attributed to many of the beliefs that eating disorders only affect biological females, despite disordered eating patterns being prevalent in all trans people, not just one specific identity.

There is also a need for more information on how to provide inclusive and gender affirming care for clients and patients. Over the last 2 years, there has been an influx of articles and materials explaining what gender affirming care is and some on how to provide gender affirming care. Even within the psychology field, the American Psychiatric Association has limited information on best practices when working with TGNC individuals. For a high stress and anxiety situation like an inpatient hospitalization, there were only 2 recommendations. The first was to place TGNC patients in gender-appropriate rooms or single-occupancy rooms and that staff should use appropriate pronouns. The second recommendation is that health care providers should be educated on hormone treatments and they should only be stopped if they are doing harm to the patient (American Psychiatric Association, n.d.). While those are things that should be done, information is still severely lacking in some areas and harm may still be done to TGNC patients.

A simple thing that eating disorder facilities

can implement is a group that aims to focus more on TGNC issues. Many treatment facilities have specialty groups for things like trauma, adolescent groups, BIPOC (Black, Indigenous, and People of Color) groups, college student groups, etc. The most difficult part in constructing one of these groups would be finding a clinician that is adequately trained, but it is still possible and is important in helping show that treatment facilities are safe environments for TGNC individuals.

CONCLUSIONS

Eating disorders have shown to be highly prevalent among the trans community but not much is done to help TGNC individuals navigate recovery from their eating disorder. For many TGNC individuals, treatment centers that are supposed to be a safe environment to heal and recover are sources of anxiety due to lack of inclusion and lack of appropriate resources

and training for clinicians to provide safe and affirming environments for TGNC people. Often times, TGNC individuals face being misgendered, deadnamed, outed, and discriminated against in healthcare settings and that needs to be fixed. The stress and anxiety that many TGNC people face because of the healthcare field can just as well be what puts them in a place to need to utilize those same intensive services.

Eating disorders in the transgender and gender non-conforming communities need to be addressed. There needs to be more push on the higher-ups in charge of treatment and healthcare facilities to provide safe and welcoming environments to all, not just cisgender and heterosexual individuals. Some facilities are beginning to actively seek out providers that are trained in providing gender affirming care but even they fall short by not having the resources to allow TGNC individuals to begin the process of things like hormone therapies.

While making treatment facilities safe environments for all demographics should be a priority, they also need to be made affordable for all. Psychiatric care can be lifesaving and people should not have to turn down care or go into life-long debt just to be able to live a healthy life. While the CEOs and founders of treatment facilities should be in the business of actually helping people, many are just in the business of making money.

Trans and gender non-conforming individuals with eating disorders should not be left to fend for themselves and left to die when there are so many resources out there and yet they often are. Everyone deserves to have accessible and safe healthcare and TGNC people are no different. More needs to be done to support TGNC individuals, as they are just as deserving of living happy and health lives as their cisgender counterparts.

REFERENCES

- Accurso, E. C., Cio, A. C., Fitzsimmons-Craft, E. E., Lock, J. D., & Le Grange, D. (2014). Is weight gain really a catalyst for broader recovery?: The impact of weight gain on psychological symptoms in the treatment of adolescent anorexia nervosa. *Behaviour Research and Therapy, 56*, 1-6. <https://doi.org/10.1016/j.brat.2014.02.006>
- American Psychiatric Association. (n.d.). *Best Practices*. American Psychiatric Association. Retrieved May 14, 2024, from <https://www.psychiatry.org/psychiatrists/diversity/education/transgender-and-gender-nonconforming-patients/best-practices>
- American Psychiatric Association. (n.d.). *What is Depression?* American Psychiatric Association. Retrieved May 13, 2024, from <https://www.psychiatry.org/patients-families/depression/what-is-depression>
- American Psychiatric Association. (2022). *Diagnostic and statistical manual of mental disorders*. American Psychiatric Association. <https://doi.org/10.1176/appi.books.9780890425787>
- American Psychological Association. (n.d.). *Ethnic and Racial Minorities & Socioeconomic Status*. American Psychological Association. Retrieved May 12, 2024, from <https://www.apa.org/pi/ses/resources/publications/minorities#:~:text=The%20relationship%20between%20SES%2C%20race,SES%2C%20race%2C%20and%20ethnicity>
- Barkosky, T. (n.d.). Common Myths and Stereotypes of Eating Disorders. <https://balancedtx.com/blog/common-myths-and-stereotypes-of-eating-disorders/>
- Castro, J., Gila, A., Puig, J., Rodriguez, S., & Toro, J. (2004). Predictors of rehospitalization after total weight recovery in adolescents with anorexia nervosa. *International Journal of Eating Disorders, 36*(1), 22-30. <https://doi.org/10.1002/eat.20009>
- Cleveland Clinic. (n.d.). *Substance Use Disorder (SUD)*. Cleveland Clinic. Retrieved May 13, 2024, from <https://my.clevelandclinic.org/health/diseases/16652-drug-addiction-substance-use-disorder-sud>
- Cusack, C. E., Levenson, N. H., & Galupo, M. P. (2022). "Anorexia wants to kill me, dysphoria wants me to live": Centering transgender and nonbinary experiences in eating disorder treatment. *Journal of LGBTQ Issues in Counseling, 16*(3), 265-284. <https://doi.org/10.1080/26924951.2022.2054492>
- Dowd, R. (2021, March). *Transgender people over four times more likely than cisgender people to be victims of violent crime* [Press release]. <https://williamsinstitute.law.ucla.edu/press/ncvs-trans-press-release/>
- Duffy, M. E., Henkel, K. E., & Earnshaw, V. A. (2016). Transgender clients' experiences of eating disorder treatment. *Journal of LGBTQ Issues in Counseling, 10*(3), 136-149. <https://doi.org/10.1080/15538605.2016.1177806>
- Duffy, M. E., Henkel, K. E., & Joiner, T. E. (2019). Prevalence of self-injurious thoughts and behaviors in transgender individuals with eating disorders: A national study. *Journal of Adolescent Health, 64*(4), 461-466. <https://doi.org/10.1016/j.jadohealth.2018.07.016>
- Eating Disorders Coalition. (n.d.). *Facts About Eating Disorders*. Eating Disorders Coalition. Retrieved May 14, 2024, from https://eatingdisorderscoalition.org/inner_template/facts_and_info/facts-about-eating-disorders.html
- Flores, A. R., Meyer, I. H., Langton, L., & Herman, J. L. (2021). Gender identity disparities in criminal victimization: National crime victimization survey, 2017–2018. *American Journal of Public Health, 111*(4), 726-729. <https://doi.org/10.2105/ajph.2020.306099>
- Hoy-Ellis, C. P. (2021). Minority stress and mental health: A review of the literature. *Journal of Homosexuality, 70*(5), 806-830. <https://doi.org/10.1080/00918369.2021.2004794>
- It Gets Better. (n.d.). *Gender Expansive, Genderqueer, Gender Nonconforming*. It Gets Better. Retrieved May 12, 2024, from <https://itgetsbetter.org/glossary/gender-nonconforming/>

- Lowell, I. (2022, April 21). *Substance Use Disorder in Transgender and Nonbinary People*. WebMD. Retrieved May 13, 2024, from <https://www.webmd.com/mental-health/addiction/substance-use-disorder-transgender-nonbinary>
- McGregor, K., McKenna, J. L., Barrera, E. P., Williams, C. R., Hartman-Munick, S. M., & Guss, C. E. (2023). Disordered eating and considerations for the transgender community: a review of the literature and clinical guidance for assessment and treatment. *Journal of Eating Disorders*. <https://doi.org/10.1186/s40337-023-00793-0>
- Monteiro, D., & Poulakis, M. (2019). Effects of cisnormative beauty standards on transgender women's perceptions and expressions of beauty. *Midwest Social Sciences Journal*, 22(1). <https://doi.org/10.22543/2766-0796.1009>
- National Association of Anorexia Nervosa and Associated Disorders. (n.d.). *Eating Disorder Statistics*. National Association of Anorexia Nervosa and Associated Disorders. Retrieved May 14, 2024, from <https://anad.org/eating-disorder-statistic/#:~:text=General%20Eating%20Disorder%20Statistics,-An%20estimated%209&text=Fewer%20than%206%25%20of%20people,BMI%2C%20the%20higher%20the%20risk>.
- National Eating Disorders Association. (n.d.). *General Eating Disorder Statistics*. National Eating Disorders Association. Retrieved May 14, 2024, from <https://www.nationaleatingdisorders.org/statistics/>
- National Eating Disorders Association. (n.d.). *LGBTQIA2S Statistics*. National Eating Disorders Association. Retrieved May 12, 2024, from <https://www.nationaleatingdisorders.org/statistics/#lgbtqia2s-statistics>
- National Education Alliance for Borderline Personality Disorder. (n.d.). *Making the Diagnosis*. National Education Alliance for Borderline Personality Disorder. Retrieved May 14, 2024, from <https://www.borderlinepersonalitydisorder.org/what-is-bpd/>
- Parker, J. E., Enders, C. K., Mujahid, M. S., Laraia, B. A., Epel, E. S., & Tomiyama, A. J. (2022). Prospective relationships between skin color satisfaction, body satisfaction, and binge eating in black girls. *Body Image*, 41, 342-353. <https://doi.org/10.1016/j.bodyim.2022.04.004>
- Philip, J. S., & Maimon, M. R. (2023). Interpersonal identity cues: The effect of therapist identity on expectations for the therapeutic relationship. *Psi Chi Journal of Psychological Research*, 28(1). <https://doi.org/10.24839/2325-7342.JN28.1.67>
- Simone, M., Telke, S., Anderson, L. M., Eisenberg, M., & Neumark-Sztainer, D. (2022). Ethnic/racial and gender differences in disordered eating behavior prevalence trajectories among women and men from adolescence into adulthood. *Social Science & Medicine*, 294, 114720. <https://doi.org/10.1016/j.socscimed.2022.114720>
- Smith, A. R., Zuromski, K. L., & Dodd, D. R. (2018). Eating disorders and suicidality: What we know, what we don't know, and suggestions for future research. *Current Opinion in Psychology*, 22, 63-67. <https://doi.org/10.1016/j.copsyc.2017.08.023>
- Sonneville, K. R., & Lipson, S. K. (2018). Disparities in eating disorder diagnosis and treatment according to weight status, race/ethnicity, socioeconomic background, and sex among college students. *International Journal of Eating Disorders*, 51(6), 518-526. <https://doi.org/10.1002/eat.22846>
- South Carolina Department of Mental Health. (n.d.). *Eating Disorder Statistics*. South Carolina Department of Mental Health. Retrieved May 14, 2024, from <https://www.state.sc.us/dmh/anorexia/statistics.htm>
- Strandjord, S. E., Ng, H., & Rome, E. S. (2015). Effects of treating gender dysphoria and anorexia nervosa in a transgender adolescent: Lessons learned. *International Journal of Eating Disorders*, 48(7), 942-945. <https://doi.org/10.1002/eat.22438>
- Tamargo, C. L. (n.d.). *Ethical implications of insurance coverage limitations in eating disorder treatment* [Unpublished doctoral dissertation]. University of Miami Miller School of Medicine. https://bioethics.miami.edu/_assets/pdf/education/ethics-and-medical-humanities-pathway/ethics-and-medical-humanities-pathway-student-projects/2021-tamargo.pdf
- Toulany, A., Wong, M., Katzman, D. K., Akseer, N., Steinegger, C., Hancock-Howard, R. L., & Coyte, P. C. (2015). Cost analysis of inpatient treatment of anorexia nervosa in adolescents: Hospital and caregiver perspectives. *CMAJ Open*, 3(2), E192-E197. <https://doi.org/10.9778/cmajo.20140086>
- The Trevor Project. (2024, January 1). *Facts about suicide among LGBTQ+ young people*. The Trevor Project. Retrieved May 14, 2024, from <https://www.thetrevorproject.org/resources/article/facts-about-lgbtq-youth-suicide/>
- UPMC Western Behavioral Health. (2023, February 7). *Depression and Anxiety in The Transgender Community*. University of Pittsburgh Medical Center. Retrieved May 13, 2024, from <https://share.upmc.com/2021/09/depression-transgender-community/>
- Wanta, J. W., Niforatos, J. D., Durbak, E., Viguera, A., & Altinay, M. (2019). Mental health diagnoses among transgender patients in the clinical setting: An all-payer electronic health record study. *Transgender's Health*, 4(1), 313-315. <https://doi.org/10.1089/trgh.2019.0029>

ACKNOWLEDGMENTS

The author thanks Dr. Kara French and Professor Lauren Hill for their support and mentorship throughout this process.

Postural Orthostatic Tachycardia Syndrome in Universities: The Importance of Improving Accessibility to Accommodations

Mackenzie L. Wheelock

FACULTY MENTOR: Professor Lauren Hill

ABSTRACT

Although universities list ADA (Americans with Disabilities Act) accommodations as available for students, getting accommodations can be difficult, especially for an understudied and lesser-known disorder such as Postural Orthostatic Tachycardia Syndrome (POTS). Research demonstrates that POTS is a disorder that affects primarily women and has many different causes and symptoms which ultimately result in the autonomic nervous system functioning incorrectly. Research also indicates there is no cure or medicinal treatment. Research additionally shows patients live with difficulty completing the most rudimentary tasks. Furthermore, research demonstrates accommodations and lifestyle changes can allow patients to live a fairly normal life. However, most colleges and universities are not prepared to provide relevant (and appropriate) accommodations. This paper argues that universities should update accommodation application procedures and options by utilizing current medical research and the ADA. With proper accommodations and awareness, universities can better the lives of POTS patients and allow them to pursue not only their educational goals, but also life goals.

Keywords: Postural Orthostatic Tachycardia Syndrome; POTS; accommodations; universities; disability rights; Section 504

INTRODUCTION

In 1993, approximately seven percent of incoming first-year students were students with disabilities (West et al., 1993, p. 457). Since then, these numbers have grown to approximately 19.4% in 2018 (National Center for Education Statistics, 2018). The increasing number of students with disabilities means an increasing need for better accommodation practices. While the Americans with Disabilities Act (ADA) does not explicitly outline what constitutes a disability, the ADA does set the standards for determining if a disorder warrants accommodations from universities. In addition, Section 504 is a national law designed to protect individuals with disabilities from discrimination, as well as ensure necessary accommodations are provided. Those students with lesser-known disorders such as Postural Orthostatic Tachycardia Syndrome (POTS) may struggle to obtain accommodations. While that struggle has a variety of potential impacts on a person's life, there are some shared experiences for students during the application process. For example, Knoop and Dunwoody (2022) identified a common struggle for students with lesser-known disabilities (such as POTS) with fighting to be understood and accepted by peers and university personnel. Scholars, however, have not yet adequately addressed the growing need for disability services for students with POTS, given the present lack of accommodation availability and access. Current research primarily describes how students with disabilities have coped with universities rather than how services and accessibility should be improved to promote success for students living with POTS. Even though universities claim accommodations are available and easily accessible for all students,

universities should make improvements to the use of the ADA and Section 504 to make the process more accessible for all students with disabilities, especially those with lesser-known disorders such as Postural Orthostatic Tachycardia Syndrome.

UNDERSTANDING POSTURAL ORTHOSTATIC TACHYCARDIA SYNDROME

The first step to bettering the college experience for students with POTS is to understand the disorder and the impact on daily living and functional limitation. POTS is a form of autonomic dysautonomia. According to the National Institute of Neurological Disorders and Stroke (2023), dysautonomia involves the malfunctioning of the autonomic nervous system, specifically, the sympathetic and parasympathetic nervous system (para. 1). The autonomic nervous system (ANS) is responsible for regulating and controlling the involuntary functions of the body, such as heart rate, breathing, blood flow, blood pressure, and body temperature control (Dysautonomia International, 2019b, para. 3; Dysautonomia International, 2019c, para. 1). When the ANS functions correctly, a person does not need to worry about controlling the functions within, as the body does so automatically. In POTS patients, this regulation does not happen properly, leading to the potential onset of a wide-ranging list of symptoms. These symptoms may be debilitating in both education practices and quality of life.

In analyzing how this dysfunction of the autonomic nervous system impacts patients, researchers explored who is more likely to develop POTS and found that women comprise approximately 80% of all known cases; however,

there is no research-backed explanation for the disparity (Anderson et al., 2014; Dysautonomia International, 2019b, para. 8). Furthermore, according to Dysautonomia International (2019c), dysautonomia primarily impacts young women who look healthy on the outside (para. 3). In other words, people with POTS may not visibly stand out from their peers. This "healthy" appearance potentially leads to the development of false perceptions of good health and/or shadows the need for accommodations or disability services. Moreover, most POTS patients are diagnosed between the ages of 15 and 50 years, though the condition remains for life (Anderson et al., 2014, p. 1; Benrud-Larson et al., 2003, p. 643; Dysautonomia International, 2019b, para. 8; Knoop and Dunwoody, 2022, p.1). In many scenarios, women in this age range may be attending college, meaning universities need to be adequately prepared to provide accommodations for POTS patients to allow for equal opportunities for success.

To better understand why people living with POTS need accommodation practices at universities, an understanding of symptoms and lifestyle impacts is crucial. The malfunctioning of the autonomic nervous system leads to the development of a potentially wide array of symptoms that can vary from day to day. As for physical implications, patients can experience issues with sleep and appetite (Bruce, 2015, p. 147; Pederson & Brook, 2017, p. 75). In other words, issues can include insomnia, fatigue, or sleeping too much, as well as having no appetite or interest in food. This struggle with sleep and eating can in turn lead to struggles staying awake or focusing on tasks. However, the most common symptoms POTS patients present

with include tachycardia (racing heart), heart palpitations, nausea, dizziness, and syncope (fainting); all these symptoms have negative impacts on a patient's quality of life (Bruce et al., 2016, p. 147; Dysautonomia International, 2019b, para. 3; Knoop & Dunwoody, 2022, p. 1). These symptoms can be debilitating and decrease students' ability to succeed.

POTS symptoms are not limited solely to physical well-being, as there are also psychological impacts to be considered. For example, Anderson et al. (2014) noted that most patients had symptoms of elevated anxiety and depression, further explaining the overall quality of life was lower for patients with POTS than those without (p. 6). Essentially, patients perceive themselves as having a lower standard of living in mental health areas. Bruce et al. (2016) identified a commonality among POTS patients when the majority of the subjects struggled with regulating mood and emotions, as well as social functioning (p. 147). As patients could potentially present with one symptom or multiple, the impact POTS has on a person's life varies between patients. Each person's life alterations are different, meaning so accommodations must also be individually tailored or determined on a case-by-case basis, as Section 504 mandates.

While symptoms and their severity can vary, certain conditions can amplify or worsen symptoms. These conditions, however, would be reduced or eliminated when a student has proper accommodations. For example, even a low amount of anxiety can make symptoms profoundly worse (Benrud-Larson et al., 2003, p. 643; Knoop & Dunwoody, 2022, p. 1). This can be a concern in universities because students may feel anxiety from presentations or basic classroom activities. Furthermore, even walking can profoundly exacerbate a patient's symptoms (Benrud-Larson et al., 2003, p. 643). This amplifier can be difficult for a university student, especially if there is a lengthy distance between classes. Moreover, Bruce et al. (2016) identified amplifiers including heat, dehydration, orthostatic intolerance (difficulty standing), stress, and overexertion (p. 147). While some of these amplifiers are within a person's control, others are not, leading to challenges in daily life. However, these challenges can be reduced by adjusting school practices and minimizing the impact on educational performance and ability.

One of the most difficult elements for someone living with POTS is the lack of adequate treatment options. As mentioned by Knoop and Dunwoody (2022), there is no medicinal treatment or cure for POTS (p. 4). The lack of medicinal treatment causes POTS to affect every aspect of life negatively, from basic life activities

to education opportunities. Nevertheless, there are natural treatments that may help to lower symptom severity, including an increase in electrolytic fluids, increased salt intake, and exercise (Bruce et al., 2016, p. 147; Madaus & Shaw, 2004, p. 47). While these natural treatments can help lower symptom severity, they will not eliminate symptoms. Since there is no true, effective treatment for POTS, students need accommodations from their university to not only be able to attend college but to provide an equal opportunity for success.

DEFINING DISABILITY AND ACCOMMODATIONS

The subjective nature of accommodations and vast amounts of flexibility given to universities is a substantial issue. However, the next essential element in understanding why the lack of accommodations exists for POTS patients is understanding the premise behind university accommodations: Section 504 and the ADA. Section 504 was established as a part of the ADA's 1973 Rehabilitation Act and is civil rights legislation for people with disabilities. Section 504 was created to prohibit discrimination against those who meet the qualifications for disability and is applied to the entities that receive federal funding (i.e., universities) (Smith, 2001, p. 2; West, 1993, p. 456). While Section 504 solely applies to entities that receive federal funds, the ADA applies to every entity, except for churches and private clubs (Smith, 2001, p. 2; West, 1993, p. 456). In other words, all universities, whether they receive funding from the government or not, must comply with ADA and Section 504 regulations.

Even though Section 504 and the ADA require that accommodations be available and provided for students with disabilities, the ADA does not specify exactly what accommodations universities are to provide. This is because Section 504 plans are created individually for each student to lay out the specific accommodations needed to be successful (Dysautonomia International, 2019a, para. 2). However, certain accommodations that are recommended for and common among POTS patients, include: 1) flexible attendance; 2) flexible positioning; 3) flexible due dates; 4) extended time between classes; 5) extended time for tests/exams; 6) remote learning; and 7) modification or elimination of physical education classes (Dysautonomia International, 2019a). While each of these types of accommodation has the potential to aid the student in different ways, they are all equally beneficial in bettering the chances of success for students living with POTS. These accommodations help to create equal

opportunities for students with disabilities to perform on the same level as their peers.

While the American Disabilities Association does not contain a definitive list of medical conditions that qualify as disabilities, the ADA does list criteria for determining if a person has a disabling condition. For example, the ADA defines a person with a disability as a person who "(1) has a physical or mental impairment that substantially limits one or more major life activities, (2) has a record of such an impairment, or (3) is regarded as having such an impairment" (ADA, 2023; Smith, 2001, p. 337; Thompson-Ebanks & Jarman, 2018, p. 287). Since eligibility for section 504 is dependent on the definition of disability, a uniform definition is required. This definition from the ADA, however, is subjective, meaning the determination is up to individual interpretation by non-medical, university personnel. The subjectiveness of the definition can make the determination of who to grant accommodations challenging for universities. As a result, each university decides for itself what is "enough" to qualify for accommodations. This makes it more challenging for students to receive their accommodations, as there is no standard expectation.

With the determination for what qualifies as a "disabling condition" being vague, universities are left with a gray area in determining not only who is eligible for accommodations, but what accommodations are reasonable and warranted. For example, West (1993) further explained that because of the definition of disability, universities are left with a large amount of flexibility in providing accommodations for disabilities (p. 456). This large amount of flexibility is yet another subjective element in university accommodations, meaning the decision is at the discretion of each university's personnel rather than by a common standard. The lack of a common standard across the board at all universities means that each university must decide for itself who should be given accommodations, which means that students who have a lesser-known and understudied disorder, such as POTS, are less likely to receive their accommodations.

Even though these accommodations are seemingly simplistic, their impact on a POTS patient's success is significant. For example, Dysautonomia International (2019a) explained the high importance of these accommodations and mentioned that accommodations can improve blood circulation, reduce flare ups, prevent blood pooling, and lower symptom severity. The accommodations can be the difference between successfully completing college and not. Furthermore, each patient's

needs are different, meaning that some patients will require more accommodation than others. With a proper section 504 plan, each student will have a plan tailored to their specific needs, thus allowing a student a better opportunity to succeed in not only their college goals, but also in their career and life goals.

THE LACK OF ACCOMMODATIONS FOR POTS: WHAT IS THE CAUSE?

The first concern contributing to the present lack of accommodations for students with POTS is the inadequate system for determining eligibility for accommodations at post-secondary institutions. In determining eligibility for accommodations, universities carry the same expectations and criteria, though the implementation varies. For example, experts discovered universities determine students' eligibility for accommodations based on "the functional impact of a physical or mental impairment" (Smith, 2001, p. 4). In other words, to determine if a student is eligible to receive accommodations, university personnel look at how the disorder affects the ability to perform daily life tasks and normal classroom activities (e.g., presentations, exams, classwork). By using this method to determine eligibility for accommodations, POTS patients may not be able to acquire accommodations if the university does not believe the functional impact is significant enough.

In addition to the vague definition of eligibility, the determination of whether a condition limits a person's life substantially enough to warrant accommodations is subjective. The potential approval of accommodations is left to university personnel to use their professional and collective opinions and judgment in determining eligibility (Smith, 2001, p. 337). In other words, Section 504 and the ADA do not list specific criteria in defining "substantial" limitation so university personnel must use their judgment to determine whether a student's condition warrants accommodations. Universities commonly require a student to provide "documentation" when requesting disability services. As with defining eligibility, different universities utilize different standards, though most used are letters from doctors, test results, and clinical assessments. Additionally, universities are required to set reasonable standards for what composes adequate and acceptable documentation (Madaus & Shaw, 2004, p. 83). This "reasonable" standard, however, is not a comprehensive one, the standard is subjective and different for every university. This lack of coherence between universities leads each institution to decide what

is adequate documentation, not the medical world. This is problematic because different medical conditions have different implications on lifestyle impacts and functionality, meaning what documentation is available differs from condition to condition, which is a factor most universities do not consider when requesting documentation.

In providing documentation to request accommodations, the lack of consistent and reasonable expectations on the part of the student is another basis for the struggle to obtain accommodations. Providing documentation that is both current and comprehensive is the student's responsibility (Madaus & Shaw, 2004, p. 83; Thompson-Ebanks & Jarman, 2018, p. 297). In other words, the student must go to their physician and request some form of documentation and then self-disclose their disability to the disability resource office at the university. This requirement that the student self-disclose is important to the accommodation process because the university does not know what the student needs until the student identifies a need.

Even though the subjectivity of documentation is a substantial portion of the struggle for students with lesser-known disorders to receive their accommodations, this is not the only concern. Another sizeable issue is a lack of students' knowledge of accommodations and access. Research shows many students with disabilities reported they did not know about the services and accommodations they were entitled to or were available to them (Marshak et al., 2010, p. 154; West et al., 1993, p. 461). In other words, students were not aware that their condition met the criteria for accommodations for their university. In many cases, while accommodations were both requested and received, they were too late and/or insufficient (West et al., 1993, p. 461). This lack of knowledge surrounding the availability of disability services is perhaps one of the most significant. While students are responsible to disclose that they have a disability if they are seeking accommodation services, the university is responsible to disclose what is available to all students (Madaus & Shaw, 2004, p. 83). Without knowing services are available, students do not know how and where to request their implementation.

Once a student is aware of the availability of accommodations at their university, the next source of difficulty in receiving adequate accommodations is the perceptions of other students and faculty on the patient. Having to self-disclose can be intimidating or worrisome for the student because the student imaginably now must live with a "label" on them and being

"labeled" with a disability can drastically change others' perceptions of a person. As a result, some students don't apply for the accommodations they need, and therefore don't receive them.

As noted by Knoop and Dunwoody (2022), a common concern for POTS patients is the concern about how others would perceive their need to take time off or potential limitations of abilities (p. 4). In having different limitations or requirements compared to peers, individuals can be perceived as less capable, therefore receiving less or different opportunities. Scholars identified another barrier for POTS patients; the potential social isolation and stigmatism felt by patients from their instructors and peers due to their disability or requesting accommodations that other students did not have (Marshak et al., 2010, p. 156; Thompson-Ebanks & Jarman, 2018, p. 298; West et al., 1993, p. 462). As a result of "labeling" themselves with a disability, POTS patients can then be treated differently or stigmatized.

HOW DO INADEQUATE ACCOMMODATIONS IMPACT POTS PATIENTS?

A lack of accommodation services for POTS patients has a vast range of potential impacts on a patient in a variety of aspects. The first impact a lack of disability services has on a POTS patient is the emotional toll. While Pederson and Brook (2017) identified that social functioning is significantly affected in POTS patients, they were unable to determine to exactly what degree (p. 75). Further research into the disorder has been able to more concretely identify the aspects of social functioning that are most impacted. For example, Knoop and Dunwoody (2022) identified a trend among POTS patients of having both emotional and social costs, including reduced or limited participation in school and social activities (p. 5). Knoop and Dunwoody (2022) further explained that while participants were coping with potentially debilitating symptoms, they also had to grieve the loss of the ability to do the activities they once used to enjoy, potential loss of friendships, feelings of guilt, not meeting expectations, and their newfound lack of independence (p. 5). While many of these effects stem from the disorder itself, they are only amplified when adequate disability services are not available. This amplification can cause symptom flare ups and struggles to keep up with schoolwork and peers. However, these amplifiers can be adequately reduced with the cooperation of the university to provide POTS patients with accommodation options to allow them an equal opportunity to succeed.

Emotional costs are not the only impact of the present lack of accommodations for POTS in

universities. Another significant impact of a lack of disability services is a lack of understanding. When a student has accommodations, others do not always understand their importance, including both students and university personnel. For example, West et al. (1993) indicated a common lack of understanding and cooperation from university personnel regarding a student's accommodations and/or modifications requested by the student (p. 462). In other words, university staff do not always know how to best aid a student in determining what accommodations or modifications may need to be made. Additionally, universities also do not always assist students in cases where they do not see the need for accommodations. Too often, universities have given priority to the rules set by the professor, instead of the legal rights of the student, such as Section 504 (Marshak et al., 2010, p. 158; West et al., 1993, p. 465). When requesting accommodations, this lack of understanding could potentially lead to resistance from university personnel. This lack of understanding and miscommunication can lead to discrimination, leading to issues with completing college, attaining equal opportunities, or being seen as level with peers.

METHODS FOR IMPROVEMENT

Given the clear importance of accommodations for students with dysautonomia and the current research done by scholars, there are solutions that should be implemented to make accessing Section 504 and ADA accommodations easier for students with POTS. For example, West (1993) suggested universities should develop better methods to advertise and make known the legal rights of students with disabilities and the availability of services (p. 465). This would eliminate the issue of students' lack of knowledge surrounding their rights, which is a leading cause for the lack of accommodations being provided. The new strategies for advertising could include universities reaching out to students during the application process to the university itself, advertising during orientation, and having professors discuss the

benefits of applying for accommodations if the student sees themselves as fit. In addition, faculty at universities, especially those working in the disability resource centers, should undergo training sessions on handling cases for students with invisible disabilities, such as POTS.

While the increased advertisement of disability rights and resources is needed, this is not the only viable solution to be implemented. The lack of consistency across universities with regard to accommodations must be eliminated or reduced to further benefit the lives of students living with POTS. For example, West (1993) wrote that even though accommodations are best for students when they are structured and tailored to each student's individual needs, there is a need for consistent standards across universities (p. 466). Section 504 and the ADA stipulate accommodations are to be created individually for each individual. However, the criteria that decide whether a student is eligible to receive accommodations should be similar across universities. By doing so, the subjectivity of the definition of "eligibility" would be lowered and students would have a clearer image of what is needed to be qualified to receive their accommodations.

While raising awareness of accommodations and consistent expectations is needed, another potential solution for improving accommodation availability for students with POTS raising acceptance and understanding by others. As explained by Knoop and Dunwoody (2022), there is a necessity for others to comprehend the burden of POTS, including an evident need for more acceptance and understanding (p. 3). In other words, university personnel and students alike need to be more understanding and accepting of students with disabilities and accommodations, even if they are "seemingly unnoticeable" disabilities like POTS. A better understanding of the life-changing implications of living with POTS is needed to help others understand why the accommodations are necessary and not an advantage. While this understanding is a difficult barrier, conversations about acceptance would help break down this

barrier and further better relationships.

While these solutions are viable and seemingly not difficult to implement, there may be hesitation among universities. As described by West et al. (1993), the current research into disability services at universities focuses on how students manage their disabilities in college rather than how to improve disability services for students to encourage growth and success for all students (p. 457). As a consequence for this lack of research, many universities have held the same practices and utilized them for all disabilities, rather than adjusting with the changing times and medical requirements (West, 1993). While this lack of adjustment could be due to a lack of training, funding, or personnel, the changes still need to be made. By keeping the same subjective standards, universities are not making advancements to improving the lives of students with lesser-known disabilities such as Postural Orthostatic Tachycardia Syndrome.

CONCLUSION

POTS is a disorder categorized by a malfunctioning autonomic nervous system, leading to a wide array of potential symptoms, each bringing forth its own challenges and obstacles. These challenges can be debilitating and having proper accommodations at universities is crucial to bettering the lives of students with POTS. The current suggestions focus on increased awareness of available services, improved consistency of services, and improved accessibility to services. These solutions are not the only viable options. Further research is needed to make the process of obtaining accommodations easier, to better advertise the availability of accommodations, and to find consistent standards for accommodation eligibility across universities. This future research and improvement on current conditions for students with disabilities can drastically change the outcome and college experience of not only students with disabilities, but for all college students.

REFERENCES

- American Disabilities Association. (2020). Guide to disability rights laws. American Disabilities Association. <https://www.ada.gov/resources/disability-rights-guide/>
- Anderson, J. W., Lambert, E. A., Sari, C. I., Dawood, T., Esler, M. D., Vaddadi, G., & Lambert, G. W. (2014). Cognitive function, health-related quality of life, and symptoms of depression and anxiety sensitivity are impaired in patients with the postural orthostatic tachycardia syndrome (POTS). *Frontiers in Physiology, 5*(230). <https://doi.org/10.3389/fphys.2014.00230>
- Benrud-Larson, L.M., Sandroni, P., Haythornthwaite, J. A., Rummans, T. A., & Low, P. A. (2003). Correlates of functional disability in patients with postural tachycardia syndrome: Preliminary cross-sectional findings. *Health Psychology, 22*(6), 643-648. <https://doi.org/10.1037/0278-6133.22.6.643>
- Bruce, B.K. (2016). Interdisciplinary treatment of maladaptive behaviors associated with postural orthostatic tachycardia syndrome (POTS): A case report. *Journal of Clinical Psychology in Medical Settings, 23*(2), 147-59. <https://doi.org/10.1007/s10880-015-9438-3>
- Dysautonomia International. (2019a). Classroom accommodations for children with dysautonomia. <https://www.dysautonomiainternational.org/page.php?ID=107>
- Dysautonomia International. (2019b). Postural orthostatic tachycardia syndrome. <http://www.dysautonomiainternational.org/page.php?ID=30>
- Dysautonomia International. (2019c). What is dysautonomia? <http://www.dysautonomiainternational.org/page.php?ID=34>
- Knoop, I., & Dunwoody, L. (2022). "You're always fighting": The lived experience of people with postural orthostatic tachycardia syndrome (POTS). *Disability and Rehabilitation, 1*(7). <https://doi.org/10.1080/09638288.2022.2071482>
- Madaus, J.W. (2004). Section 504: Differences in the regulations for secondary and postsecondary education. *Intervention in School and Clinic, 40*(2), 81-87. <https://doi.org/10.1177/10534512040400020301>
- Marshak, L., Van Wieren, T., Ferrell, D. R., Swiss, L., & Dugan, C. (2010). Exploring barriers to college student use of disability services and accommodations. *Journal of Postsecondary Education and Disability, 22*(3), 151-165. <https://files.eric.ed.gov/fulltext/EJ906688.pdf>
- National Center for Education Statistics. (2018). Students with disabilities. <https://nces.ed.gov/fastfacts/display.asp?id=60#:~:text=In%202015%E2%80%9316%2C%20the%20percentage%20of%20undergraduates%20who%20reported,male%20students%20and%2020%20percent%20for%20female%20students.>
- National Institute of Neurological Disorders and Stroke. (2023). Dysautonomia. *National Institute of Neurological Disorders and Stroke*. <https://www.ninds.nih.gov/health-information/disorders/dysautonomia#:~:text=Dysautonomia%20is%20a%20disorder%20of,parasympathetic%20parts%20of%20the%20ANS.>
- Pederson, C. L., & Brook, J. B. (2017). Health-related quality of life and suicide risk in postural tachycardia syndrome. *Clinical Autonomic Research, 27*(2), 75-81. <https://doi.org/10.1007/s10286-017-0399-5>
- Smith, T.E.C. (2001). Section 504, the ADA, and public schools: What educators need to know. *Remedial and Special Education, 22*(6), 335-343. <https://doi.org/10.1177/074193250102200603>
- Thompson-Ebanks, V., & Jarman, M. (2018). Undergraduate students with nonapparent disabilities identify factors that contribute to disclosure decisions. *International Journal of Disability, Development and Education, 65*(3), 286-303. <https://doi.org/10.1080/1034912X.2017.1380174>
- West, M. (1993). Beyond section 504: Satisfaction and empowerment of students with disabilities in higher education. *Exceptional Children, 59*(5), 456-467. <https://doi.org/10.1177/001440299305900508>

ACKNOWLEDGMENTS

The author thanks Professor Lauren Hill for her help, guidance, and constant support throughout the writing of this paper.

Evaluating the Need for a Comprehensive Battery of Assessments to Track Concussion Recovery in the Subacute Period

Samantha Watson

FACULTY MENTOR: Dr. Timothy Werner

ABSTRACT

Concussions, or mild traumatic brain injuries (mTBI), affect millions of people living in the United States each year, especially adolescent athletes. Various neurocognitive assessments have been developed and tested to diagnose these concussions in the acute period, less than 72 hours after injury. Little research has been done on which of these assessments, if any, are most appropriate for tracking concussion recovery in the subacute period, which is greater than 72 hours after injury. The CDC advises return to play based solely on the subjective reporting of symptoms, leaving room for adolescent athletes to falsely claim they are asymptomatic and return to play before their concussion has resolved. Finding objective measurements to assess recovery from a concussion is important for preventing long term problems due to premature return to activities with unresolved symptoms and deficits. This meta-analysis has revealed a highly controversial area of study and determined a select group of assessments to create a battery appropriate for and sensitive to tracking concussion recovery in the subacute period. The tests suggested for a longitudinal study following this meta-analysis include computerized neurocognitive assessments (NCATs), vestibular, balance and oculomotor assessments, and fluid-biomarker tests. Specific functions assessed by these tests include memory, reaction time, balance, sensorimotor integration, postural sway, and possible chronic inflammation due to mTBI. The conclusions of this study indicate greater research is necessary to determine the most appropriate assessments for tracking mTBI recovery in adolescent athletes during the subacute period.

Keywords: concussion, mTBI, subacute period, recovery, assessments, adolescents

INTRODUCTION

Concussions affect millions of people living in the United States each year with children, adolescents, and young adults participating in sports having an increased incidence of concussions over the last two decades (Dessy et al., 2017; Schatz & Sandel, 2013; Servatius et al., 2018). A concussion, or mild traumatic brain injury (mTBI), can result in a variety of symptoms including, headaches, nausea, dizziness or vertigo, balance problems, double vision, confusion, sensitivity to light or sound, brain fog, inability to fall asleep or stay asleep, fatigue, irritability, and mood swings (Kontos et al., 2012; Langevin et al., 2022). In most concussions, these symptoms resolve in 7-10 days, however, many still face symptoms for weeks later, suffering from what is referred to as persistent post concussive symptoms (PPCS) (Langevin et al., 2022). Additionally, concussion related deficits have been found in asymptomatic individuals weeks after they were cleared to return to normal activity, calling into question the ways health care providers are assessing concussion recovery (Servatius et al., 2018). The diagnosis of concussions based on the deficits that cause the previously mentioned symptoms are often attempted to be measured objectively by neurocognitive assessments; the tests that have been at the center of the mTBI research over the last decade. Recent research has assessed and compared the validity and sensitivity of newer,

computer based neurocognitive assessments to that of their older, paper counterparts (Arrioux et al., 2017; Cole et al., 2018; Schatz & Sandel, 2013). These computerized neurocognitive assessments tools (NCATs) take in total 20-30 minutes to complete with anywhere from four to nine subtests included within one assessment to assess memory, attention, reaction time, impulse control and various other basic cognitive functions (Cole et al., 2018; Randolph et al., 2005). Both paper and computerized tests have become standard practice for the diagnosis of concussions within the acute period, less than 72 hours post-injury, both on the sidelines of athletic events as well as in clinical offices (Schatz & Sandel, 2013; Cole et al., 2018; Arrioux et al., 2017). But are these diagnostic assessments fit to be used to assess and track concussion recovery in the subacute period, more than 72 hours after injury? There is controversy surrounding which, if any, tests are appropriate for use and to what degree they properly assess a variety of neurocognitive, vestibular, balance, and visual deficits that result from concussions.

The lack of objective and sensitive measures available to track concussion recovery in the subacute period leaves only subjective symptom measurements, like the Post-Concussion Symptom Scale (PCSS), and tests not thoroughly researched outside of the acute period as the markers for resolution of a concussion (Gera et al., 2018; CDC, 2019; Servatius et al., 2018;

Wright et al., 2017). This paper will assess what neurocognitive assessments are appropriate for use in tracking concussion recovery and take a closer look at vestibular, balance, and visual assessments as well as advancements in technologies including wearable balance technology and biomarkers that could provide the most objective measures of concussion recovery.

METHODS

This study was not experimental in nature. Instead, articles were found on databases Salisbury University and other Maryland School System Partners provided access to. Literature was found using advanced search Boolean operations on both Salisbury University's WorldCat Discovery general search, which prompts you to access articles via other databases, as well as on PubMed. There were several keywords used in several combinations in Boolean searches: concussion/mild traumatic brain injury/mTBI, neurocognitive tests, vestibular tests, balance tests, visual tests, and later, biomarkers. These terms were chosen to form a pool of articles that assessed the validity and sensitivity of a variety of neurocognitive, vestibular, and balance tests used both during the acute and the subacute periods of a mild traumatic brain injury. All but one article selected focused on mTBI. Focusing on mTBI research was important since other more severe

traumatic brain injuries (TBIs) can be diagnosed with objective measurements like MRIs and CT scans and concussions cannot. The outlier article focuses its research on biomarkers, a relatively new development in the TBI field, and the results found were still useful in determining what biomarkers could be associated with mTBI (Werhane et al., 2017). It is also important to note that articles were selected regardless of the gender, age, or group (military or athlete) studied. This decision was made based on the underwhelming amount of research done and the lack of research that distinguished between these groups. However, most experimental studies used were assessing male and female adolescents and young adults ages 13-24, many of whom were also athletes. Both experimental studies and literature reviews were collected from various peer-reviewed scientific journals, including clinical journals specializing in neurological areas of interest, journals of sports medicine and athletic training, and a military journal. By collecting articles from a wide variety of databases that pull from an even wider variety of journals, there is a high confidence that the synthesis of the articles used in this paper reflect accurate, scholarly information.

LITERATURE REVIEW

COMPUTERIZED NEUROCOGNITIVE ASSESSMENTS

Nearly two decades ago, Randolph et al. (2005) developed a set of steps to analyze traditional neuropsychological (NP) tests for use in concussion management. These steps were: 1. Test-retest reliability, 2. Sensitivity between concussed and control groups differences, 3. Validity, 4. Confidence intervals, and 5. Clinical Utility, which includes providing cutoff scores based on normal populations to determine return to activity (Randolph et al., 2005). Since the publication of this paper, many researchers have used this model to assess if the use of various neurocognitive assessments are appropriate, including the computerized versions of the traditional paper and pencil assessments.

NP tests and NCATs have been widely studied and compared to each other on various populations including high school students, college athletes, and active-duty military members during the acute period (Arrieux et al., 2017; Dessy et al., 2017; Cole et al., 2018; Randolph et al., 2005; Schatz & Sandel, 2013; Servatius et al., 2018). The comparison between traditional paper and pencil NP tests and NCATs showed most NCATs to be unreliable, invalid, and not as sensitive to between group differences as NP tests (Arrieux et al., 2017; Cole et al.,

2018). However, the researchers of these studies came to the conclusion that comparing NP tests and NCATs and analyzing the aspects of NCATs the same way Randolph et al. (2005) analyzed NP tests may not be appropriate, as changing the mode of the assessment wholly changes the cognitive structures assessed by each test (Arrieux et al., 2017; Cole et al., 2018).

This body of research has controversy surrounding which test or tests are the most valid, reliable, or sensitive in the acute and subacute periods. Meta analyses that assess clinical utility point out the lack of research on these tests during the subacute period, the period most relevant to this study (Cole et al., 2018; Dessy et al., 2017; Servatius et al., 2018). There were nine of these NCATs studied in the literature gathered for this paper: The Immediate Post-Concussion Assessment and Cognitive Testing (ImPACT) tool, Post Concussion Symptom Scale (PCSS) (stand alone as well as part of ImPACT assessment), Automated Neuropsychological Assessment Metric (ANAM), CNS-Vital Signs (CNS-VS), Axon/CogState/CogSport (CogState or CogSport), Rapid Defense Automated Neurobehavioral Assessment (DANA), The Standardized Concussion Assessment Tool (SCAT3, SCAT6), and the Concussion Resolution Index (CRI) (Arrieux et al., 2017; Cole et al., 2018; Dessy et al., 2017; Patricios et al., 2023a; Schatz & Sandel 2013; Servatius et al., 2018; Yue et al., 2020). The majority of the literature suggests that no one test is fit for use on its own for the diagnosis of a concussion and the literature is entirely mixed on which NCATs are clinically useful, especially in the subacute period. Some researchers found the ImPACT to be an independent, comprehensive assessment with clinical utility immediately after injury and up to 7 days post injury, which technically falls into the subacute time period (Arrieux et al., 2017; Dessy et al., 2017; Schatz & Sandel, 2013). But there are others who studied the ImPACT in the subacute period, up to 120 days post injury, who found a lack of sensitivity in the ImPACT assessment to asymptomatic concussed individuals (Servatius, 2018). Studies that concluded any NCAT was viable for use during the subacute period, like the ImPACT, and the response inhibition and reaction time assessments of the DANA rapid battery, either had researchers with a conflict of interest or lacked a significant pool of participants (Dessy et al., 2017; Servatius et al., 2018).

BALANCE ASSESSMENTS

The virtual reality (VR) balance assessment is a computer program that is compatible with commonly available technologies (Wright

et al., 2017). During this test, a patient stands on two different surfaces (firm and foam), with eyes open or closed, and with a static or dynamic image on a screen just over a foot away from their face, creating six different scenarios for measurement (Wright et al., 2017). Assessed during the subacute period, the dynamic visual on firm and foam surfaces with eyes open conditions proved to be highly sensitive to the concussed group and showed them having greater postural sway (Wright et al., 2017). A different study assessed the sensitivity of a wearable inertial sensor to assess postural sway during a modified Clinical Test of Sensory Integration and Balance (mCTSIB), that only included four conditions (eyes open firm and foam surfaces and eyes closed firm and foam surfaces), was shown to be sensitive in three out of four conditions, but was only tested in the acute period (Gera et al., 2018). The Balance Error Scoring System (BESS), which measures postural stability by having a trained observer count errors in balance for various conditions, was not sensitive to differences between concussed and non-concussed individuals in the subacute period (Wright et al., 2017).

VISUAL/OCULOMOTOR ASSESSMENTS

Rapid Horizontal Eye Saccades is a quick assessment where a patient reports symptoms before and after quickly saccading only their eyes left and right between two targets for 1 minute at 120 beats per minute (bpm) (Wright et al., 2017). Similarly, Optokinetic Stimulation (OKS) also required a symptom report, but this time before and after watching a striped visual stimulus move horizontally across their field of view (Wright et al., 2017). Near Point Convergence (NPC) is a typical oculomotor assessment testing one's ability to keep a target from going double as it is brought closer and closer to their nose (Wright et al., 2017). Rapid Horizontal Eye Saccades, OKS, and NPC all showed discriminatory abilities between concussed and non-concussed individuals in the subacute period, and were combined with the dynamic foam VR based balance assessment previously discussed to create a statistical model that showed a sensitivity to concussion of 100% (Wright et al., 2017). The King Devick (KD) Oculomotor Test was the only test included during previously discussed analyses of NCATs, as it also assesses language usage (cognitive function) to read numbers off cards as rapidly as possible (Dessy et al., 2017). The KD test only showed sensitivity immediately post injury, as a sideline assessment (Dessy et al., 2017). In a study of balance, oculomotor and vestibular assessments in the acute and subacute periods,

the KD test lacked sensitivity to differences between concussed and non-concussed individuals (Wright et al., 2017).

VESTIBULAR ASSESSMENTS

The Vestibular/Ocular Motor Screening (VOMS) and eye tracking were suggested as assessments for sideline testing and recovery tracking (Patricios et al., 2023a; Patricios et al., 2023b; Yue et al., 2020). However, these tests lack substantial research in both the acute and subacute periods and VOMS can suffer the same problems self-reported symptom assessments, like the PCSS, face (Yue et al., 2020). Wright et al. (2017) did not include the Dynamic Visual Acuity Test, Horizontal Gaze Stabilization Test (GST), or Head Thrust (VOR Test) vestibular tests in their model as these tests were not sensitive to group differences between concussed and control groups. Interestingly, the GST was still sensitive to differences in the group symptoms (Wright et al., 2017). The researchers note that the results of the vestibular assessments and balance assessments with eyes closed, relying heavily on the vestibular system, indicate how deficits in multiple systems of the body (other than just the vestibular system) lead to dysfunction post-concussion (Wright et al., 2017).

BIOMARKERS

While biomarkers need greater research as both a diagnostic and recovery tracker tool, the recent research and FDA approval of certain biomarkers like serum glial fibrillary acidic protein (GFAP) and ubiquitin carboxyl-terminal hydrolase L1 (UCH-LI) show that biomarkers could become clinically useful, objective measures to track recovery from a concussion (Patricios et al., 2023a; Yue et al., 2020). Another study assessed the use of neuroinflammation related cytokines to assess acute and chronic TBI but did not focus on the use of these biomarkers during the recovery of a mTBI (Werhane et al., 2017).

OTHER ASSESSMENTS

Reviewed at the Sixth International Conference on Concussion in Sport in October 2022, the Sport Concussion Office Assessment Tool-6 (SCOAT-6) is an assessment battery designed to assess concussion recovery in the subacute period (Patricios et al., 2023a; Patricios et al., 2023b). Made of individually validated components, this assessment has been researched and found valid and sensitive only in a 3-30-day time period, leaving healthcare providers without an important tool to track the progress of patients with unresolved concussions after this time (Patricios et al., 2023a). However, as a tool for managing concussions, and even treating them, the SCOAT-6 may help providers

assess which individuals need to seek further therapies and interventions like vestibular and vision therapy (Patricios et al., 2023a). Another test, that does not quite fit into the other categories of assessments, was the Grooved Pegboard Test, specifically with the non-dominant hand where a participant had to place 25 pegs into 25 holes row by row as fast and with as little mistakes as possible (Servatius et al., 2018).

FINDINGS

The lack of a consensus on NCATs as well as the controversy of using a comparison of NP tests to NCATs may lead to the development of a separate assessment for NCATs, like the one Randolph et al. (2005) developed. Researchers suggest approaching future NCAT research using analyses that make the comparison of different NCAT tests easier and more valid by using raw, non-standardized, scores that are not skewed by varying normative databases and calculations compiling several subtests for various deficiencies (Cole et al., 2018). Studying NCATs in this way while also testing them with other vestibular, visual/oculomotor, and balance assessments in a large battery in the subacute period may lead to more definitive answers about which NCATs are the most appropriate for tracking concussion recovery. Creating a longitudinal study in which cohorts of concussed individuals are tracked and tested weekly throughout their recovery if symptoms do not resolve within 10 days and are compared to a matched control could test the sensitivity and retest reliability of the most promising assessments for tracking recovery in the subacute period.

Analysis of the current literature has indicated possible tests that should be included in a hypothetical longitudinal study assessing how the sensitivity of widely implemented NCATs, like the ImpACT, are affected when paired with vestibular, oculomotor, balance, and biomarker tests with shown sensitivity in the subacute period. The ImpACT should be included in a longitudinal study, given its mixed findings and prevalence of use internationally at the high school and college level (Dessy et al., 2017). The DANA Rapid Battery Assessment (short reaction time and response inhibition components specifically) should be included due to its high sensitivity, as determined by the only study which included it and lack of contradicting evidence (Dessy et al., 2017; Servatius et al., 2018). Balance tests assessing postural sway should be studied further in the subacute period as a part of a longitudinal study. The VR balance assessment, specifically under the condition

with eyes open on a foam surface with dynamic visual changes, should be included given its inclusion in a statistical model that determined it contributed to a 100% sensitivity (Wright et al., 2017). Additionally, the mCTSIB with wearable belt technology should be included for testing in the subacute period given its sensitivity in three of four conditions in the acute period (Gera et al., 2018; Wright et al., 2017). Oculomotor assessments to include are the Rapid Horizontal Eye Saccades, OKS, and NPC given their inclusion in a statistical model that showed 100% sensitivity in the subacute period (Wright et al., 2017). Other assessments to include are the PCSS and VOMS, even given their subjective nature, as they help to provide a holistic view of a patient and would allow clinicians to track symptom changes over time which could also help patients struggling with symptoms after two to three weeks get recommended for other therapies and interventions (Langevin et al., 2022; Patricios et al., 2023a). The Grooved Pegboard Assessment with a non-dominant hand was not frequently brought up, but given its simplistic nature, ease of administration, and simple scoring, should be included as a highly feasible addition to the widely accepted SCOAT-6 if it proves to be sensitive in the subacute period in larger longitudinal studies (Patricios et al., 2023a; Servatius et al., 2018). The SCOAT6 should be included as well based on its international acceptance (Patricios et al., 2023a). Fluid biomarkers like serum GFAP and UCH-LI must be included, as their limited amount of research has shown great promise with high positive and negative predictive values indicating the possibility that they could prove to be highly objective for tracking concussion recovery (Patricios et al., 2023a; Yue et al., 2020).

The majority of the literature suggests no one assessment should be used on its own for the diagnosis of a concussion which is why although they are relatively less researched areas of study, balance, vestibular, oculomotor, and fluid biomarker tests must be combined with common NCAT assessments in order to create more objective measures for tracking concussion recovery. Combining NCAT assessment with other tests that test a broader range of symptoms and deficits could improve the sensitivity of tests administered during the subacute period. Since the CDC's own guidelines for returning to school and sports is solely symptom based, health care providers and athletic trainers have no objective measures to protect adolescents from themselves if they falsely claim to be asymptomatic to return to play before their concussion is fully resolved ("Returning to Sports and Activities," 2019). Finding objective measurements to

assess recovery from a concussion is important for preventing long term problems due to premature return to activities with unresolved symptoms and deficits. These problems include second impact syndrome (SIS), which can lead to death, chronic traumatic encephalopathy (CTE), a condition whose consequences are still being researched, and chronic symptoms that could lead to future injury or learning gaps, like balance, oculomotor, or vestibular dysfunction (Patricios et al., 2023a; Gera et al., 2018; Servatius et al., 2018; Dessy et al. 2017). These concerning outcomes have particular importance for high school and collegiate athletes who have a higher incidence of concussions, especially in contact sports (Servatius et al., 2018).

DISCUSSION AND CONCLUSION

The goal of this research was not to find one perfect test. Concussion patients, especially adolescent athletes, need a sensitive, reliable, and valid battery that assesses a wide range of symptoms and deficits. This will provide clinical utility in the subacute period and help their healthcare provider track their concussion

recovery and determine their readiness for a safe return to play. This research study had limitations, primarily, in the research available to study. Not all studies were large, experimental studies, some studies had conflicts of interest present, and some studies were not assessing utility during the subacute period. The research could have also included greater statistical analysis about the various tests discussed.

As research in this field expands and progresses, this paper hopes to serve as the starting point for the next battery of assessments that is tested during the subacute period, starting with high school and collegiate athletes. Special attention should be placed on assessing the newly established biomarkers for sensitivity and clinical utility in the subacute period of a mTBI, as well as larger studies assessing the use of NCATs, vestibular, balance, and oculomotor assessments together in the subacute period, with the possibility of discriminating between symptomatic and asymptomatic individuals. Future research should also consider the feasibility and ease of which these tests could be conducted in doctors', athletic trainers', and

vestibular and visual therapists' offices. Research approximating the level of symptoms needing to be present after 10 days to recommend interventions like vestibular and vision therapy is also needed.

Although no major group differences in recovery have been found between males and females, much of the research focuses greatly on men or men's sports (Patricios, 2023a). Male athletes in contact sports have not been found to lead to greater incidences of long-term cognitive dysfunction or impairment, neurological disease, or mental health problems (Patricios et al., 2023a). However, this entirely leaves out half the world's population. There is a lack of research on the effects of a concussion on a woman's hormones and menstrual cycle and how these changes affect their recovery and long-term problems.

Altogether, this meta-analysis found few concrete answers about testing for concussion recovery in the subacute period. What it did find was promising assessments, ideas for how to test them longitudinally in the subacute period, and many more questions.

REFERENCES

- Arrieux, J. P., Cole, W. R., Ahrens, A. P. (2017). A review of the validity of computerized neurocognitive assessment tools in mild traumatic brain injury assessment. *Concussion*, 2(1). <https://doi.org/10.2217/cnc-2016-0021>
- CDC. (2019, February). *Returning to Sports and Activities*. U.S. Centers for Disease Control and Prevention. www.cdc.gov/headsup/basics/return_to_sports.html#print
- Cole, W. R., Arrieux, J. P., Ivins, B. J., Schwab, K. A., & Qashu, F. M. (2018). A comparison of four computerized neurocognitive assessment tools to a traditional neuropsychological test battery in service members with and without mild traumatic brain injury. *Archives of Clinical Neuropsychology*, 33(1), 102–119. <https://doi.org/10.1093/arclin/acx036>
- Dessy, A. M., Yuk, F. J., Maniya, A. Y., Gometz, A., Rasouli, J. J., Lovell, M. R., & Choudhri, T. F. (2017). Review of Assessment Scales for Diagnosing and Monitoring Sports-related Concussion. *Cureus*, 9(12), e1922. <https://doi.org/10.7759/cureus.1922>
- Gera, G., Chesnutt, J., Mancini, M., Horak, F. B., & King, L. A. (2018). Inertial sensor-based assessment of central sensory integration for balance after mild traumatic brain injury. *Military Medicine*, 183, 327–332. <https://doi.org/10.1093/milmed/usx162>
- Kontos, A. P., Elbin, R. J., Schatz, P., Covassin, T., Henry, L., Pardini, J., & Collins, M. W. (2012). A revised factor structure for the post-concussion symptom scale. *The American Journal of Sports Medicine*, 40(10), 2375–2384. <https://doi.org/10.1177/0363546512455400>
- Langevin, P., Frémont, P., Fait, P., & Roy, J. S. (2022). Responsiveness of the Post-Concussion Symptom Scale to Monitor Clinical Recovery After Concussion or Mild Traumatic Brain Injury. *Orthopaedic Journal of Sports Medicine*, 10(10), 23259671221127049. <https://doi.org/10.1177/23259671221127049>
- Patricios, J. S., Schneider, K. J., Dvorak, J., Osman, H. A., Blauwet, C., Cantu, R. C., Davis, G. A., Echemendia, R. J., Makdissi, M., McNamee, M., Broglio, S., Emery, C. A., Feddermann-Demont, N., Gordon, W. F., Giza, C. C., Guskiewicz, K. M., Hainline, B., Iverson, G. L., Kutcher, J. S., . . . Meeuwisse, W. (2023a). Consensus statement on concussion in sport: the 6th International Conference on Concussion in Sport—Amsterdam, October 2022. *British Journal of Sports Medicine*, 57(11), 695–711. <https://doi.org/10.1136/bjsports-2023-106898>
- Patricios, J. S., Schneider, G. M., Jacqueline, v. I., Purcell, L. K., Davis, G. A., Echemendia, R. J., Fremont, P., Gordon, W. F., Herring, S. A., Harmon, K. G., Holte, K., Loosemore, M., Makdissi, M., McCrea, M., Meehan, William P., I., II, O'Halloran, P., Premji, Z., Putukian, M., Isla, J. S., . . . Schneider, K. J. (2023b). Beyond acute concussion assessment to office management: a systematic review informing the development of a Sport Concussion Office Assessment Tool (SCOAT6) for adults and children. *British Journal of Sports Medicine*, 57(11), 737–748. <https://doi.org/10.1136/bjsports-2023-106897>
- Randolph, C., McCrea, M., & Barr, W. B. (2005). Is neuropsychological testing useful in the management of sport-related concussion? *Journal of Athletic Training*, 40(3), 139–52. <https://doi.org/10.1177/0363546512466038>
- Schatz, P., & Sandel, N. (2013). Sensitivity and specificity of the online version of impact in high school and collegiate athletes. *American Journal of Sports Medicine*, 41(2). <https://doi.org/10.1177/0363546512466038>
- Servatius, R. J., Spiegler, K. M., Handy, J. D., Pang, K. C. H., Tsao, J. W., Mazzola, C. A. (2018). Neurocognitive and fine motor deficits in asymptomatic adolescents during the subacute period after concussion. *Journal of Neurotrauma*, 35(8), 1008–1014. <https://doi.org/10.1089/neu.2017.5314>
- Werhane, M. L., Evangelista, N. D., Clark, A. L., Sorg, S. F., Bangen, K. J., Tran, M., Schiehser, D. M., & Delano-Wood, L. (2017). Pathological vascular and inflammatory biomarkers of acute- and chronic-phase traumatic brain injury. *Concussion (London, England)*, 2(1), CNC30. <https://doi.org.proxy-su.researchport.umd.edu/10.2217/cnc-2016-0022>
- Wright, W. G., Tierney, R. T., & McDevitt, J. (2017). Visual-vestibular processing deficits in mild traumatic brain injury. *Journal of Vestibular Research : Equilibrium & Orientation*, 27(1), 27–37. <https://doi.org/10.3233/VES-170607>
- Yue, J. K., Phelps, R. R. L., Chandra, A., Winkler, E. A., Manley, G. T., & Berger, M. S. (2020). Sideline concussion assessment: the current state of the art. *Neurosurgery*, 87(3), 466–475. <https://doi.org/10.1093/neuros/nyaa022>

ACKNOWLEDGMENTS

The author thanks Dr. Timothy Werner and the Clarke Honors College for the opportunity to write this paper and for the support in all her endeavors. She also thanks Librarian Emily Zerrenner for her guidance in conducting this research.

Preventing K-12 School Shootings: Training Educators to Recognize Warning Signs in Students

Allison Yeager

FACULTY MENTOR: Dr. Viktoria Basham

ABSTRACT

The number of K-12 school shootings has been rapidly increasing in the United States for the past few years. Many innocent students and teachers have either lost their lives or have been wounded physically or mentally. In order to potentially prevent school shootings, action must be taken before the shooter makes the decision to become violent in the first place. I have analyzed scholarly journals and articles about the behaviors school shooters had exhibited prior to the shootings, and the data shows that they all showed similar warning signs that could have indicated their potential to become violent. I have also reviewed research about prevention and training measures that are currently in place, and I have analyzed their benefits and drawbacks. I argue that school shootings could be prevented by implementing school counselor-led training sessions for educators focusing on identifying early warning signs that might lead to a shooting. If distressed students are identified and given proper treatment early, overall violence in youth could be decreased, and more K-12 school shootings in the United States could be prevented.

Keywords: K-12 schools, school shootings, teachers, students, behavior, violence, warning signs, training, prevention measures, school counselors

School shootings have alarmingly increased in American K-12 schools in the past few years (Reidman, 2023). Consequently, many innocent students and staff have been wounded or murdered (Reidman, 2023). To try and combat the rapid increase in K-12 school shootings, many schools have tried to implement new safety and security measures that have some benefits, but they do not have direct prevention on school shootings (Gerlinger & Schleifer, 2021). A significant area in which K-12 schools lack is prevention methods that can stop K-12 shootings before the shooter even makes a plan to fire their gun in a school (Avi Astor et al., 2022). Even though physical security measures have some benefits, K-12 school shootings can be prevented by training educators about the early warning signs of a potential student school shooter because concerning behaviors could be revealed in the classroom. The goal of this paper is to address the gap between teacher training and school shootings by explaining how it is beneficial to try to prevent shootings before the perpetrator thinks about hurting others.

THE PSYCHOLOGICAL EFFECTS OF K-12 SHOOTINGS

School shootings do not only cause harm to physical health, but also have an effect on mental health for students, teachers, and parents. Rossin-Slater (2022) found that young students who experience school shootings are affected psychologically. A traumatic event, such as a school shooting, is likely to result in mental illness in victims due to psychological stress. Reliving certain situations that remind someone of the

shooting they experienced can put someone into a state of panic and anxiety, which is also known as Post-Traumatic Stress Disorder according to the American Psychological Association (2022).

According to the Substance Abuse and Mental Health Services Administration (SAMHSA) (2023), Post-Traumatic Stress Disorder, also known as PTSD, is a disorder developed in those who experience frightening or life-threatening events that cause severe distress. School shootings are events that can cause PTSD in students, teachers, and even parents or citizens who were not present at the time of the shooting. After experiencing a school shooting, hearing a loud noise that resembles a gunshot or someone screaming can cause anxiety and stress in those who were at school during the shooting. PTSD can also cause mental flashbacks that trigger anxiety or distress (SAMHSA, 2023). Students and teachers may start to feel like they are reliving the shooting again. The strain of PTSD can take a serious toll on one's mental health if not treated (American Psychological Association, 2022).

CURRENT PREVENTION MEASURES

In response to the increase in K-12 school shootings, school districts and lawmakers have implemented new strategies to try and reduce the amount of school shootings. According to Everytown for Gun Safety Support Fund (2024), there have been child-access and secure storage laws put in place by 26 states that vary from state to state regarding when the law applies, the definition of a child, and required storage. Both Everytown for Gun Safety Support Fund (2024) and County Health Rankings (2022) found

that Child Access Prevention laws dramatically decreased gun violence among children. However, they do not have an impact on deaths caused by school shootings (County Health Rankings, 2022).

Other strategies used by K-12 schools include increased security to keep shooters out of the building and to help keep students safe during a shooting (Gerlinger & Schleifer, 2021). The main security measures that schools have taken include an increase in student IDs, security cameras, metal detectors, and security guards (Gerlinger & Schleifer, 2021). These security measures have benefits such as fewer property crimes, but they do not correlate to prevention of school shootings (Gerlinger & Schleifer, 2021). Johnson et al. (2022) also identified a decrease in property crimes, but claimed that physical security measures are not enough for decreasing violence, such as school shootings. This claim is found in research on previous K-12 school shootings, and what measures the school had in place prior to the shooting. The research done by Johnson et al. (2022) found that the schools that have suffered school shootings retained security measures like security cameras and lock-downs but may not have had education programs for staff about school shootings and the perpetrator behind them.

Another big step taken by K-12 school districts is the implementation of school resource officers (SROs) (Gerlinger & Schleifer, 2021). An SRO is a police officer on school grounds who acts as a measure of security (Avila-Acosta et al., 2023). However, according to Avila-Acosta et al. (2023), it is very rare to come across evidence of SROs

reducing the number of school shootings. SROs are known to reduce the amount of non-gun violence on school grounds, like fights and physical altercations, but they aren't known to lower gun violence (Avila-Acosta et al., 2023). In fact, Avila-Acosta et al. (2023) found that there is "...a positive effect of SROs on firearm offenses ...," (p. 27). This dilemma is possibly due to an idea by Johnson et al. (2022), that an increase of officers in a school can give the impression to students that they are in a dangerous environment "... where violence is expected to occur," (Johnson et al., 2022). Overall, research done by Gerlinger and Schleifer (2021), Avila-Acosta et al. (2023), and Johnson et al. (2022) suggested that physical security measures are not enough to prevent K-12 school shootings, and that there needs to be a new plan implemented to reduce these events.

WARNING SIGNS EXHIBITED BY A POTENTIAL SCHOOL SHOOTER

Many school shooters have concerning behaviors in common prior to the shooting that act as warning signs for teachers. These signs vary from individual to individual, but the most common signs can include making disturbing writings or drawing pictures of themselves holding guns. (Baker et al., 2020; Farr, 2018). Malicious attitudes like these can indicate that the student displaying them may want to take them out on others.

Some school shooters have also been a part of a group or clique at school that was socially rejected by their peers (Rothe, 2022). The bullying caused perpetrators to have trouble accepting themselves and their identity since they weren't being accepted by others (Baker et al., 2020; Rothe, 2022). This can lead to students forgetting their personal values and beliefs and do something they did not intend or may regret, like pulling out a gun in their school. Rejection from peers can also cause attackers to want attention (Baker et al., 2020; Rothe, 2022). This causes at-risk students to do something that they know will get them a lot of attention, such as a school shooting.

There are also some personality traits or qualities that teachers, if trained to, may be able to recognize in the classroom that previous shooters had in common. These include anger, depression, loneliness, and poor coping skills, and could be seen in a student's behavior or facial expressions depending on how severe the trait is (Farr, 2018; Rothe, 2022). These traits may cause the at-risk student to become suicidal and have the mindset of having 'nothing left to lose', and they proceed to take their frustrations out with a gun. Some shooters were suicidal or going through a personal loss when they committed the

shooting and died by suicide right after (Rothe, 2022).

Teachers are some of the first people who would be able to see these concerning behaviors in students like anxiety, distress, and anger (Clay & Robinson, 2005). Students who prepare for big attacks like shootings put thought and research into it, which is a challenge to complete going unnoticed by school staff (Cole et al., 2022). Teachers are expected to monitor their students during the school day, and if they are trained to recognize the specific behaviors of a potential school shooter, they would be able to notice them. Clay and Robinson (2005) stated that being able to do this is one of the best ways to respond to and help students in distress as soon as possible.

OTHER REASONS FOR EXHIBITING WARNING SIGNS

One argument that could be posed is that warning signs and concerning behaviors alone do not indicate that students displaying them will commit such a violent act like a school shooting. While this initially seems true, the first step to prevent shootings is not to have better school security, but to prevent the perpetrator from becoming violent at all (Avi Astor et al., 2022). It is common for students who end up carrying out school shootings to reveal these warning signs of distress, anxiety, and anger in their behaviors before they carry out the shooting (Rothe, 2022). Also, students who display these signs may not end up committing a school shooting, but they can get the proper help and assistance from counselors or mental health professionals to help them develop coping skills to deal with mental struggles. The purpose of the solution is to assist students who have the potential to carry out a school shooting, as it is not known for sure exactly how intense these warning signs and behaviors can get and where they will lead in the future.

PROPOSED TEACHER TRAINING

The Sandy Hook Promise (SHP) organization organized a program called "Say Something," which is available to K-12 students and educators to learn. This program teaches people how to notice or look for warning signs and how to get help. The "Say Something" program was reported to reduce school violence and increase anonymous reports of potential violence. The Sandy Hook Promise also reports to have prevented 15 school shooting attacks and over 3000 mental health interventions. However, this program is not required to be taught in K-12 schools. In order to have this program be implemented at a school, an educator or administrator from an institution must submit a request through the Sandy Hook Promise website.

There is also an online course made by United

Educators (UE) called "Targeted Campus Violence: Recognize the Warning Signs," that helps prevent shootings before the perpetrator plans it. There are two versions of the course: one for faculty and one for students. However, the courses are limited to those who were assigned it by their institution.

Perpetrators often reach a point in which they cannot handle or tolerate their distress or anger, which could lead them to become violent if not treated, and many teachers or educators do not notice or recognize the breaking point (Rothe, 2022). If educators have the skills to see these signs, something as small as a simple conversation between a teacher and a student can provide information about signs of distress or anxiety in the student that could lead to them becoming violent. Communication between students and teachers is an important factor in identifying students dealing with stress and anxiety, and teachers can then help them get the proper mental health assistance (Joseph & Purser, 2023).

Being aware of the silent warning signs is crucial for identifying at-risk students. Therefore, school guidance counselors in K-12 schools should teach educators about warning signs and behaviors in students that lead to school shootings. This would be another part of the school shooting training that teachers already do, where I propose a prevention aspect on top of the lock down training.

The education programs school counselors go through to get their degrees prepare them to have knowledge about these specific behaviors and signs. Alexandria (2019) from the American School Counselor Association explained that as a part of their training, counselors are expected to understand what kind of behaviors are concerning and assist the student who displays them in counseling sessions. They are also expected to be able to explain how a student's trauma and previous hardships can affect their behavior, and provide them with support (Alexandria, 2019). School counselors should use their knowledge of these examples to train their co-workers about how to recognize them in students, and the steps they should take to get the student help.

The training should consist of two steps. First, the counselors should teach educators about all of the warning signs to look out for during class, and how they are presented in student's behaviors (Cole et al., 2022). These signs would include those talked about previously, such as anxiety, isolation, violent writings and drawings, or anger. If educators are aware that these signs could lead to violent behavior and school shootings, they should be more likely to be attentive to them and confidently identify students at risk.

Second, counselors should give educators information about different resources available to

help the students (Cole et al., 2022). Resources would include themselves as a school counselor, school psychologists, mental health resources or facilities outside of the school environment, help hotlines, or local law enforcement that can conduct threat assessments to intervene depending on the severity of the situation. This way, the student can get the appropriate help to alleviate their distress promptly.

CONCLUSION

K-12 school shootings can be prevented by training educators about the early warning signs of a potential student school shooter considering that concerning behaviors could be shown in the classroom. This research paper identifies the areas

in which teacher training is lacking in relation to K-12 school shootings by explaining how to prevent shootings before the shooter makes their plans.

One point that can be discussed for future research is recruiting school counselors to conduct the training to educators. Will school counselors be paid extra, or will this be added as another requirement for the school counselor position? If they aren't compensated for the extra work, will they consider leaving the position? These questions may vary depending on the school district and their expectations for a school counselor position.

One limitation during the research process was lack of information about existing programs.

One program that was discovered during research was a learning course by United Educators called, "Targeted Campus Violence: Recognize the Warning Signs – Faculty and Staff". The access to this course was particularly limited to students and educators who were assigned to the training, so little information was uncovered.

The numbers of K-12 school shootings keep going up and will go up as time goes on, based on the current statistics (Reidman, 2023). If no new and innovative strategies for prevention are discussed or implemented, more innocent students and educators may lose their lives or have injuries and trauma that will affect them for the rest of their lives.

REFERENCES

- Alexandria, V.A., (2019). *ASCA school counselor professional standards & competencies*. American School Counselor Association. [https://www.schoolcounselor.org/About-School-Counseling/Ethical-Responsibilities/ASCA-Ethical-Standards-for-School-Counselors-\(1\)](https://www.schoolcounselor.org/About-School-Counseling/Ethical-Responsibilities/ASCA-Ethical-Standards-for-School-Counselors-(1))
- Avi Astor, R., Bear, G.G., Bradshaw, C.P., Cornell, D.G., Espelage, D.L., Flannery, D., Furlong, M.J., Guerra, N., Jagers, R., Jimerson, S.R., Mayer, M.J., Nation, M., Nickerson, A.B., Noguera, P., Osher, D., Sugai, G., Webster, D.W., Weist, M.D. (2022). *Call for action to prevent gun violence in the United States of America*. University of California, Los Angeles. <https://ucla.app.box.com/s/kxcem8q77yj8g7d6gncu9c4ns3do08sb>
- Avila-Acosta, M., Bushway, S.D., Engberg, J., Sorensen, L.C. (2023). *The thin blue line in schools: New evidence on school-based policing across the U.S.*. EdWorkingPaper, 21-476. <https://doi.org/10.26300/heqx-rc69>
- Baker, H., Lastrapes, E., Ostermeyer, B. K., Rojas, J. I., & Vasquez, B. (2020). School shootings revisited for clinicians. *Psychiatric Annals*, 50(9), 376-381. <https://doi.org/10.3928/00485713-20200810-01>
- Clay, D. L., & Robinson, J. H. (2005). Potential school violence: Relationship between teacher anxiety and warning-sign identification. *Psychology in the Schools*, 42(6), 623-635. <https://doi.org/10.1002/pits.20100>
- Cole, R., Corbin, M., Cowan, R. G., & Tedeschi, P. J. (2022). A mixed-methods analysis of averted mass violence in schools: Implications for professional school counselors. *Psychology in the Schools*, 59(4), 817-831. <https://doi.org/10.1002/pits.22647>
- County Health Rankings. (2022). *Child firearm access prevention laws*. <https://www.countyhealthrankings.org/strategies-and-solutions/what-works-for-health/strategies/child-firearm-access-prevention-laws>
- Everytown for Gun Safety Support Fund. (2024). *Which states have child-access and/or secure storage laws?* <https://everytownresearch.org/rankings/law/secure-storage-or-child-access-prevention-required/>
- Farr, K. (2018). Adolescent rampage school shootings: Responses to failing masculinity performances by already-troubled boys. *Gender Issues*, 35(2), 73-97. <https://doi.org/10.1007/s12147-017-9203-z>
- Gerlinger, J., & Schleifer, C. (2021). School characteristics associated with active shooter drill implementation. *Analyses of Social Issues & Public Policy*, 21(1), 917-940. <https://doi.org/10.1111/asap.12251>
- Johnson, B.A., Rocha, S., Warnick, B. (2022). *Why security measures won't stop school shootings*. Ohio State News. <https://news.osu.edu/why-security-measures-wont-stop-school-shootings/>
- Joseph, J. J., & Purser, C. W. (2023). An examination of the role of perpetrators' relationship to overall school shooting casualties. *Laws*, 12(4). <https://doi.org/10.3390/laws12040073>
- Reidman, D. (2023). *All shootings at schools from 1966-present*. K-12 School Shooting Database. <https://k12ssdb.org/all-shootings>
- Rosen, J. A., & Wolf, C. R. (2014). Missing the mark: Gun control is not the cure for what ails the U.S. mental health system. *The Journal of Criminal Law and Criminology*, 104(4), 851-878. <http://www.jstor.org/stable/44113411>
- Rossin-Slater, M. (2022). *Surviving a school shooting: Impacts on the mental health, education, and earnings of American youth*. Stanford University. <https://siepr.stanford.edu/publications/health/surviving-school-shooting-impacts-mental-health-education-and-earnings-american>
- Rothe, E. M. (2022). Inside the mind of the adolescent school shooter: Contributing factors and prevention. *World Social Psychiatry*, 4(2), 85-93. https://doi.org/10.4103/wsp.ws_p_18_22
- Sandy Hook Promise (2024). *Keeping our promise: Annual impact report 2023*. <https://www.sandyhookpromise.org/who-we-are/financials/annual-report/>
- Substance Abuse and Mental Health Services Administration. (2023). *Post-Traumatic Stress Disorder (PTSD)*. [https://www.samhsa.gov/mental-health/post-traumatic-stress-disorder#:~:text=Post%2Dtraumatic%20stress%20disorder%20\(PTSD\)%20is%20a%20real%20disorder,or%20severe%20injury%20has%20occurred.](https://www.samhsa.gov/mental-health/post-traumatic-stress-disorder#:~:text=Post%2Dtraumatic%20stress%20disorder%20(PTSD)%20is%20a%20real%20disorder,or%20severe%20injury%20has%20occurred.)
- United Educators (2024). *Targeted campus violence: Recognize the warning signs*. <https://www.ue.org/risk-management/online-courses/collections/targeted-campus-violence-higher-ed/euros/nyaa022>

ACKNOWLEDGMENTS

The author thanks Dr. Viktoria Basham for their help with developing and reviewing this paper.

451 in K-12

Delaney Cinnamon

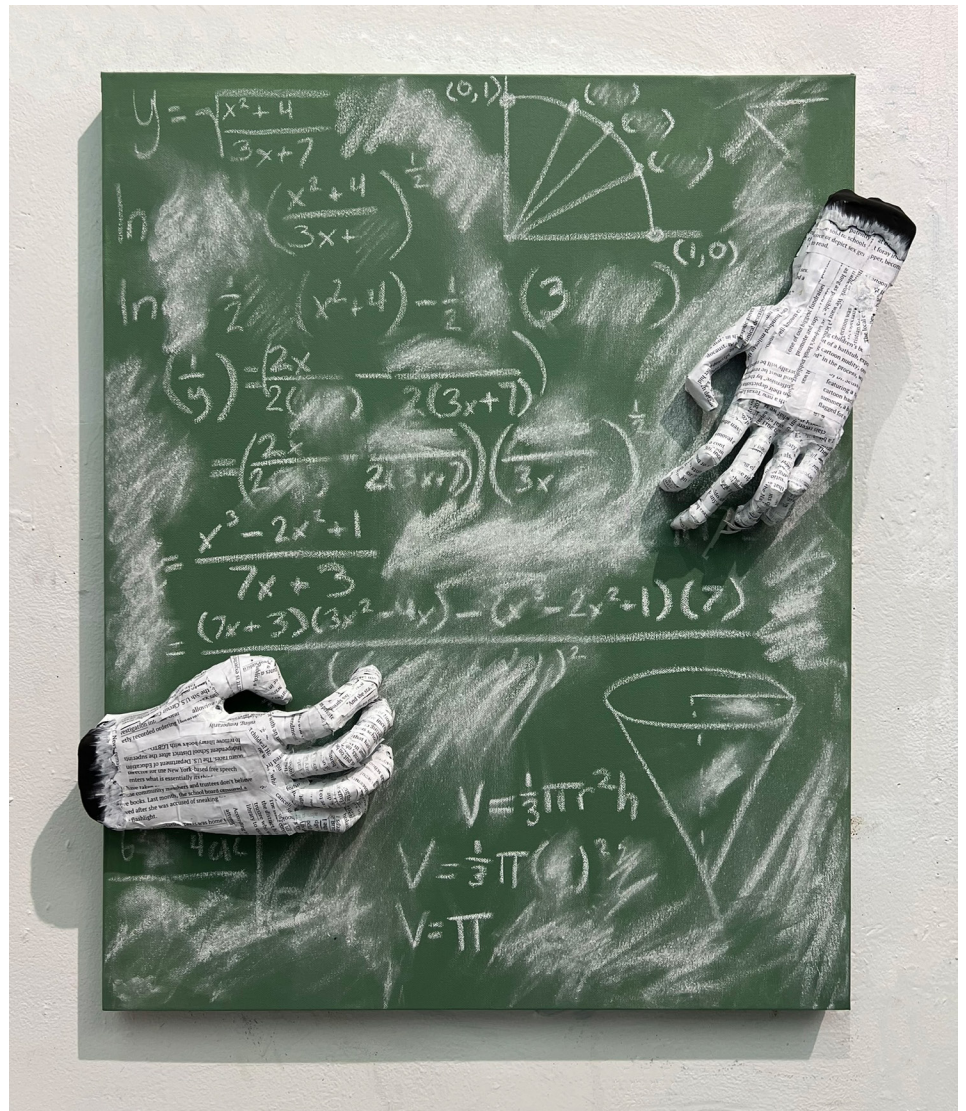
FACULTY MENTOR: Professor Jinchul Kim

ABSTRACT

This 24' x 36' piece was made with chalk, chalk paint and collage on canvas in 2024. The title of this artwork, "451 in K-12," holds significant meaning as a direct reference to Ray Bradbury's novel *Fahrenheit 451*, a powerful commentary on the dangers of censorship and book banning. This number represents the degree in Fahrenheit at which paper burns, a chilling allusion to the burning of books in the novel. Book burning, the ultimate restriction of knowledge and a symbol of erasure, is mirrored in the artwork's theme. The 'K-12' in the title is a simplification of the public education system in America, where children are required to attend school from kindergarten to 12th grade. Together, these elements convey the dangers of book banning and censorship in public education, inviting the audience to delve deeper into the artwork's narrative.

The math equations in this artwork serve as a potent metaphor for censorship. Just as these equations are rendered unsolvable with essential parts missing, so too is censorship, which renders education incomplete. Without access to a diverse range of knowledge, children's educational progress is hindered. Ultimately, the piece underscores the potential consequences of censorship, as uneducated children grow into uneducated adults, and valuable knowledge is at risk of being permanently lost.

The hands in this artwork are collaged with cut-up pieces of articles which discuss incidents including book banning in Texas, the prohibition of critical race theory in Florida, and a teacher who was brutally attacked by parents for her teaching methods. These instances are personified by a male and a female hand, both scratching away the essential parts of the math



equations on the board, further accentuating the destructive impact of censorship on education and serving as a call to action to protect diverse perspectives in learning. The artwork's narrative compels the audience to reflect on the current state of education and advocate for change.

The canvas has been painted with green chalk paint, to resemble a chalkboard found in most classroom settings, and the math equations

are written atop in chalk, furthering the piece's relation to the American education system and traditional school elements.

ACKNOWLEDGMENTS

The author thanks Professor Jinchul Kim for helping with the construction of the piece and writing the paper.

Period Power: Addressing Period Poverty in Wicomico County Public Middle Schools

Abigail Potter, Lian Peach, Maggie Atherton

FACULTY MENTOR: Professor Ryan Weaver

ABSTRACT

After being inducted into the Presidential Citizen Scholars (PCS) Program at Salisbury University (SU), we wanted to tackle an issue regarding access to necessary hygiene products in the Lower Eastern Shore Region of Maryland. Menstrual hygiene products are a basic human right, and addressing period poverty among youth is especially vital to reduce the stigma of menstruation that prohibits students from asking questions and obtaining the resources they need. Compared to the Maryland State average of children in poverty at 12%, Wicomico County, Maryland, has a rate that is 8% higher at 20% of children living in poverty. Challenging this statistic, our focus was on period poverty in our local community, and thus, we created *Period Power*, a program targeted toward the Wicomico County Public School (WCPS) middle school population. Through *Period Power*, we researched and addressed the stigma surrounding menstruation by starting conversations around the community. We partnered with the Wicomico County Board of Education (WCBOE) to provide menstrual products and educational materials to middle school students in the WCPS system. Additionally, we piloted our project in Salisbury Middle School and Wicomico Middle School and connected the WCBOE and WCPS with Aetna Better Health, who provided the necessary resources for our project.

Keywords: period poverty, menstruation, stigma, education, middle schools, healthcare

INTRODUCTION

Period poverty and insufficient access to menstrual resources and education is a global issue that impacts millions of people who menstruate (United Nations, 2015). To put this into perspective, 1.8 billion people menstruate globally each day, which is 26% of the world population (Rogatgi & Dash, 2023). However, over 35% of the world's population does not have adequate access to hygienic supplies, let alone the estimated 500 million people without adequate access to feminine hygiene products (Rogatgi & Dash, 2023; The World Bank, 2022). Period poverty is often described as the "inability to afford and access menstrual products, sanitation, and hygiene facilities and education and awareness to manage menstrual health" (*Period Poverty*, 2024). Not only do periods have a physical impact on adolescent girls, women, and nonbinary persons, but they can also contribute to significant mental strain (Rogatgi & Dash, 2023). Fluctuations in hormonal cycles can lead to an array of symptoms that make daily tasks more challenging, which can also lead to a multitude of known stereotypes and stigmas (Johnston-Robledo & Chrisler, 2022; *Menstruation*, n.d.). This negative stigma labels menstruation as dirty, unclean, or shameful (Johnston-Robledo & Chrisler, 2022; State of Period, 2023).

Addressing period poverty among youth is especially vital in reducing the educational gap and breaking this stigma and discrimination surrounding menstruation. *Period Power* is a

new period product pilot program implemented in two middle schools in the Wicomico County Public Schools (WCPS) system, Salisbury Middle School and Wicomico Middle School. This program was inspired and supported by the Presidential Citizen Scholars (PCS) program under the Institute for Public Affairs and Community Engagement (PACE) at Salisbury University (SU). The PCS program provides a space for students to complete civically engaged and civic-minded projects in the greater Salisbury and Wicomico communities over three semesters. From this, *Period Power* was born. We created *Period Power* to address the inequalities we found in our research and through conversations with community members and local leaders. With a target audience of middle school students in Wicomico County, we have and continue to provide sustainable and discrete access to feminine hygiene products and resources through partnerships between Aetna Better Health and WCPS.

WHY WICOMICO COUNTY?

According to the Peninsula Regional Medical Center (now TidalHealth), Wicomico County Health Department, and Somerset County Health Department 2019 Community Health Needs Assessment, 21% of children in Wicomico County were living below the poverty level compared to Maryland's statewide rate of 13%. This gave this statistic a data score of 1.70 on a scale from zero to three, with zero being a great outcome and three being the worst (Peninsula Regional

Medical Center, 2019). The scores are calculated based on Wicomico County's data compared to Somerset County, Worcester County, and Sussex County, DE, as well as whether necessary health targets are met and the trend of the statistics over time (Peninsula Regional Medical Center, 2019).

Two years later, the TidalHealth Somerset County and Wicomico County Health Department's 2022 Community Health Needs Assessment (CHNA) Report found that the child poverty rate was 20% in Wicomico County, with 50% of children eligible for the free school lunch program. Compared to statistics of poverty in Maryland as a whole, 12% of children in the state live in poverty and 52% are eligible statewide for free school lunch (Maryland State Department of Education, 2024; TidalHealth, 2022). Despite the rate slightly decreasing, the 2022 CHNA Report gave the child poverty statistic a score of 1.98, which is an increase of 0.28 from 2019, demonstrating that life is not getting easier for children in Wicomico County (TidalHealth, 2022).

Due to this prolonged hardship of living below the poverty level, it is inferred that consistent access to hygiene products may be sacrificed if families are living in poverty and are not able to prioritize monthly expenses for menstrual products. Upon contacting WCPS, we were directed to Kathy Frisch, the Health Services Supervisor of WCPS, and Jen Davis, the School Nurse Coordinator. Both were on board with the pilot project early on and helped establish a relationship with WCPS to implement the project with full support.

POLICY AND LEGISLATION

On July 1, 2021, House Bill 205 became effective, requiring the Provision of Free Menstrual Hygiene Products in Maryland Public Schools (*Public Schools*, 2020). This legislation calls for menstrual products to be free and available to all students via dispensers in at least two women's restrooms (*Public Schools*, 2020). When talking to Kathy Frisch, it was brought to our attention that when dispensers were implemented in schools, some students at Salisbury Middle School were tearing down the dispensers from the walls and sticking sanitary napkins to the walls. Such behaviors wasted products for those who did need them and destroyed public property, causing the school system to remove access to hygiene products in bathrooms. Frisch stated that instead, sanitary products were available in nurses' offices, but nothing was done to spread the word of this change. This response made it so students could not access consistent and discrete menstrual products from their schools as mandated, and rather would need to talk to an adult about their situation, something that often can be mortifying for an adolescent. Such a change also makes it difficult for students if they are unaware that these resources are still available to them, making them less likely to access them, especially in emergencies.

CYCLE BRACELETS

To address stigma within the community, we set up an informational table at the October Third Friday in Downtown Salisbury, Maryland to educate about menstrual cycles. Third Friday is a monthly volunteer-based community effort to highlight local businesses and talent in the downtown area of the City of Salisbury (*3rd Friday*, n.d.). This city-wide initiative began in the summer of 2009 and has been an ongoing tradition ever since (*3rd Friday*, n.d.). The creation of these bracelets was intended to encourage community members to make personalized cycle bracelets based on their cycles, friends, and families. Through our several discussions with community leaders, we felt there was a gap and a need to stir up discussion in the community about periods to better gauge the initial comfortability and knowledge of the public when it came to menstruation and conversations around healthcare needs. We found cycle bracelets to be a discrete way to show support for breaking the stigma around periods and menstruation and could double as a conversation starter for our pilot program and the empowerment of menstruation rather than seeing it as something to hide.

The cycle bracelets are comprised of four different colored beads, each color representing a different phase of the menstrual cycle – menstrual, follicular, ovulatory, and luteal. Each bracelet was also given a small pamphlet with a key of which beads correlated to which day in the cycle. In total, we helped create 52 cycle bracelets and had great conversations about the work already being done and personal experiences with the school system and menstruation. We believe that the act of starting conversations and allowing people a safe space to discuss topics they may be initially uncomfortable with, such as menstruation, are the first steps toward breaking down negative stigmas.

PILOT PROGRAM

With a school system chosen and the spark of interest shown by the community, the work began to find a company willing to fund the project. Through trial and error with several potential partners who showed interest but were unable to fund the project, we were directed toward Aetna Better Health and Tara Wampler, the Community Development Coordinator for the Lower Eastern Shore of Maryland. Wampler was eager and on board since our first meeting, already trying to implement a similar program for Lower Eastern Shore Maryland Schools. To keep the discrete nature of the project, community collaboration led us to the idea of distributing bags full of sanitary napkins and other hygiene products. Aetna Better Health generously donated all the needed supplies – pads, hand sanitizers, flushable wipes, cosmetic bags – to facilitate our pilot program at no cost to us or the schools.

With the supplies shipped and the project in the final stages of development, all that needed to be done was assembly and distribution. On February 9, 2024, we assembled 1,000 period packs with the help of WCPS English Language Learning (ELL) high school students. ELL is a county-wide program that encourages students to become fluent in English. In exchange for their help, service-learning hours were granted, which are a requirement to graduate from the Maryland Public School System. Each student must have at least 75 service-learning hours, which Dana Hetzler, ELL teacher, and Wilma Flores, ELL assistant, explained is often difficult for ELL students to satisfy due to the ELL program taking up a majority of their time, and many of the students in the program being reliant on the bus system after school.

With their help, we packed the bags in two one-hour blocks to fill 500 bags. Each pack contained three pads, one package of sanitary

wipes, one hand sanitizer, and an Aetna Better Health card with information on how to obtain a 90-day free supply of menstrual products every three months. Women who are members of Aetna Better Health of Maryland are eligible for receiving this ongoing supply through Aetna Better Health of Maryland's Period Program (*Aetna Feminine Hygiene*, n.d.). After students helped to pack up the period packs, we created menstrual cycle bracelets with the remaining time in the blocks, educating students on the phases of the menstrual cycle creatively and interactively. These packs have been distributed to the Wicomico Middle and Salisbury Middle School nurses, school counselors, and teachers, providing multiple options for a discreet hygiene resource for students who menstruate.

CONCLUSION

Period Power has been successful in its distribution methods, already having passed out 50 packs in two months. Although our time in the PCS program is over, we hope to continue to spread awareness of the program to ensure students who need resources know where to go. Additionally, we hope the *Period Power* project eventually expands to all Wicomico County Public middle schools and continues to live on through our community partnerships. This would allow students to receive necessary resources across the county discretely and consistently. A further goal of the project is to create discreet flyers with tabs at the bottom that can be torn off that state "P. Pack," an original concept that was brought to us by Kathy Frisch. Flyers can be placed in restrooms or around the school, and students can hand the tab to a nurse, teacher, or school counselor if they do not feel comfortable asking out loud for one.

In addition to the donation of supplies from Aetna Better Health, *Period Power* was awarded the PACE ShoreCorps Grant, a \$500 grant that was used to supply both middle schools with over 1,000 deodorant wipes and additional cycle bracelet materials to be stored in nursing offices. We were able to apply for and receive this grant as a direct result and benefit of PCS' connection to PACE and ShoreCorps. We also recognized a lack of product availability in the SU campus community. We continue to address the stigma of menstruation within our campus community by creating a pilot program to expand consistent menstrual product access at SU. We consider SU's campus to be a part of the Greater Salisbury community, and as we have reflected and evaluated the access to resources right around us, we believe this campus pilot program brings our project back full circle.

REFERENCES

- 3rd Friday*. (n.d.). City of Salisbury Maryland. <https://salisbury.md/3rd-friday>
- Aetna Feminine Hygiene Products Program*. (n.d.). Aetna Better Health of Maryland - Period Program. <https://periodprogram.com/>
- Johnston-Robledo, I., & Chrisler, J. C. (2020). Chapter 17 - The menstrual mark: Menstruation as social stigma. *The Palgrave Handbook of Critical Menstruation Studies [Internet]*. <https://www.ncbi.nlm.nih.gov/books/NBK565611/> doi: 10.1007/978-981-15-0614-7_17
- Menstruation and Menstrual Problems*. (n.d.). Eunice Kennedy Shriver National Institute of Child Health and Human Development - NICHD. <https://www.nichd.nih.gov/health/topics/factsheets/menstruation>
- Maryland State Department of Education. (2024). *Free and Reduced Price Meals Data: SY-2024-Statewide-Summary-Data*. <https://www.marylandpublicschools.org/programs/SchoolandCommunityNutrition/Documents/Free%20and%20Reduced%20Data/SY-2024-Statewide-Summary-Data.csv>
- Peninsula Regional Medical Center, Wicomico County Health Department, and Somerset County Health Department. (2019). *2019 Community Health Needs Assessment*. <https://online.fliphtml5.com/cxbl/pjhj/#p=1>
- Period Poverty - why millions of girls and women cannot afford their periods*. (2024, May 24). UN Women - Headquarters. <https://www.unwomen.org/en/news-stories/explainer/2024/05/period-poverty-why-millions-of-girls-and-women-cannot-afford-their-periods>
- Public Schools - Provision of Menstrual Hygiene Products - Requirement*. (2020). Maryland General Assembly. <https://mgaleg.maryland.gov/mgaweb/Legislation/Details/hb0205?ys=2021RS>
- Rohatgi, A., & Dash, S. (2023). Period poverty and mental health of menstruators during COVID-19 pandemic: Lessons and implications for the future. *Frontiers in global women's health*, 4, 1128169. <https://doi.org/10.3389/fgwh.2023.1128169>
- State of the Period. (2023). *Thinx and PERIOD*. <https://period.org/uploads/SOTP-2023.pdf>
- TidalHealth and Somerset County & Wicomico County Health Departments. (2022). *2022 Community Health Needs Assessment (CHNA) Report*. <https://online.fliphtml5.com/cxbl/fkna/#p=1>
- The World Bank. (2022, May 12). *Menstrual Health and Hygiene*. World Bank. <https://www.worldbank.org/en/topic/water/brief/menstrual-health-and-hygiene>
- United Nations. (2015). *The 17 Sustainable Development Goals*. <https://sdgs.un.org/goals>

ACKNOWLEDGMENTS

The authors thank Professor Ryan Weaver, Sara Heim, Dr. Sandy Pope, the Institute for Public Affairs and Civic Engagement (PACE), and the Office of Undergraduate Research and Creative Activity (OURCA) for the funding, resources, and guidance offered throughout this project. The authors also thank Kathy Frisch, Jen Davis, and Kim Miles from Wicomico County Public Schools and the Wicomico County Board of Education; Tara Wampler from Aetna Better Health; and Alicia Miller from the Wicomico County Health Department for their contributions and support for this pilot project.

Language Assistance and How Language Barriers Affect the Quality of Healthcare of People Who Do Not Speak English as Their Primary Language

Allison Griffin

FACULTY MENTOR: Dr. Davis Carter

ABSTRACT

People who do not speak English as their primary language, classified as limited English proficient (LEP), often receive lower quality healthcare than people who speak English as their primary language. Recent peer reviewed research has found that people with LEP have consistently reported healthcare miscommunication, late diagnosis and treatment, and lower satisfaction with medical care overall. LEP patients are less likely to visit the doctor frequently and are more likely to have to travel farther to receive quality care. Research has also found that providers often overlook the use of interpreters and try to use family members or their own limited knowledge of a language instead. Providers should utilize interpreters to their full potential, improve cultural competence, and/or become language concordant (highly proficient in another language) to ensure that people with LEP get the quality of care they deserve. Beginning to use language assistance services will lay the necessary foundation to limit inequalities found in healthcare due to language barriers.

Keywords: language barrier, healthcare, limited English proficient, quality of care, language proficiency, language assistance

INTRODUCTION

Imagine going to see your doctor and not being able to tell them what was wrong because you do not speak the same language as them. You are not able to describe what you are feeling, and as a result, the doctors take their best guess about what is happening, and you are treated for something that you do not have. The symptoms you came in with are not going away, but your doctors will not get an interpreter, so you can tell them what is actually happening. This happened to a man named Mr.S who was treated by Green and Nze in 2017. English was not his primary language, and the doctor in charge of his care decided not to involve an interpreter. Because of this, Mr.S was unable to communicate with his providers or tell them about a medication he was taking, which was ultimately the cause of his discomfort. He was being seen for renal failure, when the medication he was taking had actually caused nephritis and a bleeding gastric ulcer (Green & Nze, 2017). This misdiagnosis could have been prevented if an interpreter had been involved earlier in the care of this patient. This same scenario could be true for many people in the United States who do not speak English as their primary language, making language barriers in healthcare a critical challenge to address in order to improve patient care as a whole.

WHAT ARE LANGUAGE BARRIERS AND HOW DO THEY AFFECT PEOPLE?

In 2015, about 21% of people living in the United States spoke a non-English language at home, and 41% of these people reported having

limited English proficiency (Padilla et al. 2021, p. 1603). Ortega et al. (2021) defines limited English proficiency (LEP) as people who speak a non-English language as their primary language and have difficulty understanding, speaking, or writing in English (p. 799). The amount of people in the United States with LEP is continuing to increase, causing more difficulty within the healthcare industry (Schwei et al., 2016, p. 37). In 2019, 67.8 million people (about 22%) in the United States spoke a language other than English at home, compared to about 47.0 million people (about 18%) in 2000 (U.S. Census Bureau 2000; U.S. Census Bureau 2019). According to Smith et al. (2013), in the United States, one in five people speaks a language other than English at home (p. 33). Since the number of people with LEP is continuing to increase, it is imperative that the healthcare system adjusts to support this demographic. These patients deserve access to language assistance in a healthcare setting, especially if it will make them more comfortable when receiving medical attention.

A large problem facing LEP patients in healthcare is that many providers try to communicate without bringing in extra help. Ortega et al. (2021) found that some providers try to manage language barriers themselves or use family members as translators instead of the trained interpreters that are available to them, which is unfair to both the patient and their family. They also found that many providers will attempt to just get by with the limited knowledge of a language that they have. Both of these tactics are unreliable ways of communication and could lead to more misunderstandings

(Ortega et al., 2021). When people are not trained as interpreters, they are more likely to make a mistake and give the patient the wrong information, or information they may not understand. This can be detrimental to a patient's progression to becoming healthier and can lead to incorrect diagnosis, unwanted or improper treatments, and complications in some cases.

There is also a lack of standardization in the use of language assistance services. Green and Nze (2017) found that each provider makes their own decisions about if and how they will use interpreter services. The lack of standardization allows providers to ignore interpreters for the sake of saving time, rather than focusing on the quality of the care they are giving their patient. LEP patients are also less likely to ask for language assistance because they fear judgement, especially if they feel like their providers see interpreters as a waste of time (Green and Nze, 2017). As a result, the quality of healthcare that people receive is directly influenced by language barriers. The limited English proficient community in the United States is being failed by the healthcare system due to the lack of access to quality care, lack of policy enforcement, and lack of language assistance use.

NEGATIVE EFFECTS OF LANGUAGE BARRIERS ON HEALTHCARE

Language barriers have a direct impact on the quality of healthcare that people receive. Studies done by Ramirez et al. (2023) found that patients with LEP have consistently been shown to be less likely to have a usual care provider or visit the

doctor as frequently, less likely to have access to quality healthcare, and generally have less access and record of preventative care. This could lead to more severe problems in the future, including late diagnosis and misdiagnosis. These problems could then lead to extra testing, excessive hospitalization or readmission, and longer stays in the hospital, which would ultimately cost more for the patient and take up more of their providers' time (Ortega et al., 2021).

Additionally, language barriers can have a negative impact on the quality of healthcare received by patients with LEP, even when they have consistent access to healthcare. Miscommunication due to language barriers could also cause medication errors and/or more surgical delays (Chicas et al., 2023, p. 8). In addition, many patients often must travel farther to receive quality care in their preferred language because the doctor's offices and hospitals closest to them do not provide language assistance (Chicas et al., 2023). When patients do not have access to proper language assistance, they are generally less likely to receive quality care, and in some cases do not seek out care at all (Ramirez et al., 2023). The lack of available language assistance services may discourage patients from going to see their doctors because they may feel like they will not get the help they need, or they may feel like they are a burden for their providers.

Limited English proficient patients are also more likely to have difficulty understanding medication use and medical terminology, which can even be difficult for people whose first language is English. If a patient does not understand the instructions a doctor gives them regarding an illness or medication, they may not be able to get better and may even be putting themselves in danger without realizing it, as mentioned previously when discussing Mr.S (Green & Nze, 2017). LEP patients are more likely to have difficulty contacting their physicians both before and after hours and are more likely to have worse or less health insurance (Ramirez et al., 2023). They often delay care or struggle to pay for care due to the lack of insurance, which could lead to them deciding not to receive care until it is an emergency (Ramirez et al., 2023, p. 595). Access to quality healthcare is often dependent on insurance which can create even more problems for patients with LEP, especially if they were not born in the United States (Ramirez et al., 2023, p. 596). This proves that while providers are often not using proper language assistance services, the healthcare system as a whole is failing the LEP community. In fact, access to healthcare decreases as a patient's level

of English proficiency decreases, which means the less English a patient speaks, the lower the quality of healthcare they may receive (Ramirez et al. 2023). Many of these issues experienced by the LEP population are caused by a lack of language assistance and a lack of policy enforcement.

LACK OF POLICY ENFORCEMENT

Current policy for language assistance is not being enforced well by healthcare facilities. There is currently a language assistance policy in place, which states that people "may be entitled to language assistance," however, Ortega et al. (2021) found that it is not being followed. Individuals in need of assistance are often blamed by providers for not understanding something or for needing extra assistance in order to receive better quality care. Institutions are not encouraged to work towards offering better and assessed language assistance and utilizing language interpreters to their full potential (Ortega et al., 2021). Ramirez et al. (2023) found that, while equal access to healthcare is legally required by the Affordable Care Act, many patients with LEP still do not have the same opportunities in healthcare as people who are English proficient, meaning they speak English as their primary language or have a high level of competency in the English language. Patients are not able to easily access enough doctor's offices and hospitals that provide language assistance, and therefore have a harder time finding quality healthcare for themselves and their families. While these issues could also be related to the type of insurance a patient has, many patients just do not have proper access to healthcare in their preferred language.

However, the lack of language assistance is in direct opposition to legal requirements. While Title VI of the Civil Rights Act of 1964 states that all healthcare programs funded by the federal government are required to provide assistance to limited English proficient patients, many programs are not complying as stated by Schwei et al. (2016). Schwei et al. (2016) has also found that there is not much enforcement of this law and many healthcare programs simply do not know how to comply with its regulations. The Office of Minority Health (OMH) within the U.S. Department of Health and Human Services (USDHHS) created 14 national standards to help facilities comply with the culture and language assistance regulations put in place by Title VI of the Civil Rights Act of 1964 (Smith et al., 2013, p. 34). These standards focused on cultural competency in healthcare services and access to language services, including effective and

respectful care (Smith et al, 2013, p. 34). Instead of trying to comply with the laws and find ways to offer more assistance to LEP patients, many providers decide to ignore the policies in place. It is easier to pretend that the regulations are being followed "well-enough" rather than put in the time to ensure that every patient is receiving the best care possible.

The lack of policy enforcement can cause the overall care of LEP patients to suffer. If medical institutions are going to comply with language assistance policy, it needs to be followed by everyone that works there. Green and Nze (2017) and Ortega et al. (2021) found that most healthcare facilities at least attempt to follow laws on language assistance and have in person and online interpreters available, but many providers choose not to use them because there is no incentive, despite them saving time and money in the long run. Providers are not rewarded by their superiors for utilizing interpreters, so they are often overlooked for the sake of time (Green and Nze, 2017). However, the patient's satisfaction and understanding should be enough of an incentive for language services to be used by providers. Knowing that patients are receiving proper care and can understand what is happening should be enough to encourage providers to become more well-versed in ways to help their patients as much as possible including cultural competency and utilizing language assistance services.

LANGUAGE ASSISTANCE AS A WASTE OF TIME

The lack of policy enforcement and the limited language assistance provided shows that even though interpreters are often available and have been proven to be useful when utilized correctly, many providers underutilize interpreters and try to communicate on their own despite the language barrier. Green and Nze (2017) found that, while interpreters are often available to providers in both in person and online options, it is common for providers to overlook them, claiming that they are too time consuming, a hassle, and lack incentives from supervisors. Many providers will even use their own limited knowledge of a language or the patient's family members to try to translate what they are discussing with the patient. Patients and providers may also agree to use non-certified interpreters like other staff members or family members called ad hoc interpreters, because the patient may have a pre-existing relationship with that person (Chicas et al., 2023, p. 10; Paul, 2022, p. 251). The patients believe that if they choose the person that is translating for them, they will have their best interest at heart and

are more comfortable discussing more difficult subjects. However, the providers like using ad hoc interpreters because it saves them the time of having to get a certified interpreter to come help them.

This disparity in the healthcare field can begin as early as medical school. In some medical schools, providers are not taught to utilize the interpreters that are available to them, and when they take the initiative to get an interpreter themselves, it is not rewarded by their superiors (Green & Nze, 2017). Because providers are not taught to use interpreters when administering healthcare, many providers may not understand the full effect of language barriers on the quality of care that people receive. They are not able to see the positive outcomes when language assistance is utilized and therefore believe that it is not necessary. However, many of the disparities in quality of healthcare can be improved if providers understand the effects of LEP and how to better care for their patients with LEP.

LANGUAGE ASSISTANCE IS HELPFUL WHEN UTILIZED CORRECTLY

Despite these opinions, studies have shown that language assistance is helpful when utilized correctly. Ortega et al. (2021) found that providers using family members as translators or using their own limited knowledge of a language is ineffective when treating limited English proficient patients and can lead to more miscommunication. Paul (2022) found that these ad hoc interpretation methods have led to poorer outcomes for the patient, including feelings of guilt for having to rely on their family members for translation and possible bias from relatives or friends who may be translating for them. There are also some risks of using ad hoc interpreters including them being unfamiliar with medical terminology, offering unsolicited advice, and failing to protect patient confidentiality (Chicas et al. 2023). It is important to understand that efficiency in a language does not always translate to all concepts (Ortega et al., 2021; Paul, 2022). Medical terminology can be difficult for people who speak English as their primary language, and even more difficult for people who primarily speak a different language (Ortega et al., 2021). If interpreters are not involved or the provider does not have an acceptable level of proficiency in another language, there is a possibility of some important pieces of information getting lost in translation.

However, it is not just medical terminology that can be difficult to translate. Often times, providers need to deliver sensitive information to

their patients and there may not be a good direct translation for it. If translated word for word, some things may not be interpreted the way they are meant to. This means that a family member could be forced to give their loved one bad news in a way that may not be the most sincere, or helpful to the patient, rather than focusing on their loved ones. They should not have to translate sensitive, complex, and confidential information for their patient (Paul, 2022). It is not fair to put this responsibility onto a patient's family members. Interpreters are trained to be able to translate these types of information in a way that is easy to understand and in a way that will make the patient feel comfortable. Including interpreter services in the care team of the patient would ensure that the patient would not have to rely on family members to give them bad news or any other information. Failing to use qualified interpreters and risking mistakes could even be considered discrimination against the patient (Smith et al., 2013, p. 34). Green and Nze (2017) even found that when language assistance services are used correctly, they will save time and money in the long run. Involving interpreters in the care of LEP patients will limit the amount of miscommunication and could lead to better quality healthcare overall.

The effectiveness of using interpreters has been proven in Ryan White HIV/AIDS Program (RWHAP)-funded facilities. About 9.6 percent of adults diagnosed Human Immunodeficiency Virus (HIV) also classify as limited English proficient (Padilla et al. 2020). These patients with HIV and LEP were found to have less knowledge of HIV testing and later HIV testing (Padilla et al., 2020). However, people with LEP diagnosed with HIV were more likely to receive the recommended HIV treatment and successfully repress HIV symptoms than people who are English proficient with HIV, likely due to the fact that many of them visit RWHAP-funded facilities (Padilla et al., 2020). Padilla et al. (2020) found that these facilities have been proven to be two times more likely to use language assistance services compared to other facilities, and this has led to more LEP patients with HIV receiving recommended treatment and viral suppression. These patients are given access to language assistance services which lead to them receiving the proper care for their illnesses. These facilities were able to do what many other institutions have decided not to. Instead of ignoring policy regulations and the needs of their patients, they decided to help their patients as much as possible. They provided language assistance and saw positive results (Padilla et al., 2020). This is due to the fact that LEP patients were able to

communicate with their care team and come up with a solution that would work for them. When language assistance is used correctly, patients are able to receive the care they need, including both testing and treatment, in a timelier manner.

INTERPRETER USAGE, CULTURAL COMPETENCY, AND LANGUAGE CONCORDANT PROVIDERS

Language barriers in the healthcare industry can be combatted by utilizing interpreters to their full potential, increasing cultural competency, and encouraging language concordance. Providing interpreters as language assistance would allow patients to better communicate with their providers and vice versa. Using interpreters in the healthcare setting is probably the easiest way to solve the problem; however, the culture of healthcare facilities needs to change in order to do so (Green & Nze, 2017). Interpreters are often available in many forms but are perceived as a hassle. If providers can begin to look at interpreters as a part of the care team, they will likely see better results in the quality of care that patients receive by improving communication and understanding between patient and provider. Providers also need to work with the interpreters. When utilizing interpreters correctly, doctors should still speak directly to the patient and the interpreter is just there for translation (Polster et al. 2018). Instead of telling an interpreter to ask the patient a question, providers should still ask them themselves, use first person, and ask them if they understand, to maintain positive relationships (Smith et al., 2013, p. 33). It is important for providers to understand that the interpreter is not replacing the patient. In order to give quality care, providers need to make sure that they are still speaking to the patient and making sure that they are involved in their own care rather than becoming a bystander, which can occur easily when another person becomes involved.

A medical interpreter, by definition, is a person who is proficient in English and one or more languages and can accurately translate information using complex medical terminology (Paul, 2022, p. 247). Interpreters are highly qualified to translate information in medical situations including passing along more sensitive information. To become an interpreter, people must take a National Board Certified written and oral assessment testing; language proficiency, cultural awareness/competence, ethics, and medical knowledge (Chicas et al., 2023, p. 10). In addition to the

original qualifications to become a medical interpreter, interpreters are required to continue to complete education courses and training to maintain language proficiency and professional development (Paul, 2022). Interpreters are consistently working on improving their language skills and knowledge of the medical field in order to ensure that they can help patients to the best of their ability. Their presence in an exam room is almost as important as the doctor themselves. They help ensure that the patient understands what is happening and can make informed decisions about their healthcare. Interpreters also help with levels of cultural competency in the medical field as they are often able to represent patient's cultures and act as a bridge between patient and provider for understanding of cultural norms (Paul, 2022).

Cultural competency can play a large role in the quality of care that people receive, especially if they have any language barriers. Culturally competent medical care is shown when providers are able to communicate with their patients while taking account of each individual's cultural values and beliefs (Delgado et al. 2013, p. 204). The first step to providing culturally competent care is understanding culture. Culture is a mixture of many different aspects of a person's life including race, ethnic background, social environment, and much more (Smith et al., 2013). Culturally competent care can lead to increased access to care for patients with LEP and limit misunderstandings and poor or inappropriate care (Smith et al., 2013, p. 33). When patients feel that their care team understands what they need in more ways than just medical care, they will be able to create closer relationships with their providers, which will improve the overall quality of their care (Smith et al., 2013). However, cultural competency is a continuous commitment for providers.

Providers have to work hard to ensure that they are trying to help their patients as best they can and continuously reflect on what has worked and what has not, then change some things to make them better (Polster et al., 2018; Smith et al., 2013). Cultural competency requires knowledge of other cultures, education and training, communication between cultures, compliance of organizations/healthcare facilities, and patient focused care (Polster et al., 2018). Providers need to be willing to put in a little bit of extra work in order to make sure that they are giving the best care possible to their patients. While this may be somewhat difficult for them in the beginning, if providers continue to strive towards cultural competence, it will become standard for them to learn and understand a

patient's cultural beliefs and plan their care accordingly. Providers need to be open to changing their methods in order to provide culturally competent care based on their experiences with individual patients (Delgado et al., 2013). Cultural competency and interpreter usage should start being taught to providers in medical school, but it can also be taught in the continuing education courses that are often required for providers to keep their certifications up to date.

Continuous education and skills training is common in the medical field for other issues, so if courses on interpreter usage and cultural competency were implemented, it would be easier for providers to transition to utilizing more language assistance services. There is generally training provided when providers are hired, but there is not much reinforcement or follow-up with these skills (Chicas et al., 2013, p. 10). Today there are many different ways to provide doctors and other medical staff with education including, a traditional classroom setting, distance/virtual learning, simulations, immersive experiences, and web-based learning modules (Delgado et al., 2013). These trainings should be focused on providing care that is consistent with the patient's cultural beliefs and needs and on how to use interpreters to their full potential. A study done by Delgado et al. (2013) shows the positive effects of cultural competency education. A group of registered nurses, patient care assistants, and unit secretaries took a class on cultural competency and were tested on their level of providing culturally competent care after three and six months, when it was seen that this education course positively affected the level of self-reported culturally competent care (Delgado et al., 2013, p. 210). Education has proven to be helpful in providing culturally competent care, so it is reasonable to assume that it would positively affect interpreter usage as well.

However, having a language concordant provider (a provider that is highly proficient in a language other than English) is the ideal solution to improve the quality of care given to LEP patients. Patients may feel more comfortable with a provider that they can connect with through a common language or culture, and this will increase their satisfaction with the care that they receive (Ngo-Metzger et al., 2007). Ngo-Metzger et al. (2007) and Ramirez et al. (2023) believe that this means that the healthcare industry should encourage providers to be proficient in another language or even bilingual and have diverse backgrounds, starting in medical schools or even in middle and high school. Ngo-Metzger et al. (2007) found that

while interpreters are helpful, they may limit interpersonal relationships between patients and their care team. These relationships may have positive effects on the quality of care that patients receive.

While using an interpreter is helpful when providers do not know the language their patient is most comfortable conversing in, there are also some possible negatives. For example, if there is sensitive information or bad news that needs to be given to a patient it may be more difficult to hear from someone that they do not know or have a connection with. Some patients may also be uncomfortable talking about some things they would normally discuss with a doctor in front of an interpreter, despite patient confidentiality laws. Many patients feel that they have no choice when deciding to trust their interpreters and may feel embarrassed to talk about certain subjects in front of someone they do not know well. They may prefer to choose who translates for them during appointments, so they can choose someone they have an interpersonal relationship with (Paul, 2022). If their provider was able to speak to them in their preferred language, the patient would not have to worry about having another person in the room with them, an interpreter or family member. They would not have to make the difficult decision to trust an interpreter they do not know or make their family members translate for them.

It is increasingly common for people to start learning languages as an education requirement in middle and high school. There has also been an increase in people deciding to major or minor in a different language in college. Many people are able to use these requirements to their advantage and become more marketable in the future, especially in the medical field. After learning the basics of another language, it is easier to keep up with the language, and if providers continue to use their other language with patients, they will have an easier time retaining the language. If providers are bilingual, there also needs to be a focus on their language proficiency and communication ability. Ortega et al. (2021) says that there should be assessments and documentation proving the level of language skills of providers. This will help to ensure that providers know enough of the language to be able to translate medical terminology in a way that patients will understand, and this will limit the chances of miscommunication.

CONCLUSION

The limited English proficient community is currently being failed by the healthcare system

as a result of the effects of their language barriers, a lack of policy enforcement, and a lack of language assistance utilization. Language assistance is a service that can be different for each patient. Providers should do their best to accommodate these needs for their patients, whether that be through using an interpreter, working towards providing culturally competent care, or speaking in their patient's preferred language themselves to best support them through their care. It is difficult to make suggestions for healthcare facilities without knowing their specific needs and patient demographics. Therefore, this paper is a compilation of many different studies and research ideas that all have their own limitations.

In the future, more research should be done about specific languages or areas of the United States in order to see what demographic of people is the most in need of language assistance and if there are any demographics that are already receiving adequate assistance. Healthcare facilities should also conduct their own assessments to better understand the needs of their individual patient demographics. This will help providers better understand where they should be focusing their attention. Now, imagine being a patient who does not speak English as your first language again, but this time your doctor comes in and introduces you to an interpreter, or starts to speak in your preferred language. You are relieved that finally, someone

will understand what you are trying to say, and you can begin to figure out what is wrong. If there had been an interpreter involved in the care of Mr.S or his providers were able to speak the language he was most comfortable with, he may have been able to spend less time in the hospital and more time recovering at home with his friends and family (Green and Nze, 2017). Afterall, isn't that the point of healthcare? It is the providers responsibility to make sure that each patient is as healthy as possible so that they can live their lives to the fullest. Utilizing language assistance services to help limited English proficient patients is a way to do this.

REFERENCES

- Chicas, V. M., Tung, W., Chicas, K. A., Donnelly, M., Dawkins, D., Hampton, M. (2023). Ensuring equitable quality care through accessible language services. *Nursing Management (Springhouse)* 54(9), 8-14. DOI: 10.1097/nmg.000000000000045
- Delgado, D. A., Ness, S., Ferguson, K., Engstrom, P. L., Gannon, T. M., & Gillett, C. (2013). Cultural competence training for clinical staff: measuring the effect of a one-hour class on cultural competence. *Journal of transcultural nursing : official journal of the Transcultural Nursing Society*, 24(2), 204-213. <https://doi.org/10.1177/1043659612472059>
- Green, A. R., Nze, C., (2017) Language-based inequality in health care: who is the "poor historian"?. *AMA Journal of Ethics*, 19(3), 263-271. <https://doi.org/10.1001/journalofethics.2017.19.3.medu1-1703>
- Ngo-Metzger, Q., Sorkin, D.H., Phillips, R.S., Greenfield, S., Massagli, M.P., Clarridge, B., Kaplan, S.H. (2007). Providing high-quality care for limited English proficient patients: the importance of language concordance and interpreter use. *Journal of General Internal Medicine*, 22(2), 324-330. <https://doi.org/10.1007/s11606-007-0340-z>
- Ortega P., Shin, T. M., & Martinez, G. A., (2021). Rethinking the term limited English proficiency to improve language-appropriate healthcare for all. *Journal of Immigrant and Minority Health*, 24(3), 799-805. <https://doi.org/10.1007/s10903-021-01257-w>
- Padilla, M., Fagan, J., Tie, Y., Weiser, J., Demeke, H. B., & Luke Shouse, R. (2021). Limited English proficiency among adults with HIV in the United States – medical monitoring project, 2015–2018. *AIDS Care*, 33(12), 1603-1607. <https://doi.org/10.1080/09540121.2020.1838428>
- Paul, K. (2022). Interpreters as voice for patients with limited English proficiency. *Medsurg Nursing*, 31(4), 247-252. Retrieved from <https://proxy-su.researchport.umd.edu/login?url=https://www.proquest.com/scholarly-journals/interpreters-as-voice-patients-with-limited/docview/2709977678/se-2>
- Polster, D. S. (2018). Confronting barriers to improve healthcare literacy and cultural competency in disparate populations. *Nursing* 48(12), 28-33. DOI: 10.1097/01.NURSE.0000547717.61986.25
- Ramirez, N., Shi, K., Yabroff, K. R., Han, X., Fedewa, S. A., & Nogueira, L. M. (2023). Access to care among adults with limited English proficiency. *Journal of General Internal Medicine*, 38(3), 592-599. Doi: 10.1007/s11606-022-07690-3
- Schwei R. J., Del Pozo, S., Agger-Gupta, N., Alvarado-Little, W., Bagchi, A., Hm Chen, A., Diamond, L., Gany, F., Wong, D., & Jacobs, E.A. (2016). Changes in research on language barriers in health care since 2003: A cross-sectional review study. *International Journal of Nursing Studies*, 54, 36-44. <https://dx.doi.org/10.1016/j.ijnurstu.2015.03.001>
- Smith, L. S. (2013). Reaching for cultural competence. *Nursing* 43(6),30-37. DOI: 10.1097/01.NURSE.0000429794.17073.87
- U.S. Census Bureau. (2000). *Census 2000 Brief: Language use and English-speaking ability: 2000*. U.S. Department of Commerce. <https://www.census.gov/library/publications/2003/dec/c2kbr-29.html>
- U.S. Census Bureau. (2019). *Language use in the United States: 2019*. U.S. Department of Commerce. <https://www.census.gov/library/publications/2022/acs/acs-50.html>

ACKNOWLEDGMENTS

The author thanks Dr. Davis Carter and the Clarke Honors College for their help in developing and reviewing this paper as well as constant support for all their endeavors.

The Princess Paradox: Addressing Misrepresentation of Native American Women in Media

Kade Richardson

FACULTY MENTOR: Dr. Viktoria Basham

ABSTRACT

Despite most portrayals of Native American (NA) women in media being inaccurate, the stereotypical images of the Indian princess and Squaw remain prominent in American media. Research has found that inaccurate depictions of NA women in media have harmful effects on the self-perception of NA women due to the unrealistic standards for NA women set by media. Though extensive research has been conducted on how bias appears in media depicting NA women, to my knowledge, not much research has been done to explore how misrepresentations of NA women in media should be addressed. To fill this gap in research, I propose that an assignment for the Salisbury University COMM 336 class be made to analyze how NA women are represented in media. For this assignment, I will provide a comparison of how NA women are portrayed in the Disney movie, *Pocahontas*, and the poem "The Things We Taught Our Daughters" by NA author, Helen Knott. The objective of this paper is to make way for an academic discussion on how inaccurate representations of NA women can be identified and how American society can work towards rejecting these warped depictions of NA women in media.

Keywords: Native American women, Native American women in media, representation of Native American women, Native American women's self-perception, distorted images of Native American women, sexualization of Native American women, Pocahontas, Indian princess, Squaw, Native American culture, Eastern Shore Native Americans.

INTRODUCTION

Scholars have identified that Native American (NA) people have been depicted in media as outdated, stereotypical figures for the convenience of non-Native Americans (NNA) since colonial times in North America. It has been established by scholars that there are adverse effects on NA individual's self-perception as result of the stereotypical depictions of NA people in media (Ginsberg & Glenn, 2022; Lajimodiere, 2013; Leavitt et al., 2015; Portman & Herring, 2001; Taylor, 2015). However, there is an apparent lack of research among scholars of how the issue of inaccurate and biased portrayals of NA women in media must be addressed. Providing NA perspective when discussing the warped ideas of NA women promoted through media is an idea which has been mentioned by some scholars in the past (Ginsberg & Glenn, 2022; Leuthold, 1995), but never fully realized in an academic setting. Despite this, Green (1975) is an instance of a scholar who called for others to educate themselves on NA women. This project is a response to Green's (1975) invite to "explore the meaning of Native American lives outside the boundaries of the stories, songs, and pictures given to us" (p. 714). By identifying how and why NA women are portrayed inaccurately in media while also understanding the impacts misrepresentation have on NA women, this paper will facilitate an academic discussion on NA women in media by juxtaposing Disney's *Pocahontas* with a poem written by a NA author, Helen Knott, "The Things We Taught Our

Daughters." The goal of this project is to provide the resources necessary in the development of a class discussion for a college level course at Salisbury University on American media and representation of race and gender within media. This discussion will equip students with the skills to analyze media to identify stereotype and encourage students to perceive NA women outside of how they are depicted in popular media.

HOW ARE NA WOMEN CHARACTERIZED IN MEDIA?

NA women are a notoriously misrepresented group in media; the caricatures of the Indian princess and Squaw, the entirety of the diverse NA female population is boiled down into marketable figures. To best understand the skewed representations of NA women in media, it is necessary to first recognize the origins of these depictions. According to Lajimodiere (2013), colonialism in North America was the catalyst for modern representations of NA women. It was the male colonizers from Great Britain and France that wrote about their early encounters with NA people who constructed the idea that NA women are sub-human (Lajimodiere, 2013). Because the first encounters with NA women were documented through European perspectives, the foundation was formed for the American public's idea of NA women to be based in bias.

Female NA characters continue to be judged based entirely on their relationships to white men, as they were in colonial times, often

based in how well they obeyed the demands of white men. Glorification of servitude towards white men in female NA characters is seen in how those who were married to white men are described as "noble, selfless and willing to sacrifice themselves for love" (Bird, 1999, p. 73). Depictions in media of NA women being subservient to white men lead to the construction of one of the most popular representations of NA women: the Indian princess, which, according to Green (1975), has been documented since 1575. The Indian princess is a depiction of a NA woman who is young, sexual, noble, and more Caucasian in appearance (Bird, 1999), take Disney's rendition of Pocahontas in the film, *Pocahontas* for example. In *Pocahontas*, the main character Pocahontas is depicted as a conventionally attractive young woman with flowing black hair and a mysterious, yet noble personality (Goldberg & Gabriel, 1995). The Indian princess is helpful, and docile towards white men (Green, 1975), to colonizers, a NA woman who voluntarily assimilates to European rule is more desired other NA individuals that resisted. Though the Indian princess may seem like the better of the two main stereotypes for NA women, the Squaw and Indian princess exhibit opposing concepts while still presenting the same ideas colonialist NNAs had of NA women.

According to Bird (1999, p. 74), the Squaw is a NA woman that is depicted as "bloodthirsty, lazy, filthy and prone to drunkenness". The Squaw is a character whose sexuality is used to diminish her value as a human; it is through her

character that sexual relations with white men are realized (Green, 1975). Like Pocahontas, the Squaw is evaluated based on her relationships with white men. For the Squaw, the sexual relationships she has with white men has precedence over any other encounters she may have with colonizers; as even the white man is tainted by having sexual encounters with her (Green, 1975). As a result, the Squaw character becomes an "anti-Pocahontas image" (Portman & Herring, 2001, p. 190) because she is everything the Indian princess cannot be, in fear of her image becoming tainted by being drunken or promiscuous. Before colonization shaped NA women into only being perceived based on their relationship to white men, NA women were known for holding high positions in their tribes and being well respected (Spack, 1997 as cited in Portman & Herring, 2001); proving that colonization had a great influence on how NA women are perceived.

REAL WORLD CONSEQUENCES OF STEREOTYPES

It is because of the way NA women in media are characterized by their relationship to white men that violence against NA women is normalized in both media and in the real world. Depictions such as the Indian princess serve to prove that NA women want to become sexual servants or wives to white men, to help their tribe by assimilating to European culture. NA women are often depicted as a trophy or "virgin land that will be possessed by the white man" (Bird, 1999, p. 72) which further pushes the idea that NA women are deserving of violence against them. NA women were not seen as equals or even as people by colonizers, rather yet another thing to conquer in the new world. This was done partially to push the narrative of manifest destiny, by having the Indian princess as the symbol of the western "virgin land" (Bird, 1999, p. 72). This also justified the concept white men had that NA women were "sub-humans, only fit to kill or rape" (Lajimodiere, 2013, p. 105). Ginsberg & Glenn (2022) cited harmful stereotypes that objectify NA women as "historical justification for raping Indigenous women" (p. 26). This proves that despite the initial events of colonization taking place hundreds of years ago, the harmful images of NA women created during that time had a great impact on how NA women are perceived by NNAs.

Portrayals of NA women in media are derived from the Indian princess or Squaw stereotypes, yet despite the opposing nature of the princess and the Squaw, it is commonplace for the characteristics of both characters to be blurred together. Portman & Herring (2001)

explained how the attributes of both the Squaw and princess were "merged together into one representation of Native American Indian women through Pocahontas" (p. 190), making Pocahontas the template for how NA women are expected to fit into society. The expectations for Native American women to juggle the conflicting roles shown in popular media to belong society is unrealistic and paradoxical. Green (1975) summarized how NA women are forced into a box when it comes to societal expectations, because they were given only the option to either be an Indian princess or a Squaw. Social conditions like these that force NA women to either reach an unobtainable standard or be outcasted puts added pressure on NA women to conform to American society. Motivation behind the creation of this unobtainable standard set for NA women in media is simple; it is easier to sell these inaccurate, yet recognizable depictions of NA women to a majority NNA population. For example, in a collaboration between Disney and Burger King to promote the film, *Pocahontas*, Burger King sold "eight million Pocahontas Kids Club meals a week" (Gellene, 1995, as cited in Ono & Buescher, 2001). Since most movie and television producers are white, it makes it difficult for NA people to enforce accurate depictions of themselves in media (Leuthold, 1995). These creators of television, film, books, advertisements, and toys find it more profitable to "define Native Americans as a homogenous group" (Leavitt et al., 2015, p. 43), rather than to create media with characters from different regions or tribes, or creating characters that defy stereotypes.

An easy to recognize depiction of NA women with "highly identifiable characteristics" (Leuthold, 1995, p. 161) creates an image of NA women which can then be sold through media and products. Many Americans are familiar with dress up cowboy and Indian costumes, and it is costumes like these which contain feathered headdresses and buckskin skirts that are a fitting example of how the character of NA woman is sold to a broad NNA consumer in North America (Ono & Buescher, 2001). Disney's movie, *Pocahontas* is infamous for the popularization of the Indian princess character as Disney created a vast number of advertisements, toys, and costumes to promote the movie (Ono & Buescher, 2001). The commodification of NA women due to the warped depiction of the historical figure, Pocahontas, which Disney presents in their film, *Pocahontas*, not only promotes the idea of the stereotypical Indian princess, but the objectification of NA women as well.

Pocahontas is objectified in media and made a more desirable character for NNA audiences

via the warping of her appearance to make her "civilized" and "more Caucasian" (Green, 1975, p. 704). Lightening of Pocahontas's skin is an example of how NA women are valued on their closeness to both physical whiteness and assimilation to white European culture. In a study investigating young girls' body image after exposure to children's media, it was found that one third of the girls surveyed expressed feelings of needing to lighten their skin tone to "become a princess" (Hayes & Tantleff-Dunn, 2010, p. 422). When asked what they would have to do to become a princess, some girls responded by saying "I'd paint myself white," and "I would change from brown skin to white skin" (Hayes & Tantleff-Dunn, 2010, p. 422), indicating a correlation between self-concept in girls and whiteness. In the context of NA women in media, whiteness is equated to "cleanliness, Godliness, and civility" (Leuthold, 1995, p. 154) which is why it is usual to see Pocahontas advertisements depicted by white models in the stereotypical Indian princess attire (Ono & Buescher, 2001). According to Bird (1999), in cartoon depictions of Pocahontas, she is drawn with lighter skin than her male counterparts, which supports the concept of lighter skin being used to represent a good character in media. The Pocahontas character created by Disney supports objectification of NA women by pushing the Indian princess image into mainstream media through Disney's well-known brand. Nonetheless, why does it matter that NA women are characterized as the Indian princess or Squaw? Why are the ways NA women are represented significant? The answer to these questions is found by exploring NA women's self-expression.

HOW DO NA WOMEN "FIT IN"?

Seeing one's race represented in media has a significant impact on how people understand how they are expected to fit into society by determining how one is expected to dress, speak, and interact with people of other races (Leavitt et al., 2015). For NA individuals, it is rare to see themselves depicted in media, and even more rare for the depiction of them to be accurate, or at least, not outdated. According to Leavitt et al. (2015), the way that NA people are forced into a stereotype in media "inhibits the ability of Native Americans to ... imagine themselves as anything other than the limited media portrayals" (p. 44). The damage to self-image in NA women begins with the fact that NA women constantly see NA characters in media that do not resemble their own self-expression as many representations of NA women in media focus on depicting them as "18th and 19th century figures" (Leavitt et al.,

2015, p. 40). Due to NA people being pressured to choose between conforming to a stereotype or being completely invisible in the eyes of most NNAs, some NA people opt to conform to the expectations placed on them.

Conforming to society's expectations is a more accessible and logical option for some NA people, as attempting to change how most NNAs view NA people is an impossible task. A prime example of how some NA people willingly fit into stereotypes placed on them by society is in "Indian Imitation Villages" where NA people will capitalize on tourism by "playing Indian" for tourist to sell the authentic Indian experience or products (Buken, 2002, p. 51). "Playing Indian" is when NA people work to fit the image of themselves in media. An example of this is the Miccosukee Indian Village in Miami, Florida, which sells dreamcatchers, jewelry and leather goods to tourist who are attracted by the colorful totem poles and mascots (Miccosukee Casino & Resort, 2024). Conforming to the expectations others have of them empowers NA people, as they can earn the money and influence that would have otherwise been gained by NNA people, as stated in Buken (2002, p. 51), "If we [NA people] do not do it under our control, non-natives will reap the profit of doing it anyway." However, conforming to expectations assigned to NA women can cause NA women to "internalize white stereotypes of the 'drunken,' 'savage,' or 'lazy' Indian" (Leuthold, 1995, p. 154). As a result of stereotypical female NA characters in media, NA women may feel as if others expect them to be "drunken" or "lazy" (Leuthold, 1995, p. 154) because it would validate their NA identity to NNAs by proving to NNA that they fit the expectation. Though, NA women may struggle to fit in to American or Native society, to my knowledge, there has not been recent research done on how stereotypes and prejudice can impact the mental health of NA women and girls.

For NA women that grow up outside of a reservation, and completely immersed in American culture, their view of their culture could be limited as they too are only left with racist depictions of NAs in media. Nahanni Fontaine, a NA woman, shared how she "grew up 'divorced from ancestral cultural teachings and connections' and experienced related trauma, inducing [substance] abuse and addiction" (Ginsberg & Glenn, 2022), another example of how assimilation into dominant culture and erasure of NA culture in media negatively impacts the lives of NA women. As a result of being unable to conform to the paradoxical expectations placed on them by society, NA women struggle with shame, and often reject their NA identity (Ginsberg & Glenn, 2022). NA

women's shame towards their identity combined with the "low use of mental health services" among NA women, cause many NA women to become substance abusers (Portman & Herring, 2001, p. 195). Despite inaccurate depictions of NA women being concentrated in fictional media, it nevertheless has an impact on how real NA women perceive themselves, their heritage, and their culture. By expecting NA women to fit NNAs idea of NA culture, NA culture is erased and replaced with NNA culture, a result of colonialization that still plagues American media.

SOLUTION AND MEDIA ASSESSMENT

The goal of this project is to provide the information required to create assignment for the Salisbury University (SU) COMM 336 class that will open an academic discussion on how NA women are represented in media in comparison to how NA women choose to represent themselves in media. The class, COMM 336 is the subject of this paper's outcome because the COMM 336 course centers around American media and gender roles in media. Works in form of Disney's *Pocahontas* and Helen Knott's "The Things We Taught Our Daughters" will be the basis of comparing how a large media company, such as The Walt Disney Company; and the female NA author, Helen Knott decide to represent NA women in their works.

DISNEY'S POCAHONTAS

Disney's *Pocahontas* is a classic example of how NA women are commonly misrepresented in media; the character Pocahontas was the inspiration for Green's (1975) term, "The Pocahontas Perplex" (p. 701), used to describe expectations placed on NA women by the media. It is logical to relate NA stereotypes to Pocahontas because she is the figure of sexualization and commodification of NA women in media. The purpose behind *Pocahontas* was never to represent NA women accurately, or give young NA girls a role model, it was to "transform the story of a real person into a line of marketable objects" (Ono & Buescher, 2001, p. 25). Though, the original story of Pocahontas is the inspiration for most media featuring the NA female protagonist, the legend of Pocahontas was most likely fabricated by John Smith, who many scholars refer to as one of the most infamous "American historical liars" (Hubbell, 1957). Furthermore, the characterization of Pocahontas in the Disney film incites a romanticized image of NA women. Taylor (2015) described the attributes of the "Ideal Indian" as "speed, agility, stamina, and endurance" (p. 123), all of which describe Pocahontas' character as many scenes are focused on her running, and climbing skillfully

through the forest, while being sought after by John Smith (Goldberg & Gabriel, 1995). These chase scenes in *Pocahontas* encourage the idea that NA people are something to obtain. Conquering of a NA woman is yet another aspect of NA depictions in media today that originated with colonialism (Bird, 1999; Ginsberg & Glenn, 2022; Green, 1975) and the prospect European colonialists had of owning not only the newly discovered land, but the people inhabiting it as well.

Another theme present in *Pocahontas* is Pocahontas's rejection of her tribe. Pocahontas refuses to marry Kocoum, a NA man who is arranged to marry Pocahontas, and instead, Pocahontas peruses the white colonialist, John Smith (Goldberg & Gabriel, 1995). Pocahontas's motive is justified due to John Smith being one of the good white men, as he does not immediately kill Pocahontas in the film, unlike the other bad colonists who battle with the members of the Powhatan tribe. The portrayal of John Smith as the hero in both Disney's *Pocahontas* and the legend of Pocahontas is a rationalization of colonialism as Pocahontas does not treat Smith as an intruder when she protects him from being killed by her father, the Chief of the Powhatan tribe (Goldberg & Gabriel, 1995; Paul, 2014). The fact that Pocahontas rejects Kocoum for John Smith is an example of the stereotype that "American Indian women are naturally attracted to white [men] rather than American Indian men" (Bird, 1999, p. 75). The distinction between the "good" and "bad" NA is clear in *Pocahontas* in the scene when Pocahontas and John Smith kiss (Goldberg & Gabriel, 1995), solidifying that Pocahontas is a "good" NA because she "defy[s] her own people" (Green, 1975, p. 704) by choosing the white man. The "bad" NA, Kocoum, attacks John Smith in a fit of uncivilized rage after witnessing their kiss and consequently, gets shot by one of John Smith's men (Goldberg & Gabriel, 1995). This scene illustrates the savage NA man versus the civilized Indian princess by exaggerating the distinction between the fierceness of Kocoum's attack and the innocent love between Pocahontas and John Smith. Despite *Pocahontas* being centered around the character, Pocahontas, she is lacking in complexity, as her main motive is her love for John Smith, displaying how in media, female NA characters can only exist for white men.

Pocahontas not only intensified the popularity of stereotypical and distorted depictions of NA women, but it also completely ignored the reality of the history behind Pocahontas. Not once in the Disney film is the captivity of the real Pocahontas shown, rather it

focuses on the capturing of the white man, an "inversion" of the truth (Paul, 2014). Considering that the legend of Pocahontas has been proven to be fictionalized to justify colonialism (Hubbell, 1957; Paul, 2014), it is jarring that media continues to use the outdated legend in films as recent as *Pocahontas*, released in 1995. Though, the image of Pocahontas has been ingrained in the minds of many Americans, changing how both the NA women of the past and present are perceived is a daunting, yet possible goal. Seeking out authentic experiences of NA women can both show the inaccuracy of stereotypical depictions while also shedding light on the real struggles NA women face and how NNA's can support them.

HELEN KNOTT'S "THE THINGS WE TAUGHT OUR DAUGHTERS"

To contrast *Pocahontas*, the poem "The Things We Taught Our Daughters" by, Helen Knott depicts the reality of NA women, from the perspective of a female NA author. Though, 84.3% of NA women experience violence in their lifetime, more than half of which being sexual or intimate partner violence (Rosay, 2016), it is rare to see depictions of NA women in media that are used to discuss violence against NA women. However, Knott explores themes of sexual abuse and generational trauma in her poem "The Things We Taught Our Daughters" as she "critiques the responses to physical and sexual abuse" (Ginsberg & Glenn, 2022, p. 37). Knott expresses her frustrations with the silencing of sexual abuse victims within the NA community as she said, "we taught them silence... to look away, to forget and to not bear witness" (0:08, 0:17). Knott highlighted the culture of shame surrounding sexual and physical violence in the NA community, and the willingness for NA individuals to silence each other when they are victims of sexual abuse.

Knott also conveyed how NA communities tend to use less harsh descriptors to belittle the seriousness of the violence, such as "domestic dispute" (2:05) rather than calling it what it is, rape and abuse. References to the dynamics in NA communities are made in the lines "love

just isn't really love if he's not saying it with his fists" (2:15) and "we don't call the cops on our own" (1:25). Values like these are what Knott cited as the reason for normalizing abuse within the NA community. This is because it is seen as more important to stick together and ignore the abuse as a family, than it is to report it and potentially tear the family apart. Knott brings light to the normalization of violence against NA women going unpunished, with many quick to blame women or dismiss their accusations against abusers. According to Rosay (2016, p. 41), NA victims of violence are even left behind by the American justice system, as in "Oliphant v. Suquamish Indian Tribe (1978), the U.S Supreme Court ruled that Indian tribes do not have criminal jurisdiction over non-Indian perpetrators." NA women who are victims of violence receive little to no support from others, even so, through artistic expression, they can begin to heal and learn to cope (Ginsberg & Glenn, 2022).

Knott (2017) ended her poem, "The Things We Taught Our Daughters" with a call to action and asking NA people to "tell ourselves and our daughters the words that should have been said" (3:55) encouraging the NA community to reflect on the past and learn from it by stopping the cycle of domestic abuse in NA households. The poem, "The Things We Taught Our Daughters" illustrates a part of the female NA experience that is rarely seen in any popular cowboy and Indian type of media. NA women as represented in Knott's poem are complex, and face their own internal hardships based on pressures in and outside of the NA community. By studying media and art created by NA women, the truth of the issues, values, and ideas of NA women can be understood, outside of the stereotypical depictions of NA women in media created by NNAs.

WHY NATIVE AMERICAN WOMEN?

The reason for the focus of this paper being solely on NA women instead of other women of color is because of the location of Salisbury University (SU). The Eastern shore and specifically, Salisbury, has a rich history of NA tribes which can be seen

in everything from the names of waterways and roads to the names of buildings on the SU campus. Tribes such as the Choptank, Pocomoke and Nanticoke all originated on the Eastern shore (Papenfuse, 2022), and dorm halls on the SU campus are named after these infamous historical tribes (Salisbury University, 2024). SU even includes informational posters in these halls to educate students on the NA history behind the name of the dorm hall (Salisbury University, 2024). The Edward H. Nabb Research Center at SU has an online exhibit on NA history, art, and culture (Carayon, 2020), further showing the relevance of NA history on SU's campus. Considering the unique connection that SU has with the NA history of the area, an assignment on NA women in media in an SU COMM class is the most appropriate outcome of this project.

CONCLUSION

NA women have been combating misrepresentations of themselves in media for as long as the stereotypical Indian princess and Squaw images have existed (Leuthold, 1995). The most effective method for NA women to defy expectations placed on them by society is by expressing themselves through media (Ginsberg & Glenn, 2022; Leuthold, 1995). This paper has provided the media analysis necessary for a scholarly discussion comparing Disney's *Pocahontas* and Helen Knott's "The Things We Taught Our Daughters" to be incorporated into the SU COMM 336 class. By implementing this, students will gain the skills needed to identify prejudice against NA women in popular media. Even though within the range of this paper it is not possible to have an impact on increasing the number of NA creators and producers of media as suggested by Leuthold (1995), this project will serve to make progress towards deconstruction of NA stereotyping in media. Change is possible through education; and by exploring how change can be made in the depictions of NA women, NNA individuals can revise their skewed ideas of NAs and discover that NA women are much more than a stereotype.

REFERENCES

- Bird, S. E. (1999). Gendered construction of the American Indian in popular media. *Journal of Communication*, 49(3) 61-80. <https://doi.org/10.1111/j.1460-2466.1999.tb02805.x>
- Buken, G. (2002). Construction of the mythic Indian in mainstream media and the demystification of the stereotype by American Indian artists. *American Studies International*, 40(3) 46-56. <https://search.ebscohost.com/login.aspx?direct=true&db=asn&AN=8539630&site=ehost-live>
- Carayon, C. (2020). Native Americans then and now. *Nabb Research Center Online Exhibits*. Retrieved April 25, 2024, <https://libapps.salisbury.edu/nabb-online/exhibits/show/native-americans-then-and-now>
- Goldberg E. & Gabriel M. (1995). *Pocahontas* [Film]. The Walt Disney Company.
- Ginsberg, R., & Glenn, W. J. (2022). "Everything is in us": Collaboration, introspection, and continuity as healing in #NotYourPrincess. *American Indian Quarterly*, 46(1), 25-63. <https://doi.org/10.1353/aiq.2022.0002>
- Green, R. (1975). The Pocahontas perplex: the image of Indian women in American culture. *The Massachusetts Review*, 16(4), 698-714. <http://www.jstor.org/stable/25088595>
- Hayes, S., & Tantleff-Dunn, S. (2010). Am I too fat to be a princess? Examining the effects of popular children's media on young girls' body image. *British Journal of Developmental Psychology*, 28, 413-426. [10.1348/026151009X424240](https://doi.org/10.1348/026151009X424240)
- Hubbell, J. B. (1957). The Smith-Pocahontas story in literature. *The Virginia Magazine of History and Biography*, 65(3), 275-300. <http://www.jstor.org/stable/4246320>
- Lajimodiere, D. (2013). American Indian females and stereotypes: warriors, leaders, healers, feminists; not drudges, princesses, prostitutes. *Multicultural Perspectives*, 15(2), 104-109. <https://doi.org/10.1080/15210960.2013.781391>
- Leavitt, P. A., Covarrubias, R., Perez, Y. A., & Fryberg, S. A. (2015). 'Frozen in time': the impact of native American media representations on identity and self-understanding. *Journal of Social Issues*, 71(1), 39-53. <https://doi.org/10.1111/josi.12095>
- Leuthold, S.M. (1995). Native American responses to the western. *American Indian Culture and Research Journal*. <http://dx.doi.org/10.17953>
- Miccosukee Casino & Resort. (2024). Retrieved April 30, 2024, from <https://miccosukee.com>
- Ono, K. A., & Buescher, D. T. (2001). Deciphering Pocahontas: unpacking the commodification of a Native American woman. *Critical Studies in Media Communication*, 18(1) 23-43. <https://doi.org/10.1080/15295030109367122>
- Papenfuse, E. C. (March 14, 2022). Maryland at a Glance: Native Americans. *Maryland Manual On-Line: A Guide to Maryland & Its Government*. Retrieved April 30, 2024, <https://msa.maryland.gov/msa/mdmanual/01glance/native/html/01native.html#:~:text=Native%20band%20whose%20primary%20village,day%20Salisbury%20in%20Wicomico%20County.&text=One%20of%20the%20largest%20tribes,Mary's%20counties%2C%20Maryland>
- Portman, T. A. A., & Herring, R. D. (2001). Debunking the Pocahontas paradox: The need for a humanistic perspective. *Journal of Humanistic Counseling, Education & Development*, 40(2), 185-199. <https://doi.org/10.1002/j.2164-490X.2001.tb00116.x>
- Paul, H. (2014). Pocahontas and the myth of transatlantic love. *The myths that made America* 89-102. Transcript Verlag.
- Rosay, A. (2016). Violence against American Indian and Alaska Native women and men. *National Institute of Justice Journal*, (277), 39-45. <https://nij.ojp.gov/library/publications/violence-against-american-indian-and-alaska-native-women-and-men>
- Salisbury University. Retrieved April 25, 2024, <https://www.salisbury.edu>
- Taylor, M. (2015). Indian-styled mascots, masculinity, and the manipulated Indian body: Chief Illiniwek and the embodiment of tradition. *Ethnohistory*, 62(1), 119-143. <https://doi.org/10.1215/00141801-2681750>

ACKNOWLEDGMENTS

The author thanks Dr. Viktoria Basham for all the enthusiastic support and encouragement during the development of this paper.

The Puzzle

Bradley Powers

FACULTY MENTOR: Professor Jinchul Kim

ABSTRACT

"The Puzzle" (2024), oil on canvas, 18" x 24", is a self-portrait exploring identity in incompleteness, growth, and the tremendous impact of culture on an individual. The picture plane acts like a mirror that the subject of the piece is looking into with focus, as she precisely presses a puzzle piece into the corresponding place on her face. There are missing pieces along her arms and chest revealing empty space within the body, yet she is unbothered by her incompleteness. This represents the awareness that one is constantly in a state of growth.

Around her are five hands, all working the puzzle. The hands are diverse, with a variety of skin tones, sizes, and ages, and represent the interconnectivity of all cultures. Their involvement in the puzzle is symbolic of the importance of having an awareness of the world as it affects every individual. The floral pattern in the background is based on traditional Chinese porcelain designs, which represent growth as well as the impact of history on the present. Due to current events across the globe, people change on a personal level every day and make choices that will affect generations to come. Additionally, in the day and age of the internet, people are more connected on an international scale than ever before, resulting in constant external influences on personal development. The hands adding puzzle pieces to the subject represent the impact of diverse cultures on the personality of the artist, inviting the viewer to examine what and who has made them the person they are as well. Humanity should invite the exploration of differences and connection through similarities, nurturing mutual growth and unity.

Human beings are constantly faced with new experiences, all of which have an effect



on development, suggesting people are never truly complete. In every moment, there is more to experience and learn. When accepted with an open mind, it is freeing to find peace in this constant state of growth.

ACKNOWLEDGMENTS

The author thanks Professor Jinchul Kim for his help with this paper and guidance and encouragement with this painting.

Is Inspiration Ethical? An Exploration of Cultural Appropriation in Art and Media

Willow Nyland

FACULTY MENTOR: Dr. Viktoria Basham

ABSTRACT

Cultural appropriation has been discussed frequently in the 21st century, but where do we draw the line between sensitivity toward cultural symbolism and artistic freedom? Recent scholarly research explores the legality of copyrighting intellectual property inspired by important cultural symbols, along with the importance of protecting items and ideas that have importance in cultural symbolism. However, there has been no proper solution to either of these issues thus far. The rationalization of cultural appropriation in art and media by non-marginalized groups through racist frames prohibits broader ethical discussion and education that can protect said marginalized groups from further harm. Furthermore, there is no clear definition of cultural appropriation in mass media or in scholarly conversation. This paper attempts to contribute to the broader ethical conversation regarding cultural appropriation. Additionally, it brings the perspective of the artist into the conversation and poses questions on how to balance the freedom of artists to use the world around them as inspiration for their works and allow cultures to maintain the integrity of their cherished symbols.

Keywords: cultural appropriation, inspiration, ethics, cultural symbolism, art, media

IS INSPIRATION ETHICAL? AN EXPLORATION OF CULTURAL APPROPRIATION IN ART AND MEDIA

Many celebrities, such as Ariana Grande and her usage of Japanese culture and characters in her promotion of her hit song "7 Rings," have been accused of culturally appropriating one ethnic group or another (Kornhaber, 2019). These accusations can seem founded, especially when the celebrity misinterprets the language of the chosen culture, such as in the case of when Ariana Grande attempted to tattoo the characters for seven rings in Japanese Kanji characters and ended up with the translation of "a small barbecue grill" instead (Brice-Saddler, & Epstein, 2019). Some may also accuse celebrities of cultural appropriation due to fashion choices such as hairstyles, like in the case of when Rihanna was accused of cultural appropriation after having white models don traditional African American braids in a Fenty fashion show (Ritschel, 2021). However, not everyone agrees that these instances are cultural appropriation, making it a widely contested issue even within the seemingly appropriated cultures themselves. With that being said, what does cultural appropriation mean and how does society navigate these issues without causing harm to other cultures? Alongside that, is it more important for individuals to have creative freedom to take inspiration from the world around them without limitations, or for cultural communities to be able to maintain autonomy over the depictions of their culture in art and media? Lastly, how does this relate to philosophical ethical standards, and how can

future philosophers draw solid lines for what is and is not cultural appropriation? This paper intends to provoke a broader conversation in the world of ethics so that boundaries can be drawn regarding what is and is not cultural appropriation so that artists and the general population no longer must second guess their actions regarding the key symbols of other cultures.

WHAT IS CULTURAL APPROPRIATION?

First, to debunk the myths and misconceptions surrounding cultural appropriation, it is important to understand what said misconceptions are. Cultural appropriation in media has been used as a term for when anything that is common within one culture is used by another ethnic group. An example of this is from Williams (2023), who wrote an article discussing Korean Pop (K-pop) stars, and the ways in which their music takes inspiration from hip-hop. He also discussed what he seems to paint as the greater issue; the ways in which these idols culturally appropriate African American culture by wearing du-rags and cornrows, both important symbols of Black American culture (Williams, 2023). Given this, cultural appropriation might be defined as whenever one ethnic group uses another ethnic group's cultural symbols. However, according to further research, this definition is incomplete.

Berson (2010) in his article relating to intellectual property rights and its ties to cultural appropriation defined cultural appropriation as "... the conditions under which access to that which is valued in a community, but which is

non-excludable and non-rivalrous, is granted to outsiders" (p. 205). Here, it is explained that cultural appropriation is defined as when an important cultural symbol is used by people outside of said culture. This definition aligns with what Williams (2023) claims in some ways; however, Berson's (2010) article aligns more with the next piece of evidence. Miller (2021) stated that cultural appropriation is commonly defined as theft of religious symbolism or aspects of what she calls "material and intellectual culture" (p. 216) from one group by another. To provide further context to what that means, material culture is something tangible such as a kimono or a historical Native American headdress whereas intellectual culture would consist of ideas or ways of living, like Hannukah as a Jewish holiday. With this said, cultural appropriation is now defined as when a cultural symbol is stolen by someone outside of the original culture.

However, this definition, even when adding the term theft to it, does not fully encompass cultural appropriation either. According to further research, the missing piece of this definition is the inclusion of intimacy, as Nguyen and Strohl (2019) stated in their paper. Couples are a wonderful example of the social and societal power of intimacy. Nguyen and Strohl (2019) gave this example; if a couple were to exchange love letters it would be their choice on whether they would choose to share those love letters, and if someone were to breach the couple's privacy that would be morally wrong. This idea can be applied to a variety of concepts including more modern ones, such as text message conversations, but love letters will be

the example used in this paper. Nguyen and Strohl (2019) proposed that this concept can be applied to cultures and cultural symbols, but the idea of intimacy cannot be the only way that cultural appropriation can be defined. So, the final definition of cultural appropriation used by this paper is when something that has important cultural and historical implications in a community is used by individuals outside of the community without consent.

WHY IS CULTURAL APPROPRIATION IMPORTANT?

Now that a clear definition of cultural appropriation has been established, why is cultural appropriation as a concept important in the first place? This is one of the overarching questions that this paper hopes to address. One of the first reasons cultural appropriation matters is because of the concept of harm. Motl (2018), in her analysis of cultural appropriation in the dress talk of Electronic Dance Music (EDM) festivalgoers, went in-depth on the harm caused by cultural appropriation towards marginalized communities and the reasons the appropriators use to justify their actions. Dress talk is a term used to explain the ways in which one's identity can be shown via the clothing that they wear. An easily definable one would be the Gothic style of dress, which is used to express oneself but also as a way to seek out others with similar interests, such as bands that align with the style of dress. However, dress talk can also be an expression of one's culture. This can be seen through cultural symbols such as Native American headdresses, Japanese kimonos, or even cultural tattoos. An example of this, and the ways in which cultural appropriation can be classified as theft, is displayed through the ways EDM artists do not credit the groups from which they draw inspiration (Motl, 2018).

Williams (2023) states how this relates to cultural appropriation as popular music beats have foundations in the African American hip-hop community, and the lack of credit by pop artists towards the original Black artists is not only disrespectful but illegal. The fact that this applies to both K-pop and EDM music styles illustrates a concerning trend in music, wherein artists are using the works of marginalized communities to further their career without crediting the people they took inspiration from. This is emphasized further as cultural symbols such as headwraps are used as a way of making someone's attire seem more exotic despite headwraps being historically disrespected and criminalized for being a symbol of African culture (Nguyen & Strohl, 2019). This brings to light the double standard in how cultural symbols are viewed by the public, as

when African communities wear cultural symbols such as braids or headwraps, they are shunned and discriminated against (Motl, 2018; Nguyen & Strohl, 2019). However, when Caucasian persons use these symbols as a part of their outfits they are praised and considered to be innovative (Motl, 2018). A person of color can never change the way that they look to escape the racism they face on a daily basis, so why should Caucasian people be able to use cultural symbols as an escape from their own reality as Motl (2018) claims?

THE RATIONALIZATION OF CULTURAL APPROPRIATION

If these actions are so widely considered to be wrong by scholars, then why is cultural appropriation a continuing issue? This is where the rationalization of cultural appropriation comes into play. Even though Motl (2018) mentioned four different frames that people use to rationalize the appropriation of other cultures, this paper will only focus on two: naturalization and minimization. The naturalization standpoint argues that racial inequality is inevitable due to the biological differences between races (Motl, 2018). This was covered by Miller (2021) in her paper exploring the "deracialization", as she calls it, of Japanese citizens due to the younger generation's rise in body modification and cosmetic surgery. Deracialization is never truly defined by Miller (2021), but it seems to be used to mean when a person or group of people begin to change ethnic traits in an attempt to fit in better with another ethnicity. An example of this phenomenon includes instances of Westerners asserting that Japanese people get double eyelid surgery or strive for pale skin to conform to Western beauty standards and trends (Miller, 2021). However, according to Miller (2021), these surgeries are not performed with Westerners in mind; they are performed as a way to conform to beauty standards rooted in Japanese culture (Miller, 2021). This proves that not only is naturalization used as an excuse for racism, but it also is used as a way to prevent nonwhite persons from partaking in traditions that overlap with Western trends. Put another way, partaking in "deracialization" is seen as forsaking your own culture.

Minimization is more self-explanatory, and common amongst those seeking to appropriate cultures or to justify racism as a whole. Motl (2018) explained that the racial frame of minimization asserts that since "discrimination is no longer a ventral factor in affecting minorities' life chances" (Bonilla-Silvia, 2014, as cited in Motl, 2018, p. 260) it is not relevant to modern society. She implied that since people are not

dying *en masse* due to racial discrimination, racism does not exist, and therefore cultures cannot be appropriated (Motl, 2018). This perspective seems to assume that due to the fact that all cultures are legally equal to each other, there is no longer any need for concern regarding the unequal treatment of different races.

However, this is factually incorrect, as stated by Wong-Padoongpatt et. al (2022) in their paper discussing the impacts of racism and violence on Asian Americans in the United States during COVID-19. This paper goes in-depth on the harm that Asian Americans faced during the COVID-19 pandemic and asserts that racism is not just defined as violent acts against a group of people but can also be attacks that are less easily seen: verbal ones (Wong-Padoongpatt et. al, 2022). These attacks can be anything from making fun of an ethnic trait of a person to, as was common during the pandemic, accusing a group of people of being associated with sickness. Though verbal attacks are less visibly damaging to those affected, they can still cause a similar amount of mental harm, therefore making them just as relevant. This theory can be tied back to the harm caused by cultural appropriation. Persons using the frame of minimization believe that as cultural appropriation is based on symbols with historical and emotional significance, these symbols are not sacred anymore as racism is a thing of the distant past (Motl, 2018). This in itself is a harmful assertion but coupled with the fact that individuals use this as a way to justify using these important symbols carelessly is concerning.

WHITMILL V. WARNER BROS AND ITS TIES TO CULTURAL APPROPRIATION

An example of careless usage of a cultural symbol can be found in an article by Tan (2013) wherein he explored the Whitmill v. Warner Bros case and the precedent that it set for the safety of cultural symbols. The case itself was a debate between fair use and infringement of copyright claims. Ultimately the question of the case itself was whether Whitmill's tattoo drafts were valid to copyright, given they were inked onto a person's skin (Tan, 2013). However, Tan (2013) proposed that there was a side to the story that had been missed initially: the perspective of the people on whom Whitmill based the tattoo's design. In his paper, Tan (2013) explored how the Māori perspective on the case decreed that Whitmill did not have any right to copyright art that was clearly inspired by *tā moko*, the traditional Māori tattooing style. This was due to the ways in which Whitmill's take on *tā moko* distorted the meaning from a cultural symbol of ancestral importance and personal history to a mere

aesthetic or a symbol of capitalistic greed (Tan, 2013). However, this is not the full picture.

What Tan (2013) seemed to miss in his paper is the perspective of the artist. While Whitmill's tattoo was inspired by *tā moko*, does that mean that the effort he put into designing it was all for naught? It does not seem completely moral to force artists to research every singular idea that is copywritten by a specific culture, nor does it seem like a good solution for the cultures themselves to completely outlaw any outside exposure of their culture. Isolating cultures is what causes racist frames, like naturalization, as mentioned before by Miller (2021). More importantly, where should philosophers draw the line between claiming a cultural symbol as your own through your art and appreciating culture through your art?

INSPIRATION AND GLOBALIZATION

Though the connection between cultural appropriation and inspiration has not been researched before, research has been conducted by scholars to understand what exactly impacts inspiration. Rhyning (2021) experimented with two groups of students from two different nations, both of whom were given the same assignment: to design packaging that reflected both what they believed to be aesthetically pleasing and their country. Students used various resources for their projects, including various products from local stores, but what Rhyning (2021) focused on was the usage of online websites, like Pinterest.com. This was due to those website's ties to the concept of globalization. Globalization, as conceptualized by Rhyning (2021), is the redefinition of societal standards through the lens of what is globally popular and relevant through sources like the Internet, a global connection tool. Through her research, Rhyning (2021) brought into question the globalization of style, a concept that is addressed thoroughly by Miller (2021) and Motl (2018) in their respective papers. In the case of Japanese individuals, globalization of style is brought up as an erasure of culture and an attempt to fit in with Western beauty standards despite the ways in which Japanese culture overlaps with traditional Western beauty standards (Miller, 2021). In the case of EDM festivalgoers, globalization of style relates to the ways in which festivalgoers attempt to remove race from the equation by appropriating cultural pieces and emphasizing otherness (Motl, 2018). These festivalgoers claim that appropriation of other cultures is a way of creating a more inclusive environment for those cultures, but also refuse to listen to said cultures when they are asked to stop.

Ultimately, globalization seems to be the opposite of cultural appropriation, so why does

it matter to this paper? This is because both subjects focus on the integrity of cultures. Cultural integrity ties directly to globalization due to the ways in which the protection of individual cultures can reduce the loss of individuality to globalization. Due to the ways in which our current culture is interconnected through the Internet and social media, it is easy to lose sight of the importance of uniqueness in favor of being universally pleasing (Ryning, 2021). Ryning (2021) claimed that globalization is a widespread issue and that it is a threat to cultural integrity and individuality as a whole. This implies that society should keep cultures separate from each other in an attempt to preserve the integrity of said cultures. In contrast, Miller (2021) cited the ways in which perceived globalization is just cultures finding the same traditions or trends in different ways. For instance, Westerners claimed that Japanese people dyed their hair as an imitation of Western culture and therefore used it as a symbol of globalization when, in reality, these people were dyeing their hair to look more like their favorite anime characters, something that is inherently Japanese (Miller, 2021).

Both arguments make good points, but it is important to recognize the importance of connections between cultures and not demonize the mere act of becoming more connected as a society via the Internet. Rhyning (2021) made a good point that globalization on a mass scale is problematic, as the erasure of cultures for a global norm is not ideal, but that does not mean that cultures cannot be shared at all. Take the concept of K-pop in America for example. Many American citizens enjoy Korean Pop music, but that does not take away from their connection with American culture. Without any globalization, society would not be able to spread and promote understanding of others, and that again leads to racism and fear of the other.

FIXING CULTURAL APPROPRIATION

With all this to consider, cultural appropriation is such a big deal, then how can society work to fix it? Nguyen and Strohl (2019) were headed in the right direction with their idea of group intimacy, something that was briefly discussed earlier. In their words "Intimacy is flexible - relations of intimacy can be extended, outsiders can be granted temporary or long-term insider status, insiders can be exiled, and boundaries can be redrawn" (Nguyen & Strohl, 2019, p. 991). Though this idea is a good starting point, it is not flawless when tying it back to the previous analogy of personal love letters. Though you would never post a couple's intimate love letters for all to see, culture is intrinsically part of the world. It is evidence of humanity and civilized

society as a whole. With that in mind and adding in the fact that one of the first things that you do in traditional art classes is draw from life, it brings to question where the line is in drawing people and things from the world out of inspiration or appropriation of culture. In a sense, this paper is misleading because it does not have a direct answer to "fixing" cultural appropriation, only a starting point. Philosophically discussing this topic is imperative given how the overall conversation in media tends to simply be pointing fingers as opposed to putting proper thought into what is or is not cultural appropriation.

CONCLUSION

As stated before, it is not the goal of this paper to have a completely perfect answer to this question, nor is it to have an answer at all, but for discussion of this subject to be more widespread and supported by factual evidence. Despite the abundance of sources used, the subject matter had to be pulled from a variety of places, with some information and evidence coming from places that would seem completely unrelated at first glance, like Motl's (2018) analysis of EDM dress talk. Ultimately, this topic needs to be discussed further in an ethical situation, philosophers need to define what the ethical boundaries for art and media regarding cultural appropriation because if those boundaries are solidly drawn it will assist the public. If more people knew how to handle cultural symbols and were aware what the basic universal expectations were for them regarding said symbols, it would set a baseline that each culture can adapt and edit to fit the comfort of their people. Additionally, all parties would benefit from a clear-cut definition of the differences between cultural appropriation and cultural appreciation as such a definition would not only solidly hold up in a court of law but would also assist in helping artists know what their boundaries are. With a discovered definition in place, artists would no longer need to worry about what they can or cannot do, and inspiration in art would be able to be directly tied to cultural appreciation, whilst cultural appropriation would have a more definable negative connotation. In future research, cultural appropriation and appreciation need to be defined, as the difference between these two terms can make all the difference in combating people disguising cultural appropriation as cultural appreciation, and people from misinterpreting cultural appreciation. Most of the issues with cultural appropriation do not ultimately come down to the issue with enforcement, though those are still big issues, but the lack of global understanding of the boundaries surrounding cultural symbols.

REFERENCES

- Berson, J. (2010). Intellectual property and cultural appropriation. *Reviews in Anthropology*, 39(3), 201-228. DOI: 10.1080/00938157.2010.509026
- Brice-Saddler, M., & Epstein, K. (2019). Ariana Grande tried to fix her Japanese tattoo. It still doesn't mean what she wanted it to. *The Washington Post*. <https://www.washingtonpost.com/arts-entertainment/2019/01/30/ariana-grande-got-japanese-tattoo-she-didnt-mean-it-say-bbq-grill/>
- Kornhaber, S. (2019). How Ariana Grande fell off the cultural appropriation tightrope. *The Atlantic*. <https://www.theatlantic.com/entertainment/archive/2019/01/ariana-grandes-7-rings-really-cultural-appropriation/580978/>
- Miller, L. (2021). Deracialisation or body fashion? Cosmetic surgery and body modification in Japan. *Asian Studies Review*, 45(2), 217-237. DOI: 10.1080/10357823.2020.1764491
- Motl, K. (2018). Dashiki chic: Color-blind racial ideology in EDM festivalgoers' dress talk. *Popular Music and Society*, 41(3), 250-269. DOI: 10.1080/03007766.2018.1519094
- Nguyen, C., & Strohl, M. (2019). Cultural appropriation and the intimacy of groups. *Philosophical Studies*, 176(4), 981-1002. DOI: 10.1007/s11098-018-1223-3
- Ritschel, C. (2021) Rihanna accused of cultural appropriation after models wear braids during Savage X Fenty show. *Independent*. <https://www.independent.co.uk/life-style/rihanna-savage-fenty-cultural-appropriation-b1928786.html>
- Rynning, M. (2021). Local traditions and global inspiration: Design students in Singapore and Norway. *The International Journal of Art & Design Education*, 40(1), 216-231. DOI: 10.1111/jade.12346
- Tan, L. (2013). Intellectual property law and the globalization of indigenous cultural expressions: Māori tattoo and the Whitmill versus Warner Bros. case. *Theory, Culture & Society*, 30(3), 61-81. DOI: 10.1177/0263276412474328
- Williams, A. (2023). What's the deal with K-pop and cultural appropriation? *Uproxx*. <https://uproxx.com/pop/k-pop-cultural-appropriation-black-music/>
- Wong-Padoongpatt, G., Barrita, A., King, A., & Strong, M. (2022). The slow violence of racism on Asian Americans during the COVID-19 pandemic. *Front Public Health*, DOI: 10.3389/fpubh.2022.958999

ACKNOWLEDGMENTS

This author thanks the faculty and staff of the Clarke Honors College for their help and support in the research contributing to and their review of this paper.

Microplastics, Nanoplastics, and Their Known Health Implications: Potential Solutions to Implement in the United States

Jasmine N. Bowie

FACULTY MENTOR: Professor Lauren Hill

ABSTRACT

With increasing information regarding the dangers of plastics to human and ecosystem health, plastics are becoming an increasingly concerning pollutant. Although plastics make up a relatively small portion of municipal solid waste, they make up the vast majority of ocean litter (United Nations, 2018). All currently used waste disposal practices for plastics create plastic particles that have the potential and tendency to accumulate within organisms, including humans. Over the past several years, research illustrating the connection between plastic particles and illnesses such as Alzheimer's disease, autoimmune disorders, and cancer has proven the dire need for regulations on plastic pollution. Yet, plastic pollution policies in the United States continue to fall short of creating meaningful change. In contrast, other countries such as France, the Netherlands, and Ecuador have implemented a variety of policies in an effort to contribute to the global fight against the plastics crisis. As the United States progressive legislation lags behind other countries, the amount of plastic manufactured, used, and discarded rises. Although legislation regulating plastic production and waste in the United States exists on a state level, the lack of federal legislation considerably exacerbates the state of environmental and human health. Modelling federal legislation in the United States after policy in foreign nations would attenuate the production, degradation, and spread of plastics around the world.

Keywords: plastic, single-use plastic, microplastics, nanoplastics, human health, pollution, policy, environment

INTRODUCTION

Exact statistical data for pollution-related deaths is highly variable and difficult to measure due to differing health outcomes and parameters included in estimates (Pozyer et al., 2023). The Institute of Environmental Management and Assessment's 2019 article about global pollution death tolls found that between 400,000 and 1 million people die from pollution annually. Other authorities such as the Global Alliance on Health and Pollution claim that pollution-related deaths were estimated to be as high as 9 million people in 2015. Scholars iterate that plastics remain among the most impactful and persistent pollutants globally, with widespread health concerns ranging from increasing risk of developing Alzheimer's disease to cancer (Owens and Conlon, 2021; Li et al., 2023; Osman et al., 2023; Gou et al., 2024).

Recent research highlights a strong negative correlation between federal plastic regulation and plastic pollution. For example, the United States has few federal laws regulating plastic when compared to European countries like Ireland and France (Environmental Protection Agency [EPA], 2023; EPA, 2024; United States Department of State, 2022; United Nations Environment Programme, 2018). Consequently, the United States averages approximately 250% more microplastic fibers found in tap water than the averaged European countries sampled (Statista, 2023). Furthermore, scholars point out that environmental pollution poses a greater risk to marginalized regions including South and

Southeast Asia where waste from high-income countries like the United States is imported for disposal (Owens and Conlon, 2021). The lack of federal policy in the United States contributes to the growing global plastics crisis; although state policies in the country exist, they often fall short of addressing large-scale industrial concerns. With no country-wide plastic regulations to date, implementing federal policy in the United States similar to other developed foreign nations would help alleviate the development of microplastics and nanoplastics altogether.

AN URGENT CONCERN: MICROPLASTICS AND NANOPLASTICS

Understanding the limitations of the research and classifications of plastic particles is helpful to understand the complexities of comparing available literature within the field. Consequently, compiling a consistent body of research to support plastic legislation is difficult and the scope of the plastics crisis is often onerous to conceptualize. Understanding the most popular classifications used in plastic particle research will help alleviate common misconceptions that hinder progress towards implementing legislation.

According to the United Nations Environment Programme (2023), microplastics can be defined as plastic particles less than 5 millimeters (mm) in diameter; however, Yuan et al. (2022) clarifies that, despite this widespread definition, microplastic analysts typically only cover particles between 1 mm to 1 micrometer (μm) (p. 3).

In contrast, nanoplastics are less commonly acknowledged in literature and are often defined as any plastic particle less than 1 μm , but there is debate about size characterization as evident by Yuan et al. (2022, p. 3) who classifies nanoplastics as particles less than 100 nanometers (nm) (Choudhury et al., 2023, p. 2; Shi et al., 2024, p. 2). These measurements can be restated as scholars primarily considering microplastic particles between the thickness of a penny and approximately 1/100th the thickness of a piece of paper. Even harder to visualize, nanoplastic particles of 100 nm or smaller are particles approximately the size of a flu virus or smaller.

Additionally complicating matters, type and size classifications of plastic particles are not regulated; however, many scholars have adopted terms such as primary and secondary microplastics to describe the origin of plastic particles (Chen et al., 2020; Muhib et al., 2022; Yuan et al., 2022). Plastics less than 5 mm produced for textiles, microbeads in cosmetic products, or other uses are frequently classified as primary microplastics. Secondary microplastics are usually defined as plastic fragments developed by the degradation of primary microplastics through weathering, improper disposal, or digestion (Choudhury et al., 2023, p.3; Muhib et al., 2022, p. 2; Facciola et al., 2021; Li et al., 2023; Usman et al., 2022). Beyond these widespread definitions, the knowledge needed to trace the origin of secondary microplastics based on size, shape,

and chemical makeup is largely unknown (Choudhury et al., 2023, p. 19; Jiang et al., 2022, p. 5). Thus, deciphering the main sources of plastic particles found in the environment is extremely difficult and remediation efforts are forced to include all sources of plastic since specifics cannot be pin-pointed. The limited research available and lack of regulated classifications in microplastic research restricts the scope of possibility within the field; all the while, plastic consumption and, therefore, pollution continues to rise.

One of the few widely agreed upon aspects of plastics research is the existence of a plastic cycle in the environment. The cycling of both primary and secondary plastic particles in the environment perpetually creates more secondary microplastics and nanoplastics that become embedded within sediments, soils, the biosphere, and the atmosphere (Choudhury et al., 2023, p. 2; Muhib et al., 2022; Usman et al., 2022). **Figure 1.** illustrates an example of the typically described plastic cycle in the environment (Bianco and Passananti, 2020). Scholars are still trying to learn more about the way plastic particles are cycled in the environment, but so far, the extent of the environmental contamination is too complex to conceptualize. As microplastics and nanoplastics accumulate within the environment, they make their way into drinking water sources, wildlife, seafood, and the air (Gambino et al., 2022; Choudhury et al., 2023; Muhib et al., 2022, p. 4; Yuan et al., 2022; Muhib et al., 2022, p. 2; Shi et al., 2024, p. 6; Jiang et al., 2022, p. 2). These plastic deposits in the environment lead to organism consumption and, thus, illness associated with plastic ingestion.

Discussion of the effect of toxins on the environment can be organized into two terms: biomagnification and bioaccumulation. Jiang et al. (2022, p. 2) and Yuan et al. (2022, p. 3) discuss the biomagnification of the negative impacts of microplastics as they move through the food chain, while Choudhury et al. (2023) and Muhib et al. (2022) emphasize the impact of bioaccumulation within organisms. Characteristic of biomagnified substances, microplastics that move through the environment may have their negative impacts compounded by the natural processes that further break them down such as the digestion of an ingested particle or the weathering of a primary microplastic which produces exponential quantities of secondary microplastics (Choudhury et al., 2023).

The exponential increase of plastic items in the environment from the initial introduction of trash or litter means that the millions of metric tons of plastic manufactured worldwide every

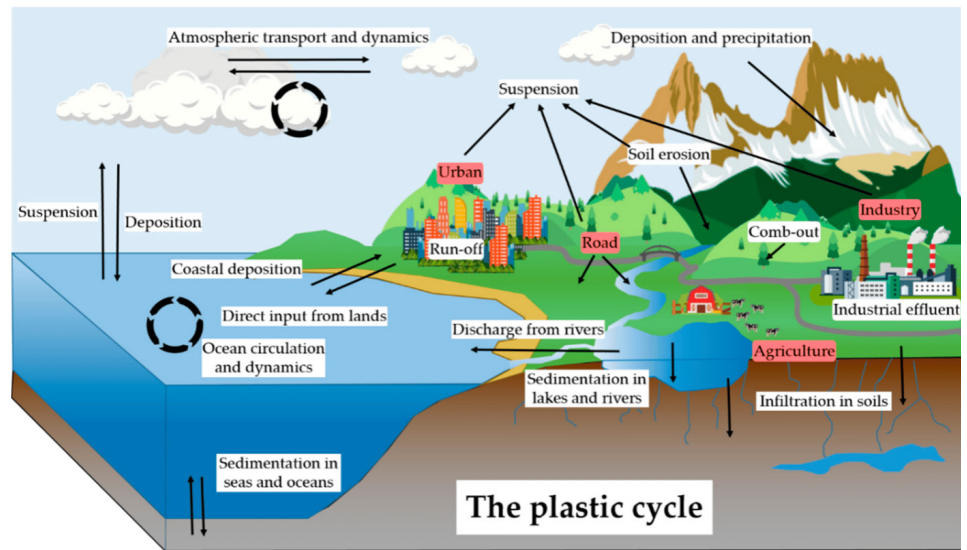


Figure 1: The Life Cycle of Plastic in the Environment

A plastic cycle model taken from Bianco and Passananti (2020) that describes the plastic cycle. Red labels indicate sources of plastic, while white labels indicate the processes and locations in the environment that are contaminated with plastic particles. This cycle includes the comb-out effect which describes the filtration of dry atmospheric particles by plants (Klein and Fischer, 2019).

year produce numbers of microplastics and nanoplastics that are impossible to accurately quantify. Choudhury et al. (2023) iterates that approximately 250 million tonnes of plastic will have accumulated in the environment by 2025, putting the health of ecosystems at risk (p. 2). Of these many tons, most plastic in the environment are particles so small that they are nearly indiscernible to the human eye. To further put the extent of plastic particles in the environment into perspective, the United Nations (2018) claims that as many as 51 trillion microplastics may already be found in the ocean. They iterate that this number represents 500 times more microplastics than there are stars in the Milky Way Galaxy. These immeasurably large numbers of plastic particles enter and remain within organisms as they are encountered in the environment.

Research detailing plastic particles observed in organisms and commonly consumed water has only become widely accessible within recent years, and thus is very limited to include only a few species and sites. Some of the most recorded samples of plastic particles within organisms include different types of fish such as minnows and carp, bivalves like mussels, and mice (Choudhury et al., 2023; Yuan et al., 2022). Similarly, plastic particles have been detected in a range of drinking water samples including groundwater, tap water, water treatment plants, and bottled water (Muhib et al., 2022). The ingestion of plastic particles is inevitable considering the state of

the environment; however, current research must emphasize the extent of the plastics crisis to begin understanding the long-term effects of the pollution. Although research surrounding the plastic crisis is limited and scientists are just beginning to understand the extent of the plastics crisis, the bioaccumulation of microplastics is problematic due to the increased health risks associated with large quantities of plastic particles in organisms (Choudhury et al., 2023, p. 11).

EFFECTS OF MICROPLASTICS AND NANOPLASTICS ON HEALTH

The presence of microplastics and nanoplastics in food, water, and air cause humans to consume them regularly while their accumulation within our bodies can cause neurotoxicity, respiratory and cardiovascular toxicity, cytotoxicity, genotoxicity, and more (Choudhury et al., 2023; Shi et al., 2024, p. 2; Jiang et al., 2022, p. 2; Yuan et al., 2022). Of this list, two of the most grievous health impacts are neurotoxicity and genotoxicity. Neurotoxicity is commonly defined as the effect of chemicals on the nervous system which often causes a decline in neurocognitive function. Choudhury et al. (2023) reported changes in the appearance and weight of the brain and increased mortality as some neurotoxic effects observed in fish studies. Similarly, genotoxicity is commonly defined as the effect of chemicals on the genetic information stored within cells. Interference of this genetic information often causes mutation of

cells and thus cancer or other genetic disorders. On a broader scale, many researchers found that microplastics and nanoplastics generally increase inflammation and organ damage, with some citing specific effects on the body including protein corona formation – the development of protein coatings around nanoparticles which allow them to bypass barriers within the body (Choudhury et al., 2023, p. 11; Yuan et al., 2022, p. 13).

However, because most studies have been conducted on cells, fish, or other organisms, scholars agree that the research on how microplastics and nanoplastics affect human bodies is significantly understudied. The extent of the health risks to humans remains understudied and a 2023 article from the United Nations Development Programme discusses that little evidence was available to support the claim that microplastics contribute to significant health impacts in humans. However, research has become available that suggests the ingestion of plastic particles are likely risk factors for cancer, Alzheimer's disease, and the development of autoimmune disorders (Li et al., 2023; Osman et al., 2023; Gou et al., 2024). As more research is published pertaining to the health effects of microplastic both within humans and other organisms, the call for solutions to alleviate the growing concentrations of microplastics in the environment becomes more dire.

To further illustrate the need for solutions for the rapid spread of plastic particles, Yuan et al. (2022) notes that adverse effects of microplastics and nanoplastics including the transportation of heavy metals and dichlorodiphenyltrichloroethane (DDT) likely cause more chronic conditions than we are currently aware of (p. 14). In birds, DDT causes eggshell thinning which results in eggs crushed under the weight of their brooding parents (Stanford University, 1988; EPA, 2024). In humans, DDT may affect the liver and reproductive system and act as a carcinogen (CDC, 2021). The disastrous impacts of plastic pollution reach far and are not limited to the cycling or spread of plastic particles themselves. The species harmed due to human activity is not limited to humans alone but extends to nearly every currently living and future creature on earth.

Unfortunately, due to microplastics and nanoplastics being an underdeveloped field of research, few long-term solutions are available. Choudhury et al. (2023, p. 19) and Muhib et al. (2022, p. 8) claim that one of the main knowledge gaps preventing the field's progression is the inefficiency of the classification of plastic particles. Currently, researchers like

Shi et al. (2024) are developing more efficient technology to better characterize microplastics and nanoplastics. Remaining significant gaps in the literature include the origin of atmospheric microplastics and their impact on the pulmonary system as well as the efficacy of tracing the origin of plastic particles from their shape, structure, and size as nanoplastics (Choudhury et al., 2023, p. 19; Jiang et al., 2022, p. 5). The current research available, however limited, makes it clear that plastic pollution is negatively affecting lives.

PRODUCTION AND WASTE

The global plastics crisis is derived from both the production and disposal of plastic items. In 1976, 50 million metric tons of plastic were produced worldwide, and when compared to the 400.3 million metric tons produced in 2022, production is rapidly increasing despite widespread concern over pollution-related deaths and environmental health (Statista, 2024). Of the staggering amount of plastic produced worldwide in 2022, the National Renewable Energy Laboratory (2022) estimates that 44 million metric tons were produced by the United States. To put this into perspective, 44 million metric tons is equivalent to approximately 485,016,977 200-pound adults. That number is higher than the combined estimated 2024 populations of the United States and Mexico (United States Census, 2024; Worldometer, n.d.). Facciola et al. (2021) iterates that 18% of global plastics are produced in the United States, despite the country only holding approximately 4.18% of the global population (United States Census, 2024). In other words, Americans produce approximately 4.3 times the amount of global plastic than the population reasonably allows. Plastic only accounts for 18.5% of municipal solid waste in American landfills but make up approximately 80% of all marine litter (United Nations, 2018). The estimation of plastic in American landfills does not represent the billions of pounds of plastic waste that are exported from the United States every year. The unproportional production of plastic waste in the United States compared to foreign nations calls for a reassessment of policy on plastics.

One of the most prevalent issues surrounding the disposal of plastic waste globally is the mismanagement and consequent pollution-heavy toll that common disposal practices produce. Often, "disposal" in high-income countries like the United States means exporting waste to other countries. In 2015, the United States exported 4.5 billion pounds of scrap plastic while 0.95 billion pounds of scrap plastic were exported in 2022. The significant

reduction in waste exports comes after the main recipient of American scrap plastic waste, China, implemented a ban on recyclable plastic imports in 2018 (Statista, 2023). This caused American plastic exports to decrease, with most plastic waste not being disposed of in domestic landfills and aquatic environments (Bourtsalas et al., 2023). Of the plastic not buried in landfills, 5.6 million tons are combusted, or burned (EPA, 2024). Data pulled from Statista (2023) explains that an estimated 2.24 million metric tons of plastic waste were mismanaged in 2016. Mismanagement of waste in this data set includes litter, illegal dumping, and exported, inadequately managed plastic waste. Not included in the classifications of mismanaged waste are the impacts of combustion and burying trash.

Combusting or burning trash and littering are some of the most common ways that microplastics generate, spread, and enter humans as the combustion of trash releases plastic particles into the atmosphere, which then remain for a while before entering a human respiratory or digestive track (Choudhury et al., 2023). Jiang et al. (2022) focuses on atmospheric plastic pollution, where an estimated 26-130 microplastics are inhaled everyday per person, but some people may inhale approximately 272 microplastic particles per day. No matter the quantity inhaled per day, these particles bioaccumulate in bodies until they cause health issues (Choudhury et al., 2023; Muhib et al., 2022). Littering causes a comparable issue, with plastics breaking down in the environment through weathering and eventually causing microplastics to be washed away into waterways or consumed by humans and animals.

Improper waste management causes contaminants from trash to leach into freshwater, marine, soil, and atmospheric environments (Choudhury et al., 2023; Facciola et al., 2021; Jiang et al., 2022; Shi et al., 2024; Yuan et al., 2022; United States Department of the Interior, 2019). Even regulated waste management like combustion and landfills often cause environmental strain as chemicals are released into the atmosphere or escape from the usually carefully monitored landfill drainage basins. Despite careful management of landfills, contamination is inevitable. Chemical leaching is particularly problematic with compounds that take a long time to break down in the environment or that pose serious health risks to both humans and animals, such as microplastics and nanoplastics. The microplastics leached from trash ingrain themselves into sediment both in the ocean and in freshwater bodies of water. They also embed into soils that agriculture

and wildlife rely on, and into the atmosphere which can produce acid rain in response to the contamination (Choudhury et al., 2023; Gambino et al., 2022; Yuan et al., 2022).

Despite the emphasis on mismanaged waste, the imprudent American waste disposal system is not the only source of concern. Facciola et al. (2021) claims that many airborne plastic particles originate from synthetic textile fibers, while Jiang et al. (2022) emphasizes particles from COVID-19 masks make their way into our lungs and respiratory tracts due to use. Similarly, a shocking number of plastic particles have been observed leaching from plastic tea bags, disposable water bottles, and take-out food containers (Shi et al., 2024; Muhib et al., 2022; Yuan et al., 2022). Shi et al. (2024) found that a single cup of tea brewed with a plastic tea bag contained an estimated 3.1 billion nanoplastics and 11.6 billion microplastics (p. 2). Plastic bottles of water were worse, with an estimated 54.2 million plastic particles per liter (Shi et al., 2024). Despite this, there are no regulations around the material food or drink items must be stored or sold in. This means that plastic particles within humans rapidly accumulate and will inevitably result in disastrous health effects. The health consequences of using plastic food and drink containers raises discussion of environmental justice issues as the daily use of single-use plastics is not always a choice for some families.

Developing countries, most notably South and Southeast Asia, are often left to dispose of imported waste from developed countries such as the United States. The mass amounts of plastic that are exported to developing countries leads many of the citizens of these countries to resort to burning the trash as fuel for heat or cooking (Owens and Conlon, 2021). This habit of combusting plastic waste out of necessity produces atmospheric plastic particles that are ingested through inhalation and consumption. Plastic producers in developed countries are not held accountable for the management of the waste created by their products, so the plastic industry continues to increase. Conversations of environmental justice surround the plastic industry as disadvantaged populations are most affected by the global plastics crisis (Owens and Conlon, 2021).

POLICY: FOREIGN AND DOMESTIC

Current research detailing microplastic concentrations in environmental samples around the world is scarce and often presented in incomparable units; however, broad data about microplastic concentrations in tap water from few global countries and regions is available

(Choudhury et al., 2023; Gambino et al., 2022; Büks and Kaupenjohann, 2020). According to Statista (2023), European countries average approximately 1.9 microplastic fibers per 500 milliliters of tap water, Ecuador averages 2.2 fibers per 500 milliliters, and the United States averages 4.8 fibers per 500 milliliters. 500 milliliters can be equated to approximately 16.9 fluid ounces or 1.76 cups, so the difference between the European and United States' averages is approximately 2.9 more microplastic fibers per 1.76 cups of tap water. This data is parallel to the difference in federal regulations on single-use plastics in leading countries against plastic pollution like Ecuador and European countries compared to the regulations in the United States.

According to Chen et al. (2020), the order of global regions from the most amount of microplastic pollution in freshwater bodies to the least is Asia, North America, Africa, Oceania, South America, then Europe. Consistent with this ranking, European countries have been implementing pollution laws on single-use plastic items such as plastic bags since as early as 2002. Ireland was among the first to enforce increased fees on single-use plastic bags; the United Nations Environment Programme (2018) specifies that the tax incentives were effective enough to decrease the average number of bags consumed per person per year from 350 to 14. Norway was even earlier with implementing sustainably practices, having used "reverse vending machines" since 1972 to collect recyclables around the country (United Nations Environment Programme, 2018). Between 1972 and the time of Chen et al.'s 2020 ranking of microplastic pollution per region, European countries passed laws regulating plastic consumption varying from tax incentives to produce less trash like in the Netherlands and Ireland to outright bans on single-use plastics like in France and some areas of Italy. In contrast, the United States' first single-use plastic bag ban was not approved until 2016. Even then, the law was localized to California and barely passed the vote with only 52% of voters voting in favor of the ban. Since then, eight states have banned plastic bags, but there is no country-wide single-use plastic ban in the United States to date (National Conference of State Legislatures, 2021).

Ecuador is a similar leader in plastic reduction and disposal legislation as the first Latin American country to adopt policy that addresses the plastic cycle. Active in environmental plastic reduction legislation since 2012, Ecuador's efforts range from supporting education and publicity about plastics to encourage global action to passing legislation to

phase out single-use plastics from their economy as much as possible (Ministry of Foreign Affairs and Human Mobility, 2022). In 2020, they passed the Organic Law for the Rationalization, Reuse and Reduction of Single Use Plastics which aimed to restrict single-use plastics in Ecuador in three phases with more restrictions placed after every phase. After 12 months of the bill's initial implementation, the sale and use of single-use plastics was restricted across the country. After 24 months, the manufacturing and importation of single-use plastic bags and food containers that did not contain an adequate amount of already recycled plastic were prohibited. Finally, after 36 months, the prohibited single-use plastics list was expanded to include wrappers and all items used for food or beverage for human or animal consumption that did not contain the acceptable amount of recycled plastic. Additionally, economic incentives were utilized to discourage the public from buying plastic items altogether, whether they were recycled or not (The Library of Congress, 2021). Restrictions this harsh in middle-income countries like Ecuador are virtually unheard of due to the strain they can place on the economy. Their leadership encourages high-income countries such as the United States to reconsider a more significant role in the efforts to reduce climate change. Above all, Ecuador emphasizes the importance of global solidarity in addressing issues like plastic pollution. (Ecuador, 2022). In contrast, the United States has a history of avoiding global collaboration efforts to address issues as broad as climate change such as the major climate treaty known as the Paris Agreement (United States Department of State, 2020).

As the plastics crisis and global climate change become more severe issues, the United States lags behind the efforts of other countries in mitigating the impending long-term damages to the environment and global population. The most relevant national policy to address plastic pollution in the United States is likely the National Environmental Policy Act which was signed into law by President Nixon in 1970. The policy details that federal agencies must assess the environmental effects of any actions they wish to take (EPA, 2023). Similarly, the Marine Protection, Research, and Sanctuaries Act was signed into law in 1972 and details that the transportation of material for the purpose of ocean dumping is prohibited. Simply put, the legislation was designed to ban the ocean disposal of extremely harmful wastes such as biological warfare agents, sewage sludge, and high-level radioactive waste. However, the act specifies that a permit may be acquired to deviate from the waste dumping regulations

(EPA, 2024). Both policies leave much to be desired and few significant government policies pertaining to pollution have been passed since then. Since neither of these directly or ruthlessly tie themselves to plastic, the policies themselves are ineffective at aiding in efforts to decrease American plastic production and disposal and now serve as little more than an excuse to avoid federal responsibility.

Current actions to address plastic pollution in the United States on a federal level are limited to voluntary programs rather than legislation. The programs include the WasteWise program which promotes more effective use and reuse of materials, and the Sustainable Materials Management program which details that the Environmental Protection Agency will release an annual report that analyzes the trends of municipal solid waste (United States Department of State, 2022). None of the programs force significant change to the plastic production or waste produced by the United States.

Federal regulation of plastic production and waste has been stalled in the face of state-wide restrictions on implementing plastic bans. As of 2019, 17 states have these preemptive ban restrictions including Colorado, Delaware, Florida, and Texas (Gibbens, 2019). Preemptive bans broadly prohibit the regulation of specific products, typically plastics and polystyrene

containers. Plastics industry corporate entities gain power in the United States government through the American Legislative Exchange Council, which allows both state legislators and lobbyists to vote on model bills before the voted upon legislation spreads to other states (PlasticBagLaws.org). As these corporations rise in power and influence over government processes, plastic ban preemptions become more prevalent at the cost of consumer wellbeing. Despite these ban preemptions, Article VI of the United States constitution establishes that federal constitution and law generally supersede state law. Additionally, the United States Supreme Court has granted the federal government power to pass legislation that protects public health and safety (National Academies Press, 2002).

From total single-use plastic bans to federally supported tax incentives, any action would be a step toward progress. However, there are concerns regarding public accessibility and economic strain during the transition away from single-use plastics as impoverished communities often rely on the lower cost of plastic items compared to non-plastic items (Wiefek et al., 2021). These concerns could be alleviated with federal support using subsidies and regulations on price for any plastic alternatives that are implemented.

CONCLUSION

The variety of solutions that have already been proved effective around the world provide a blueprint for how American policy could work to mitigate the production and use of plastic. Current and future research is aimed towards finding suitable, accessible plastic alternatives that can be distributed on a mass scale such as the development of bioplastic – which are biodegradable materials made from renewable resources such as starch (Rosenboom et al., 2022).

The United States' avoidance of implementing preventative legislation to alleviate the production and consumption of domestic plastics is only worsening the global plastics crisis. As established by hundreds of scientists around the world, plastic poses a global health risk. While research examining the extent of health consequences of plastic ingestion and the adverse effects of the contaminants they carry and leach into the environment accelerates, there is little reason to exclude plastic from the public health conversation. With proper management, the United States could minimize the public health consequences associated with plastic pollution and ingestion. Any legislation regulating plastic production, use, and waste management would benefit both Americans and the global population.

REFERENCES

- Bianco, A., & Passananti, M. (2020). Atmospheric micro and nanoplastics: An enormous microscopic problem. *Sustainability*, 12(18), 7327. <https://doi.org/10.3390/su12187327>.
- Bourtsalas, A. C. T., Yepes, I. M., & Tian, Y. (2023). U.S. plastic waste exports: A state-by-state analysis pre- and post-China import ban. *Journal of Environmental Management*, 344, 118604. <https://doi.org/10.1016/j.jenvman.2023.118604>.
- Büks, F., & Kaupenjohann, M. (2020). Global concentrations of microplastics in soils – a review. *SOIL*, 6(2), 649–662. <https://doi.org/10.5194/soil-6-649-2020>.
- Centers for Disease Control and Prevention. (2021). *Dichlorodiphenyltrichloroethane (DDT) factsheet*. https://www.cdc.gov/biomonitoring/DDT_FactSheet.html.
- Chen, H., Qin, Y., Huang, H., & Xu, W. (2020). A regional difference analysis of microplastic pollution in global freshwater bodies based on a regression model. *Water*, 12(7), 1889. <https://doi.org/10.3390/w12071889>.
- Choudhury, A., Simnani, F. Z., Singh, D., Paritosh, P., Sinha, A., Nandi, A., Ghosh, A., Saha, U., Kumari, K., Jaganathan, S. K., Kaushik, N. K., Panda, P. K., Suar, M., & Verma, S. K. (2023). Atmospheric microplastic and nanoplastic: The toxicological paradigm on the cellular system. *Ecotoxicology and Environmental Safety*, 259. <https://doi.org/10.1016/j.ecoenv.2023.115018>.
- DDT and birds*. (1988). Stanford University. https://web.stanford.edu/group/stanfordbirds/text/essays/DDT_and_Birds.html.
- European Environment Agency. (2023). *Mismanaged waste - a key source*. <https://www.eea.europa.eu/publications/european-marine-litter-assessment/mismanagedwaste-a-key-source>.
- Facciola, A., Visalli, G., Ciarello, M. P., & di Pietro, A. (2021). Newly emerging airborne pollutants: Current knowledge of health impact of micro and nanoplastics. *International Journal of Environmental Research and Public Health*, 18(6), 1–17. <https://doi.org/10.3390/ijerph18062997>.
- Gambino, I., Bagordo, F., Grassi, T., Panico, A., & De Donno, A. (2022). Occurrence of microplastics in tap and bottled water: Current knowledge. *International Journal of Environmental Research and Public Health*, 19(9), 5283. <https://doi.org/10.3390/ijerph19095283>.
- Gibbens, S. (2019). *See the complicated landscape of plastic bans in the U.S. Environment*. <https://www.nationalgeographic.com/environment/article/map-shows-the-complicated-landscape-of-plastic-bans>.
- Global Alliance on Health and Pollution (GAHP). (2022). *Pollution and health: A global public health crisis*. <https://www.gahp.org/reports/pollution-and-health-a-global-public-health-crisis>.

- Global contamination of plastic fibers in tap water by select country 2017*. (2023). Statista. <https://www.statista.com/statistics/745210/plastic-fibers-in-tap-water-by-select-country/>.
- Global plastic production*. (2024). Statista. <https://www.statista.com/statistics/282732/global-production-of-plastics-since1950/>.
- Gou, X., Fu, Y., Li, J., Xiang, J., Yang, M., & Zhang, Y. (2024). Impact of nanoplastics on Alzheimer 's disease: Enhanced amyloid- β peptide aggregation and augmented neurotoxicity. *Journal of Hazardous Materials*, 465. <https://doi.org/10.1016/j.jhazmat.2024.133518>.
- Institute of Environmental Management and Assessment. (2019). *Plastic pollution leading to huge death toll in developing world*. <https://www.iema.net/articles/plastic-pollution-leading-to-huge-death-toll-in-developing-world>.
- Jiang, Y., Han, J., Na, J., Fang, J., Qi, C., Lu, J., Liu, X., Zhou, C., Feng, J., Zhu, W., Liu, L., Jiang, H., Hua, Z., Pan, G., Yan, L., Sun, W., & Yang, Z. (2022). Exposure to microplastics in the upper respiratory tract of indoor and outdoor workers. *Chemosphere*, 307. <https://doi.org/10.1016/j.chemosphere.2022.136067>.
- Klein, M. & Fischer, E. K. (2019). Microplastic abundance in atmospheric deposition within the Metropolitan area of Hamburg, Germany. *Science of the Total Environment*, 685, 96-103. <https://doi.org/10.1016/j.scitotenv.2019.05.405>.
- Li, S., Keenan, J. I., Shaw, I. C., & Frizelle, F. A. (2023). Could microplastics be a driver for early onset colorectal cancer? *Cancers*, 15(13), 3323. <https://doi.org/10.3390/cancers15133323>.
- Ministry of Foreign Affairs and Human Mobility. (2022). *Ecuador's background and most recent actions to address marine litter and plastic pollution and its projection in leading the way towards a future global agreement on the matter*. Republic of Ecuador. https://apps1.unep.org/resolutions/uploads/ecuador_submission_for_oewg_session_in_dakar_-_2022_2.pdf.
- Muhib, M. I., Uddin, M. K., Rahman, M. M., & Malafaia, G. (2023). Occurrence of microplastics in tap and bottled water, and food packaging: A narrative review on current knowledge. *Science of the Total Environment*, 865, 161274. <https://doi.org/10.1016/j.scitotenv.2022.161274>.
- National Academies Press (US). (2002). *The governmental public health infrastructure*. <https://www.ncbi.nlm.nih.gov/books/NBK221231/>.
- National Conference of State Legislatures. (2021). *Brief state plastic bag legislation*. <https://www.ncsl.org/environment-and-natural-resources/state-plastic-bag-legislation>.
- Osman, A. I., Hosny, M., Eltaweil, A. S., Omar, S., Elgarahy, A. M., Farghali, M., Yap, P.-S., Wu, Y.-S., Nagandran, S., Batumalaie, K., Gopinath, S. C. B., John, O. D., Sekar, M., Saikia, T., Karunanithi, P., Hatta, M. H. M., & Akinyede, K. A. (2023). Microplastic sources, formation, toxicity and remediation: A review. *Environmental Chemistry Letters*, 21(4), 2129-2169. <https://doi.org/10.1007/s10311-023-01593-3>.
- Owens, K. A., & Conlon, K. (2021). Mopping up or turning off the tap? Environmental injustice and the ethics of plastic pollution. *Frontiers in Marine Science*, 8. <https://doi.org/10.3389/fmars.2021.713385>.
- Population clock*. (2024). <https://www.census.gov/popclock/>.
- Pozzer, A., Anenberg, S. C., Dey, S., Haines, A., Lelieveld, J., & Chowdhury, S. (2023). Mortality attributable to ambient air pollution: A review of global estimates. *Geohealth*, 7(1). <https://doi.org/10.1029/2022GH000711>.
- Preemption – PlasticBagLaws.org*. (n.d.). PlasticBagLaws.org. <https://www.plasticbaglaws.org/preemption>.
- Rosenboom, J. G., Langer, R., & Traverso, G. (2022). Bioplastics for a circular economy. *Nature Reviews Materials*, 7, 117-137. <https://doi.org/10.1038/s41578-021-00407-8>.
- Shi, K., Zhang, H., Gao, J., Zhang, J., Zhang, X., Kan, G., & Jiang, J. (2024). Detection of nanoplastics released from consumer plastic food containers by electromagnetic heating pyrolysis mass spectrometry. *Analytica Chimica Acta*, 1296, 342344. <https://doi.org/10.1016/j.aca.2024.342344>.
- The Library of Congress. (2021). *Ecuador: Law on restrictions on the use of plastic enters into force*. <https://www.loc.gov/item/global-legal-monitor/2021-02-16/ecuador-law-on-restrictions-on-the-use-of-plastic-enters-into-force/>.
- The National Renewable Energy Laboratory (NREL). (2022). *News Release: NREL calculates lost value of landfilled plastic in U.S.* <https://www.nrel.gov/news/press/2022/nrel-calculates-lost-value-of-landfilled-plastic-in-us.html>.
- Thompson, R. C., Olsen, Y., Mitchell, R. P., Davis, A., Rowland, S. J., John, A. W., McGonigle, D., & Russell, A. E. (2004). Lost at sea: Where is all the plastic? *Science (New York, N.Y.)*, 304(5672), 838. <https://doi.org/10.1126/science.1094559>.
- United Nations (UN). (2018). *'Turn the tide on plastic' urges UN, as microplastics in the seas now outnumber stars in our galaxy*. <https://news.un.org/en/story/2017/02/552052-turn-tide-plastic-urges-un-microplastics-seas-now-outnumber-stars-our-galaxy>.
- United Nations Development Programme (UNDP). (2023). *Microplastics on Human Health: How much do they harm us?* <https://www.undp.org/kosovo/blog/microplastics-human-health-how-much-do-they-harm-us>.
- United Nations Environment Programme (UNEP). (2018). *As the EU weighs a ban on single-use plastics, these European countries are moving ahead*. <https://www.unep.org/news-and-stories/story/eu-weighs-ban-single-use-plastics-these-european-countries-are-moving-ahead>.
- United Nations Environment Programme (UNEP). (2023). *Microplastics: The long legacy left behind by plastic pollution*. <https://www.unep.org/news-and-stories/story/microplastics-long-legacy-left-behind-plastic-pollution>.
- United States Department of State. (2020). *On the U.S. Withdrawal from the Paris Agreement*. <https://2017-2021.state.gov/on-the-u-s-withdrawal-from-the-paris-agreement/>.
- United States Department of State. (2022). *U.S. actions to address plastic pollution*. <https://www.state.gov/u-s-actions-to-address-plastic-pollution/>.
- United States Department of the Interior (DOI). (2019). *Marine debris impacts*. <https://www.doi.gov/ocl/marine-debris-impacts>.
- United States Environmental Protection Agency (US EPA). (2024). *Marine protection, research and sanctuaries act (MPRSA) and federal facilities*. <https://www.epa.gov/enforcement/marine-protection-research-and-sanctuaries-act-mprsa-and-federal-facilities>.
- United States Environmental Protection Agency (US EPA). (2024). *Plastics: Material-specific data*. <https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/plastics-material-specific-data>.

- United States Environmental Protection Agency (US EPA). (2024). *The case of DDT: Revisiting the impairment*. <https://www.epa.gov/caddis/case-ddt-revisiting-impairment>.
- United States Environmental Protection Agency (US EPA). (2023). *What is the national environmental policy act?* <https://www.epa.gov/nepa/what-national-environmental-policy-act>.
- U.S. mismanaged plastic waste key figures*. (2023). Statista. <https://www.statista.com/statistics/1228063/misplaced-plastic-waste-united-states/>.
- U.S. plastic waste exports 2015-2022*. (2023). Statista. <https://www.statista.com/statistics/1097245/us-scrap-plastic-exports/>.
- Usman, S., Razis, A. F. A., Shaari, K., Azmai, M. N. A., Saad, M. Z., Isa, N. M., & Nazarudin, M. F. (2022). The burden of microplastics pollution and contending policies and regulations. *International Journal of Environmental Research and Public Health*, *19*, 6773. <https://doi.org/10.3390/ijerph19116773>.
- Wiefek, J., Steinhorst, J., & Beyerl, K. (2021). Personal and structural factors that influence individual plastic packaging consumption – Results from focus group discussions with German consumers. *Cleaner and Responsible Consumption*, *3*, 100022. <https://doi.org/10.1016/j.clrc.2021.100022>.
- Mexico population (2024)*. Worldometer. (n.d.). <https://www.worldometers.info/world-population/mexico-population/>.
- Yuan, Z., Nag, R., & Cummins, E. (2022). Human health concerns regarding microplastics in the aquatic environment - From marine to food systems. *Science of the Total Environment*, *823*. <http://dx.doi.org/10.1016/j.scitotenv.2022.153730>.

ACKNOWLEDGMENTS

The author thanks Professor Lauren Hill and Dr. Elizabeth Ragan for their help with developing and editing this paper as well as providing me unwavering support during the creation of this paper.

Unmasking the Pandemic: A Groupthink Analysis of Vaccine Hesitancy During COVID-19

Nicole Washington

FACULTY MENTOR: Professor Lauren Hill

ABSTRACT

Irving Janis's groupthink model has been widely used to analyze group behavior, providing insight into why groups engage in defective decision-making. Despite this, the nullifying component of misinformation within his model is often overlooked. This study explores the prominence of this component within the group behavior seen during the COVID-19 pandemic, specifically focusing on the collective thinking of individuals – primarily conservative Republicans and a subsection of Christian nationalists – opposed to receiving the COVID-19 vaccine despite its proven effectiveness. Though general adversity to COVID-19 health mandates has been explored vaguely through a groupthink lens, little research has considered anti-vaccination beliefs specifically and the effects of misinformation on groupthink as a whole. Peer-reviewed research and content on various online platforms were analyzed to determine the model's alignment with COVID-19 anti-vaccination behavior, providing both academic and anecdotal perspectives. Multiple criteria from both sections of Janis's model – antecedent conditions and observable consequences – were found to fit aspects of the group behavior. However, various popular figures with massive followings promoted much misinformation about the vaccine, and this, combined with the abundance of misinformation across all corners of the Internet, contribute heavily to its collective spread. These findings suggest the likelihood that this misinformation influenced individuals' perceptions of getting vaccinated, weakening the usage of the groupthink model to describe it. This research highlights both the need to revisit the original groupthink model and the importance of individuals conducting their own research to lessen their susceptibility to misinformation.

Keywords: groupthink, misinformation, anti-vaccination, COVID-19 vaccine

INTRODUCTION

The power of individuals uniting within their shared beliefs is a testament to how strong and impactful groups can be. However, at times, this collective thinking can prove to be detrimental. Irving Janis developed the concept of "groupthink" in 1982, which he defined as "a deterioration of mental efficiency, reality testing, and moral judgment that results from in-group pressures" (p. 9). He derived this concept and eventually a corresponding groupthink model from an evaluation of six political "fiascoes" and how collective thinking contributed to defective decision-making. Since its inception, the term "groupthink" has often been used to describe group behavior across many domains of life, and it has more recently been proposed as a potential descriptor for actions observed during the COVID-19 pandemic. Despite the origins of Janis's model, however, the term "groupthink" is often used incorrectly due to the model's users frequently omitting this critical consideration from it:

Even when the members of a decision-making group select a defective course of action as a result of their own miscalculations, the main cause of their errors may prove to be misinformation from seemingly trustworthy experts...In such instances, the miscalculations are not attributable to defective decision-making procedures and therefore are not candidates

for an explanation in terms of groupthink (1982, p. 195).

From the onset of the global health crisis sparked by the outbreak of the novel coronavirus in late 2019, misinformation concerning the virus's legitimacy has been quite pervasive, particularly concerning the vaccine's release. Even though the spread of this misinformation did not always come from self-proclaimed "experts" as mentioned in Janis's statement, the leaders that were behind much of it – both human and religious – maintained such loyal followings that their words were treated as if they were. The vast effects of their messaging – which will be discussed later – displayed themselves even in spite of the vaccine's proven effectiveness and safety.

According to the U.S. Food and Drug Administration (FDA) (2021), "Since Dec. 11, 2020, the Pfizer-BioNTech COVID-19 Vaccine has been available under EUA in individuals 16 years of age and older," and it was determined to be 91% effective against COVID-19 when it was approved to be administered to the general public. The vaccine has been developed and updated in response to variants of the coronavirus that have emerged since then, and numerous clinical trials have confirmed the vaccine's efficacy. Despite this efficacy and the vaccine serving as protection for one's community through herd immunity, as of January 2022, 23 million Americans remained

unvaccinated against COVID-19 and actively refused to get the vaccine (Centers for Disease Control and Prevention, 2023; Holtkamp et al., 2022, p. 8). These individuals compose an anti-vaccination group more commonly known as "anti-vaxxers." This brought into question whether the group behavior observed in response to the vaccine – both in support of and against it – could have been "groupthink" impacted by misinformation. Although the "anti-vaxxer" group behavior seen during the pandemic aligned with many aspects of Janis's groupthink model, misinformation was spread by influential figures and across various media platforms. The extent of this spread was great enough to weaken the use of the model as a descriptor due to its significant potential to have influenced the group members' decision-making.

GROUPTHINK MODEL

The groupthink model that Janis developed is composed of two main sections: antecedent conditions and observable consequences. As defined by Janis, antecedent conditions are evident factors "that produce, elicit, or facilitate the occurrence of the [groupthink] syndrome," while the observable consequences are made up of groupthink symptoms and defective decision-making symptoms that he observed in his analysis of the political fiascoes mentioned previously (Janis, 1982, pp. 174-176). Janis's

model was designed to be used to analyze future instances of group behavior. Essentially, the more criteria from the model that are found to be in alignment with collective behavior being examined, the more likely that behavior is to be represented by groupthink. All of the antecedent conditions and observable consequences found to be in alignment with “anti-vaxxers” can be found in **Tables 1-3**.

Two of the groupthink model’s antecedent conditions that are present in the dynamics and group structure of “anti-vaxxers” are the group’s cohesion and the homogeneity within their backgrounds and ideologies. Janis heavily emphasized the importance of group cohesiveness within his model, explaining how its strength can increase a group’s ability to “bring about conformity to its norms and to gain acceptance of its goals” (1982, p. 4). Though many groups and demographics of individuals have documented hesitancy surrounding the COVID-19 vaccine, a particular group of note is conservative Republicans due to their staunch adherence to “traditional and conventional forms of institutions and behaviour,” as defined by Wilson (2013, p. 4). A relevant subsection of this demographic is Christian nationalists, who believe that “America is distinctively ‘Christian,’ and that this should be reflected in its public policies, sacred symbols, and national identity” (Baker et al., 2020, p. 275). Of course, not all conservative Republicans and Christian nationalists are “anti-vaxxers,” but various polls and studies have consistently demonstrated a higher prevalence of vaccine opposition within these communities.

Notably, Hamel et al.’s study from December 2020 found that 42% of Republicans displayed vaccine hesitancy, primarily due to concerns about side effects and government distrust. Similarly, a study by Corcoran et al. (2021) concluded that Christian nationalists were generally more doubtful about the COVID-19 vaccine and “less likely to have received or plan to receive” it (pp. 6618-6619). These political and religious groups already have solidified ideologies as a result of their decades of establishment, which have allowed the beliefs among their members to be consistent (He, 2023, pp. 32-36). These shared beliefs serve as a strong foundation for concerted decisions and responses to events, and the response and influence of many conservative Republican figures to the COVID-19 vaccine – which will be discussed later – is a perfect exemplification of that. Furthermore, with these demographics in mind, the influence of potential group “leaders” like former President Donald Trump, a strongly conservative Republican, cannot be

TABLE 1. Antecedent Conditions in Alignment with “Anti-Vaxxer” Behavior

Criterion	Description
A	Decision-Makers Constitute a Cohesive Group
B-1-2	Lack of Tradition of Impartial Leadership
B-1-4	Homogeneity of Members’ Social Background and Ideology
B-2-1	High Stress from External Threats with Low Hope of a Better Solution than the Leader’s
B-2-2c	Moral Dilemmas: Apparent Lack of Feasible Alternatives Except Ones that Violate Ethical Standards

TABLE 2. Symptoms of Groupthink in Alignment with “Anti-Vaxxer” Behavior

Criterion	Description
C-1	Decision-Makers Constitute a Cohesive Group
C-2	Illusion of Invulnerability
C-3	Belief in Inherent Morality of the Group
C-4	Collective Rationalizations
C-5	Stereotypes of Out-Groups
C-6	Illusion of Unanimity
C-7	Direct Pressure on Dissenters

TABLE 3. Symptoms of Defective Decision-Making in Alignment with “Anti-Vaxxer” Behavior

Criterion	Description
D-1	Incomplete Survey of Alternatives
D-3	Failure to Examine Risks of Preferred Choice
D-4	Failure to Reappraise Initially Rejected Alternatives
D-6	Selective Bias in Processing Information at Hand

Tables 1-3 summarize the antecedent conditions and observable consequences from Irving Janis’s original groupthink model that can be observed within “anti-vaxxer” behavior.

underestimated. His specific actions alongside those of others will be explored in more detail in the subsequent section, but the influence of various leaders like him played an instrumental role in “anti-vaxxer” behavior, particularly in their lack of impartiality, another antecedent condition within the groupthink model.

Furthermore, though the stressors brought on by the pandemic were immense and engulfed the entire nation, they were further amplified for those that were wary about the COVID-19 vaccine, especially considering the deterrents discussed previously. According to the FDA (2021), some of the most common side effects from the vaccine are “pain, redness and swelling at the injection site, fatigue, headache, muscle or joint pain,

chills, and fever.” Even though the side effects have been proven to be mild at best, even hearing about the potential side effects could be a considerable source of stress for some (Centers for Disease Control and Prevention, 2023). Granted, even though the vaccine is backed by clinical trials and evidence, the consistently proven lack of trust in the government that many conservative Republicans have could have given rise to internal conflict and sparked a dilemma concerning their viewpoints (Pew Research Center, 2020).

Another type of dilemma the vaccine gave rise to during the pandemic was a moral one, specifically among Christian nationalists. As discussed by Jones (2022), many vaccines,

including the one currently used to protect against COVID-19, are made by "growing the viruses in fetal cells" that were originally obtained from two elective abortions in the 1960s (p. 2238). Considering the typical "pro-life" stance of Christian nationalists and their view of abortions as immoral, the vaccines being created with the help of one likely raised ethical concerns for those educated on the matter (NPR, 2022). All the antecedent conditions at play here collectively contribute to and make up the "anti-vaxxer" group, providing a foundation for who they are and their beliefs.

In addition to the antecedent conditions indicated, there were many groupthink symptoms observed, as shown in Table 2. Even though the COVID-19 virus poses a universal threat and no one is completely immune to it, some "anti-vaxxers" hold opposing beliefs that are further intensified by the group's political and religious affiliations (Centers for Disease Control and Prevention, 2024). While 85% of Democrats perceive COVID-19 as a "major threat to public health," only 46% of Republicans view it as such, and "fewer than half of Republicans (45%) are very or somewhat concerned about unknowingly spreading the coronavirus, and only about a third (35%) worry they will contract COVID-19 and need to be hospitalized" (Pew Research Center, 2020, p. 4; Tyson, 2020). Furthermore, a study conducted by Upenieks et al. (2022) found that some religious beliefs can foster "distrust of science" and reduce motivation for adopting "positive health behaviors" like vaccination, choosing to follow their faith over facts (p. 678). Paradoxically, even though actually getting the vaccine would greatly increase one's chances of not contracting the virus, some have chosen to weigh their personal beliefs over this, which demonstrates the vast power those beliefs have in influencing their decision-making (Centers for Disease Control and Prevention, 2023).

On a larger scale, the circulation of ideas like these contribute to the formation of "echo chambers" – spaces within groups that collectively encourage the reinforcement of shared beliefs while rejecting information that challenges them – further solidifying individuals' commitment to these ideas and making them less receptive to alternative perspectives (Forsyth, 2020). These phenomena lead to all types of demonstrations characterized by these beliefs, such as protests opposing the vaccine and vaccine mandates (U.S. News Staff, 2021). Also, as mentioned, leaders like Donald Trump have played quite a role in this radicalization. Notoriously active on the popular social media platform Twitter – recently rebranded as "X" – during his presidency, his constant generalizing

references to "Democrats" and the "Radical Left" on the platform within Tweets of his have likely fueled stereotypes about them, creating a stronger echo chamber on the platform itself and undoubtedly intensifying the separation of the parties (Trump, 2020a, 2020b).

Alongside the groupthink symptoms, most of the defective decision-making criteria from Janis's groupthink model could also be observed within "anti-vaxxer" group behavior, as displayed in Table 3. Given that the "anti-vaxx" group in question is composed of individuals and lacks a traditional structure, it is difficult to objectively decide whether defective decision-making was made, as the spectrum of being vaccine hesitant to fully opposed to getting the vaccination individualizes the matter. However, for those who have fully decided to never get the vaccine, making up the striking 23 million Americans aforementioned, it could be argued that their decision is defective due to the fact that getting the vaccine would be contributing to community herd immunity, which benefits not only one's self but the individuals around them, according to current COVID-19 guidance (Centers for Disease Control and Prevention, 2023; Holtkamp et al., 2022, p. 8). Again, even though the term "defective" is subjective, healthcare providers using the vaccine's proven reliability alongside the CDC's recommendations to supplement their perspectives would likely suggest that an individual get vaccinated against the virus. In that case, the defective decision-making criteria listed here would retain its defective character for individuals sound within their decision to not get the vaccination.

MISINFORMATION

As described, a significant number of Janis's groupthink model criteria was found to align with "anti-vaxxer" behavior. However, as originally stated, misinformation is a potentially nullifying component of the model, so the role that misinformation played in the group behavior observed should be taken into consideration. Based on the research and anecdotal evidence available that will be explored below, it was found that the two main ways that misinformation about the COVID-19 vaccine spread during the pandemic were from leaders influencing their followers and through various media platforms.

Amidst the stress and fear of the pandemic, many turned to acting president Donald Trump for direction. However, much of his guidance proved to be misleading. According to a study conducted by Evanega et al. (2020), throughout a significant portion of the pandemic, Trump's remarks were found to be responsible for nearly

38% of the overall COVID-19 misinformation spread (p. 4). Considering how much information people were consuming during the pandemic, 38% is a striking figure. Examples of this misinformation-spreading include Trump constantly promoting the use of the immunosuppressive drug hydroxychloroquine as a cure for the coronavirus – which can lead to adverse side effects and is currently advised against by the World Health Organization (2023) – and his claims that that the Trump presidential administration had the virus completely under control when, in actuality, they did not and responded quite slowly and poorly to the pandemic (Parker & Stern, 2022, pp. 1-10). Additionally, prior to the pandemic, he was expressing anti-vaccination beliefs and claiming that vaccines cause autism; so, even when Trump ended up getting the COVID-19 vaccine, many did not follow suit or support his actions because they had already solidified their views on receiving it (Edwards-Levy, 2021; Hornsey et al., 2020, p. 5). Again, he was spreading all this inaccurate information about the virus in its entirety, which could have discouraged many from even seeing a need for getting vaccinated. In various respects, Trump was further contributing to these echo chambers of misinformation about the virus, and given his immense position of power, many considered all his messaging to be wholly reliable.

Other individuals that could have served as leaders for "anti-vaxxers" during the pandemic and spread an abundance of misinformation about the COVID-19 vaccine are a group referred to as the "Disinformation Dozen" in a study done by the Center for Countering Digital Hate (CCDH) in 2021. In this study, the CCDH was able to pinpoint 12 individuals, ranging from doctors to lawyers to self-proclaimed activists, that were found to have spread "up to 65% of anti-vaccine content" on social media (Center for Countering Digital Hate, 2021, p. 6). Those numbers are concerning on their own, but they are even more so considering that these are only the 12 individuals spreading the bulk of the misinformation.

According to tracking by the CCDH, 425 anti-vaccination accounts across social media platforms have a collective following of 59.2 million as of December 2020 (Center for Countering Digital Hate, 2021, p. 6). A variety of concerning claims can be found within the social media posts featured in the report, from vaccines causing autism to hydrogen peroxide curing the coronavirus. Some even went as far as catering to specific minority groups, like one post from Dozen member Rizza Islam expressing that black people should not get the vaccine

because it originated from “the people that enslaved [them]” (Center for Countering Digital Hate, 2021, pp. 13, 16, 22). One of those posts would be harmful on its own, but to consider that there are full accounts with individuals dedicated to spreading this type of information is great cause for concern. Especially knowing that many of the individuals in the “Dozen” are doctors, the perceived credibility of these individuals likely played a significant role in how people responded to the information they put out (Center for Countering Digital Hate, 2021, p. 6). Considering this, the individual influences of both Donald Trump and the members of “Disinformation Dozen” are formidable on their own, but their various media platforms significantly amplified the strength of their messaging alongside that of others.

One of the most active and instrumental social media platforms in circulating COVID-19 anti-vaccination beliefs has been Twitter. As briefly mentioned, Twitter is a popular platform for people to connect with each other and share their thoughts and opinions. In spite of the positive and colorful social atmosphere Twitter was able to provide for many throughout the pandemic, the platform grew into quite the misinformation-filled space during that time. In one analysis of 673 Twitter tweets related to the pandemic, Kouzy et al. (2020) found that “153 tweets (24.8%) included misinformation, and 107 (17.4%) included unverifiable information” (p. 5). Similarly, Pierri et al. (2023) concluded that there was a general increase in the numbers of reshares of specifically “COVID-19 vaccine misinformation” on the platform between 2021 and 2022, and that most of it originated from only a few individuals, with even one organization known as Children’s Health Defense – coincidentally founded by Disinformation Dozen member Robert Kennedy Jr. – racking up twice as many reshares on the platform than information promoting CDC guidelines and recommendations (p. 6). These findings underscore the power that misinformation can wield on the Internet – even if one person leads the charge – and the observation that Twitter contributed to its prevalence on social media during the COVID-19 pandemic.

Furthermore, Thelwall et al. (2021) concluded that 79% of the COVID-19-vaccine-related tweets analyzed in their study included themes of “right-wing opinions” and “conspiracy theories” (p. 7), which emphasized the importance of the platform at the time for the group as many professional organizations did not deem them credible (p. 8). Considering the ideologies previously discussed as being associated with the “anti-vaxx” group, it is likely that

tweets from members of that group made up a majority of the 79%. With the ability for anyone to make a post and have it be seen by many through personal followings, hashtags, or even natural “virality” in addition to the “retweet” feature that allows users to repost and comment on other people’s Tweets, the structure of Twitter is a perfect environment for the creation of an echo chamber. In the case of “anti-vaxxers,” considering the likelihood of many misinformation-containing tweets about the COVID-vaccine being from these individuals, the existence of this mass of unsubstantiated opinions and beliefs from them could have greatly influenced individuals’ decision-making. And, as aforementioned, the extreme activity of Trump and other members of the “Disinformation Dozen” on the platform undoubtedly fueled the spread of this misinformation and allowed it to be more and more impactful as it circulated.

Another platform that has spread a lot of vaccine misinformation is Fox News. The right-wing news network is extremely popular among conservatives, with the cable channel attracting 1.1 million daily viewers and the website version of the network garnering 74.7 million unique monthly visitors (Mastrangelo, 2023; TheRighting, 2023). Given that immense audience and the strongly partisan nature of the coverage, it is extremely likely that any information broadcasted on the network – vaccine-related or not – would be quite influential to at least some, if not many. Just a 2-week snippet of their COVID vaccine coverage revealed that, out of Fox’s 129 segments on the topic, “57% included claims that either undermined or downplayed immunization efforts,” totaling 216 claims in that period (Monroe & Savillo, 2021). The network continued to cover vaccine information like this throughout the pandemic, and the influence of that has been documented.

According to a data analysis conducted by Motta and Stecula (2023), Fox News was found to be associated with a “more negative vaccine sentiment” as well as an increased likelihood of refusing to get vaccinated (pp. 515-518). Similar information was concluded in a study done by Graham et al. (2020), which delved into how Trump’s messages – which have proved to be greatly influential – were often prominent and “reinforced” by Fox News in their daily coverage of the pandemic (p. 3). Fox News is a daily watch for a substantial number of Americans, and for some, it may be their main source of information on current events. Being fed so much misinformation about the COVID-19 vaccine – even if only for a short amount of time

but especially on a frequent basis – certainly could have discouraged people from getting the vaccine and even strengthened their beliefs on the matter, furthering the circulation of “anti-vaxx” views both inside and outside of one’s household.

Epoch Times is a third platform that has served in spreading a great deal of misinformation about the COVID vaccine. The online newspaper is ranked third among the most popular conservative news websites, attracting 6.2 million unique visitors to its site each month (TheRighting, 2023). The platform has grown immensely in recent years, and this growth has emerged alongside an increase in the amount of inaccurate information they have spread. Many of their articles on the vaccine contain reports and analyses of studies, but numerous articles of theirs either misleadingly interpret study results as more widely applicable than they are or are reporting on a study that is heavily flawed itself.

One such article from the *Epoch Times* was originally published in September 2023 and titled, “Researchers Find COVID Vaccines Causally Linked to Increased Mortality, Estimate 17 Million Deaths.” However, these “researchers” in question did not find anything groundbreaking; the correlation the cited report claimed to find between deaths and the COVID vaccine was likely just the virus killing people at high rates during that period of time and consequently producing these death surges, not the vaccine itself (Teoh, 2023b). Unfortunately, this theme of the *Epoch Times* promoting inaccurate research findings persists throughout their articles; other articles such as “COVID-Vaccinated More Likely to Be Hospitalized: CDC Data” and “Monkey Virus DNA Found in COVID-19 Shots” have also been disproved and found to lack scientific reliability (Rougerie, 2023; Teoh, 2023a). Articles like these may be even more deceiving and harmful than information on a platform like Twitter or Fox News because they read as if they are supported by credible research and evidence, which could make people feel as though they are adequately informed on the matter. However, this is just another way that people have been subjected to misinformation about the vaccine and potentially influenced to not receive it.

Despite the evidence that has been presented, Forsyth, a researcher who used Janis’s groupthink model to analyze health mandate responses during the COVID-19 pandemic, did not discuss misinformation in his study, yet claimed that the group behavior resulting from the mandates could be considered “groupthink.” Considering this, he could argue that misinformation is not a critical component

in the utilization of the groupthink model and its criteria. However, according to Janis himself, if misinformation played a role in the group behavior seen, it should be considered as a factor to potentially nullify groupthink, depending on its severity (Janis, 1982, p. 195). When various health mandates and safety recommendations from the CDC began to come out, much misinformation was spread about the virus (Freckelton, 2020). Even, for example, former president Donald Trump constantly downplaying the severity of the virus could have lessened one's likelihood to feel the need to adhere to the mandates and could be considered misinformation. Furthermore, Forsyth failed to mention even the potential of misinformation in relation to the mandates, which did not allow for a full and thorough evaluation of group behavior averse to COVID-19 health mandates, rendering his evaluation less credible and adherent to Janis's original model.

CONCLUSION

Twitter, Fox News, and the *Epoch Times* were all separately analyzed to emphasize how, across all different types of media channels, COVID-19 vaccine misinformation has still been rampant, and the spreading of the information by group "leaders" such as former president Donald Trump and the Disinformation Dozen exacerbated its

strength. Even though many of the groupthink model criteria fit the group behavior, the sheer mass of misinformation available to the public during this time likely had an influence on conservative Republicans in their decisions to get vaccinated. Two of the primary limitations of the current analysis are its time and length constraints, which inhibited the depth to which the topic could be discussed. That said, future research should explore the group behavior exhibited by vaccine supporters and Democrats alike, what influenced it, and how it aligns with Janis's groupthink model. Exploring this perspective would allow for comparison between the types of information and messaging that motivated individuals to get or not get the vaccine, their respective efficacies, and further, what can be learned from that to persuade the public to make advisable health decisions in the future. A third limitation of this analysis is that field research could not be conducted, which would have been able to supplement the current lack of scholarly research providing anecdotal insight into "anti-vaxxer" decision-making processes when choosing whether to get the COVID-19 vaccine; interviews exploring that could be conducted to strengthen the present analysis.

Concerning Janis's model, the digital atmosphere that modern America is immersed

in today invites the potential of misinformation influencing decision-making considerably due to its unfortunately significant prominence. With this, the model should be reexamined to analyze how misinformation could be intertwined with group decision-making and reconsider whether it should be a nullifier for groupthink – as it stands currently – or a factor that increases both the likelihood and severity of defective decision-making within groups. Given the magnitude of perspectives pertaining to the groupthink model's legitimacy, hopefully this research will aid in prompting the academic discourse around updating it. Outside of the groupthink model, the prevalence of the misinformation discussed is extremely concerning; if information about something as critical as one's health has the potential to be that influential, it is extremely vital that people conduct their own credible research and consult multiple reputable sources of information before making any health-related decisions, as the amounts of misinformation spread – both physically and digitally – will only continue to increase. In a world where misinformation is omnipresent, personal decision-making plays a vital role in shaping a healthier, more informed society, ultimately contributing to a future in which factual, sound knowledge trumps ignorance.

REFERENCES

- Baker, J. O., Perry, S. L., & Whitehead, A. L. (2020). Keep America Christian (and white): Christian nationalism, fear of ethnoracial outsiders, and intention to vote for Donald Trump in the 2020 presidential election. *Sociology of Religion*, 81(3), 272-293.
- Cao, J., Ramirez, C. M., & Alvarez, R. M. (2022). The politics of vaccine hesitancy in the United States. *Social Science Quarterly*, 103(1), 42-54. <https://doi.org/10.1111/ssqu.13106>
- Center for Countering Digital Hate. (2021, March 24). The Disinformation Dozen. *Center for Countering Digital Hate*. <https://counterhate.com/research/the-disinformation-dozen/>
- Centers for Disease Control and Prevention. (2023, September 22). Benefits of getting a COVID-19 vaccine. *Centers for Disease Control and Prevention*. <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/vaccine-benefits.html>
- Centers for Disease Control and Prevention. (2024, April 9). *About COVID-19*. Centers for Disease Control and Prevention. <https://www.cdc.gov/coronavirus/2019-ncov/your-health/about-covid-19.html>
- Corcoran, K. E., Scheitle, C. P., & DiGregorio, B. D. (2021). Christian nationalism and COVID-19 vaccine hesitancy and uptake. *Vaccine*, 39(45), 6614-6621. <https://doi.org/10.1016/j.vaccine.2021.09.074>
- Edwards-Levy, A. (2021, December 24). Trump's endorsement of vaccines aligns with most Republicans' views – But it may be an uphill battle to convince the holdouts. *CNN*. <https://www.cnn.com/2021/12/24/politics/trump-covid-vaccine-republicans-polling/index.html>
- Evanega, S., Lynas, M., Adams, J., & Smolenyak, K. (2020, September). Quantifying sources and themes in the COVID-19 'infodemic.' *Cornell Alliance for Science*. <https://allianceforscience.org/wp-content/uploads/2020/09/Evanega-et-al-Coronavirus-misinformationFINAL.pdf>
- Forsyth, D. R. (2020). Group-level resistance to health mandates during the COVID-19 pandemic: A groupthink approach. *Group Dynamics: Theory, Research, and Practice*, 24(3), 139-152. <https://doi.org/10.1037/gdn0000132>
- Freckelton, I. (2020). COVID-19: Fear, quackery, false representations and the law. *International journal of law and psychiatry*, 72, 101611. <https://doi.org/10.1016/j.ijlp.2020.101611>
- Graham, A., Cullen, F. T., Pickett, J. T., Jonson, C. L., Haner, M., & Sloan, M. M. (2020). Faith in Trump, moral foundations, and social distancing defiance during the Coronavirus pandemic. *Socius*, 6. <https://doi.org/10.1177/2378023120956815>
- Hamel, L., Kirzinger, A., Muñana, C., & Brodie, M. (2020, December 15). KFF COVID-19 Vaccine Monitor: December 2020. *KFF*. <https://www.kff.org/coronavirus-covid-19/report/kff-covid-19-vaccine-monitor-december-2020/>

- He, J. (2023). Group belongingness: Investigating the formation, maintenance, and influencing factors of social identity and group membership. *Studies in Psychological Science*, 1(2), 32-40. <https://doi.org/10.56397/sps.2023.09.03>
- Holtkamp, N., Marus, J., Ross, T. (2022, April 5). Trends in COVID-19 vaccination intentions. *Assistant Secretary for Planning and Evaluation*. <https://aspe.hhs.gov/reports/trends-covid-19-vaccination-intentions>
- Hornsey, M. J., Finlayson, M., Chatwood, G., & Begeny, C. T. (2020). Donald Trump and vaccination: The effect of political identity, conspiracist ideation and presidential tweets on vaccine hesitancy. *Journal of Experimental Social Psychology*, 88, 103947. <https://doi.org/10.1016/j.jesp.2019.103947>
- Janis, I. L. (1982). *Groupthink: Psychological studies of policy decisions and fiascoes*. Houghton Mifflin.
- Jones, D. G. (2022). Religious concerns about COVID-19 vaccines: From abortion to religious freedom. *Journal of religion and health*, 61(3), 2233-2252. <https://doi.org/10.1007/s10943-022-01557-x>
- Kouzy, R., Abi Jaoude, J., Kraitem, A., El Alam, M. B., Karam, B., Adib, E., Zarka, J., Traboulsi, C., Akl, E. W., & Baddour, K. (2020). Coronavirus goes viral: Quantifying the COVID-19 misinformation epidemic on Twitter. *Cureus*, 12(3), e7255. <https://doi.org/10.7759/cureus.7255>
- Mastrangelo, D. (2023, June 27). Fox News top rated cable network in second quarter of 2022. *The Hill*. <https://thehill.com/blogs/pundits-blog/media/3540152-fox-news-top-rated-cable-network-in-second-quarter-of-2022/>
- Monroe, T., & Savillo, R. (2021, July 16). Fox has undermined vaccination efforts in nearly 60% of all vaccination segments in a 2-week period. *Media Matters for America*. <https://www.mediamatters.org/fox-news/fox-has-undermined-vaccination-efforts-nearly-60-all-vaccination-segments-2-week-period>
- Motta, M., & Stecula, D. (2023). The effects of partisan media in the face of global pandemic: How news shaped COVID-19 vaccine hesitancy. *Political Communication*, 40(5), 505-526. <https://doi.org/10.1080/10584609.2023.2187496>
- NPR. (2022, May 8). How abortion became a mobilizing issue among the religious right. *NPR*. <https://www.npr.org/2022/05/08/1097514184/how-abortion-became-a-mobilizing-issue-among-the-religious-right>
- Parker, C. F., & Stern, E. K. (2022). The Trump administration and the COVID-19 crisis: Exploring the warning-response problems and missed opportunities of a public health emergency. *Public Administration*, 100(3), 616-632. <https://doi.org/10.1111/padm.12843>
- Pew Research Center. (2020, June 25). Republicans, Democrats move even further apart in Coronavirus concerns. *Pew Research Center*. <https://www.pewresearch.org/politics/2020/06/25/republicans-democrats-move-even-further-apart-in-coronavirus-concerns/>
- Pew Research Center. (2023, September 19). Public trust in government: 1958-2023. *Pew Research Center*. <https://www.pewresearch.org/politics/2023/09/19/public-trust-in-government-1958-2023/>
- Pierri, F., DeVerna, M. R., Yang, K. C., Axelrod, D., Bryden, J., & Menczer, F. (2023). One year of COVID-19 vaccine misinformation on Twitter: Longitudinal study. *Journal of medical Internet research*, 25, e42227. <https://doi.org/10.2196/42227>
- Rougerie, P. (2023, July 7). CDC data didn't show COVID-19 vaccines increase risk of hospitalization, contrary to claim by The Epoch Times. *Health Feedback*. <https://healthfeedback.org/claimreview/cdc-data-didnt-show-covid19-vaccines-increase-risk-hospitalization-contrary-claim-epoch-times/>
- Teoh, F. (2023a, July 10). Claim that COVID-19 mRNA vaccines contain DNA contaminants based on study of vials of "unknown provenance"; No evidence COVID-19 mRNA vaccines can alter DNA in people. *Health Feedback*. <https://healthfeedback.org/claimreview/claim-covid-19-mrna-vaccines-dna-contaminants-study-unknown-provenance-no-evidence-covid-19-mrna-vaccines-alter-dna-people/>
- Teoh, F. (2023b, October 12). Analysis claiming to find COVID-19 vaccines killed 17 million people is highly flawed, doesn't account for COVID-19 mortality surges. *Health Feedback*. <https://healthfeedback.org/claimreview/analysis-claiming-covid-19-vaccines-killed-17-million-people-flawed/>
- Thelwall, M., Kousha, K., & Thelwall, S. (2021). Covid-19 vaccine hesitancy on Englishlanguage Twitter. *El Profesional De La Información*, 30(2), 1-13. <https://doi.org/10.3145/epi.2021.mar.12>
- TheRighting. (2023, August 29). Most popular conservative and far-right websites in the United States in July 2023, based on number of unique visitors (in 1,000s) [Graph]. In *Statista*. <https://www.statista.com/statistics/1340485/usa-most-visited-conservative-websites/>
- Trump, D. J. [@realDonaldTrump]. (2020a, February 25).*Democrats talking point is that we are doing badly. If the virus disappeared tomorrow, they would say we did a* [Tweet]. Twitter. <https://x.com/realDonaldTrump/status/1232492832897658880?s=20>
- Trump, D. J. [@realDonaldTrump]. (2020b, August 7). *I called the politicization of the China Virus by the Radical Left Democrats a Hoax, not the China Virus itself.* [Tweet]. Twitter. <https://x.com/realDonaldTrump/status/1291713214066184192?s=20>
- Tyson, A. (2020, July 22). Republicans remain far less likely than Democrats to view COVID-19 as a major threat to public health. *Pew Research Center*. <https://www.pewresearch.org/short-reads/2020/07/22/republicans-remain-far-less-likely-than-democrats-to-view-covid-19-as-a-major-threat-to-public-health/>
- Upenieks, L., Ford-Robertson, J., & Robertson, J. E. (2022). Trust in God and/or science? Sociodemographic differences in the effects of beliefs in an engaged God and mistrust of the COVID-19 vaccine. *Journal of Religion and Health*, 61, 657-686. <https://doi.org/10.1007/s10943-021-01466-5>
- U.S. Food and Drug Administration. (2021, August 23). FDA approves first COVID-19 vaccine. *U.S. Food and Drug Administration*. <https://www.fda.gov/news-events/press-announcements/fda-approves-first-covid-19-vaccine>
- U.S. News Staff. Photos: Anti-vaccine protests. (2021, October 29). *US News & World Report*. <https://www.usnews.com/photos/2021/10/29/protests-against-the-covid-19-vaccine-in-photos>
- Wilson, G. (2013). *The psychology of conservatism (routledge revivals)*. Routledge.
- World Health Organization. (2023, March 28). Coronavirus disease (COVID-19): Hydroxychloroquine. *World Health Organization*. [https://www.who.int/news-room/questions-and-answers/item/coronavirus-disease-\(covid-19\)-hydroxychloroquine](https://www.who.int/news-room/questions-and-answers/item/coronavirus-disease-(covid-19)-hydroxychloroquine)

ACKNOWLEDGMENTS

The author thanks Professor Devon Bristow for their help with developing this paper, Professor Lauren Hill for all of her suggestions, and the Clarke Honors College community for their constant encouragement and support.



Laridae
SALISBURY UNIVERSITY
Undergraduate Academic Journal

VOLUME VI - FALL 2024

Salisbury University

Office of Undergraduate Research and Creative Activity (OURCA)
Guerrieri Academic Commons 233 • 1101 Camden Avenue, Salisbury, MD 21801
410-546-1674 • salisbury.edu/ourca
Support student research and creativity at salisbury.edu/ourca-giving

LARIDAE MISSION STATEMENT

Salisbury University works to foster an academic environment where students are empowered to develop curiosity, creativity, and critical thinking to chase ideas from inception to resolution. *Laridae* seeks to facilitate and further augment SU's academic environment by offering a high-quality forum for the pursuit of knowledge. As a teaching and scholarly institution, we aim to engage with the work that our undergraduate population produces to provide an inclusive environment for students to showcase their work with the academic community.

ACKNOWLEDGMENTS

Salisbury University President: Dr. Carolyn Ringer Lepre
Provost and Senior Vice President of Academic Affairs:
Dr. Laurie Couch
Dean of Graduate Studies and Research: Dr. Clifton Griffin
OURCA Faculty Advisor: Dr. Rhyannon Bemis
OURCA Faculty Advisor: Dr. Sherry Maykrantz
OURCA Postdoctoral Fellow: Dr. Edward Davis Carter
Creative Services and Brand Strategy: Crystal Kelly,
Karlie Batchelder, and Christine Smith
Library Services: Moushumi Chakraborty
Writing Center: Dr. Beth Towle

UNDERGRADUATE STUDENT EDITORIAL BOARD MEMBERS

Founder: Abiodun Adeoye
Co-Editors-in-Chief: Lian Peach and Jane Simoncic
Deputy Editor: Benjamin Cooper
Arts and Humanities Section Editors:
Alexandria Barton, Olivia Kuntz, and Sophia Smith
Interdisciplinary and Social Sciences Section Editors:
AJ Fontaine, Kendall King, and Logan Lankford
Sciences Section Editors:
Albi Freda, Allison Griffin, and Felicity Holder

FACULTY REVIEWERS

Viktoria Basham	Lisa Marquette
James Burton	Andrew Martino
Anne Chillingworth-Shaffer	Shruti Patel
Soraya DoDoo	Kathryn Prinkey
Brent Fedorko	Joshua Sokoloski
Angela Freeman	Christine Spillson
Heather Germalde	Ryan Sporer
Nicole Hall	Casey Stratton
Jessica Heimann	Laura Vilalobos
Catherine Jackson	Erin Weber
David Johnson	Timothy Werner
Carolyne King	

FACULTY MENTORS

Viktoria Basham	Jinchul Kim
Jaime Bunting	Jennifer Nyland
Edward Davis Carter	Joshua Sokoloski
Angela Freeman	Ryan Weaver
Kara French	Timothy Werner
Lauren Hill	