



The University of Texas at Austin
Longhorn Center for Academic Equity

VOLUME 14

SPRING 2022



THE RONALD E. MCNAIR SCHOLARS RESEARCH JOURNAL

THE UNIVERSITY OF TEXAS AT AUSTIN

The McNair Research Journal is a multidisciplinary journal of undergraduate research conducted by the McNair Scholars cohort of 2021-2022.



McNAIR SCHOLARS

"The true courage of space flight...is not sitting aboard 6 million [pounds] of fire and thunder as one rockets away from this planet. True courage comes in enduring...persevering, the preparation and believing in oneself."

—Ronald E. McNair



DIVISION OF DIVERSITY AND COMMUNITY ENGAGEMENT
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11 July 2022

The Division of Diversity and Community Engagement (DDCE) is honored to have the McNair Scholars Program as part of its portfolio and fully supports the program's goal of increasing the number of low-income and first-generation college students in graduate school. This goal is consistent with the DDCE's efforts to create an intellectually and culturally diverse environment at the university.

Therefore, it is my pleasure to offer an introduction to this year's issue of *The McNair Scholars Research Journal of The University of Texas at Austin*. The students published in this issue are McNair Scholars who were selected to participate in the McNair Summer Research Institute. These student scholars work with faculty mentors who support their research interests and guide them through the research project process that culminates in completing articles for publication in this, the McNair Journal. Not only does the journal offer a steppingstone for the student scholars who want to seek out additional publication opportunities, but the journal also provides a venue for graduate programs to see examples of the student's work.

As is evident in this issue, the research interests of the 2021 cohort of McNair Program scholars are as diverse as the individual students themselves. This annual publication marks the continuation of what we hope will be a successful pursuit of academic advancement followed by a fulfilling professional career. I have no doubt readers of the journal will recognize the value of the McNair Scholars Program and the opportunity it offers to participating undergraduates whose scholarly accomplishments are a reflection of what represents the best of The University of Texas at Austin.

Dr. LeToya Smith
Vice President
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11 July 2022

A Message from the Directors

We are very pleased to present this year's volume of The McNair Scholars Research Journal at The University of Texas at Austin. This journal is the culminating product of the efforts of our McNair Scholars during their Summer Research Institute. The scholarly research presented here is a testament to the hard work and dedication of our scholars. The McNair Scholars Research Journal represents a persistent tradition of our students achieving academic excellence.

The McNair Scholars Program prepares high-priority students for doctoral studies through involvement in research, faculty mentoring, academic colloquia series, and other scholarly activities. Ever since our first cohort of scholars graduated in 2009 and entered into graduate programs, our program continues to prepare first generation college students from underrepresented backgrounds to diversify the academic environment.

This year's journal contains the work of Scholars who completed the 2021 Summer Research Institute. We are very proud of the accomplishments of our McNair Scholars, especially considering the added challenges of conducting and completing research during a global pandemic that forced everyone off campus for over a year. We look forward to helping Scholars achieve their academic goals and future endeavors.

We would like to thank all the McNair Faculty Mentors for their support, guidance, and expertise in working with our Scholars. Your participation as faculty mentors has truly enriched the academic careers and enhanced the potential of our students. This program is also dependent on the support of our incredible staff members who work very hard to allow us to put forth a quality program. We would also like to extend appreciation to Dr. LaToya Smith, Vice President for Diversity and Community Engagement for her unwavering commitment and support of the McNair Scholars Program.

With the support of all these individuals and the perseverance of the McNair Scholars, we can continue to demonstrate that, at The University of Texas McNair Scholars Program, "What Starts Here Changes the World!"

Thank you,

Dr. Darren Kelly
Director, McNair Scholars Program
Associate Vice President

Dr. Anthony Brown
Faculty Director
McNair Scholars Program

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Female Empowerment in Khmer Storytelling in Cambodia: Hybridity of Tradition and Modernity

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Storytelling is a conversation among people of different generations, a conversation that helps them negotiate shared cultural identities based on both the past and the present. Cultural identities in Khmer stories are presented as fluid through tropes and themes related to gender pluralism and proto-feminist portrayals. As Khmer stories are adapted into different genres of literature and performance arts, the social messages shift and evolve. Yet, these disparate modes of storytelling retain their powerful effect as embodied ways of sharing and reshaping cultural identity between generations, from the past to the present. My research, which centers on modern and contemporary adaptations of “traditional” Khmer storytelling, moves beyond the conventional imperialist paradigm that posits a dichotomy between modernity as enlightened and progressive, and tradition as conservative and backward, arguing for a more nuanced conception of the hybrid relationship between the two. These kinds of cultural artifacts are not produced purely for entertainment, nor solely as vehicles for nostalgia. Moreover, I argue, these adaptations play a productive role in the ongoing negotiation and construction of identity in Cambodian communities.

Keywords:

cultural production, Khmer storytelling tradition, female empowerment, hybridity

Introduction

The fixed notions of “authentic culture” and “homogenous community” are essentially artificially constructed across space and time. For instance, culture is related to how people have a sense of belonging to a particular community in certain space in the present. The sense of belonging in a particular space in the present is related to temporal connections that bind people to a shared past. Benedict Anderson argues that each nation is an imagined community whose members share confidence in a sense of

authentic national identity and homogeneous community while there are great differences and heterogeneity within a national population (Anderson 6). From another viewpoint, Stuart Hall claims that cultural identities are names for the different ways in which a person is positioned by and positions themselves within the past (Hall 236). Drawing from these theories regarding flexible cultural identities, in this paper, I discuss how Khmer cultural identities are presented as unstable and flexible in the storytelling traditions. Specifically, the two competing and overlapping models of cultural identity that I explore in Khmer stories are the “perfectly virtuous woman” and the “modern woman,” terms that I adopted from Areeya Hutinta’s article, “The Concept of the ‘Perfectly Virtuous Woman’: Constructed Identity of Khmer Women for the Nation.” Through literature and performing arts, I argue that the female protagonists in Khmer stories exert their agency within and beyond prescribed roles for women. Therefore, through the vehicle of female empowerment, cultural producers and cultural consumers promote different visions of nationhood and Khmer identities.

The Role of Storytelling in Khmer Communities

Hall argues that histories are not simple nor factual; he claims that the past is constructed through memory, fantasy, narrative, and myth (Hall 237). In the case of Khmer history, the origin of Cambodia, its early ruling dynasties, various traditions and historical events with mythical motifs are mixed in with legendary reports recorded in folktales, royal annals, and ancient texts (Gaudes 333). Tradition, such as through the form of storytelling, is not a fixed concept; rather tradition is a concept that changes throughout time. Through the increase of interaction between people with different experiences and backgrounds, there is a productive space for change to happen without people being forced to conform to an idea of fixed tradition (Nederveen Pieterse 142). Katherine Brickell explains that Khmer tradition is often associated with the golden age of the Khmer Empire or Angkorian Period (9th – 15th century) that takes place before the decades-long violent conflicts such as the Siamese-Vietnamese War and French colonization (Brickell, “We Don’t Forget” 439). In this paper, my interpretation of Khmer tradition also encompasses ongoing influential cultural practices such as storytelling which are fluid and adaptable.

Khmer storytelling is fluid because the people who engage with this tradition have contributed to and changed it. I draw upon Jan Nederveen Pieterse’s scholarship in *Globalization and Culture: Global Mélange*, to explore the change of Khmer storytelling tradition through cultural production. In relation to time, hybridity is a term for mixed times and refers to the coexistence and interspersion of premodernity, modernity, and postmodernity (Nederveen Pieterse 68). Nederveen Pieterse defines premodernity, modernity, and postmodernity as structures and periodization (Nederveen Pieterse 67). Tradition transcends times of premodernity and continues in the times of modernity and postmodernity through the form of cultural production. Tradition is always in the

continuous process of change because cultural practices emerging from tradition, such as storytelling, continue to change and be produced throughout the mixed times of premodernity, modernity, and postmodernity.

Storytelling is a strong example of hybridity between traditional and modern Khmer cultural practices. Nederveen Pieterse also defines hybridization as the ways in which old forms become separated from existing practices and recombine with new forms in new practices (Nederveen Pieterse 70). Hybridity within a community is to recognize and acknowledge the hybrid past in terms of the present; the past empowers the community and gives it agency in the present (Nederveen Pieterse 79). On the other hand, identities in the present also determine how the past is conceived, which contributes to the concept of time periodization as having the qualities of being interdependent and mutually constitutive. The individual's perspectives influence their changing conceptualization of time, tradition, and modernity. A way that the Khmer storytelling tradition exemplifies hybridity is through the various roles that it has served in Khmer society, ranging from transmitting social morals of the past to providing a space for people to discuss contemporary issues relevant to the present.

Khmer storytelling tradition changes through various cultural production such as literature and performance arts. One genre of Khmer literature explored in this paper is called *sastra Ibaeng* meaning "book for entertainment" or stories meant to amuse. *Sastra Ibaeng* is a genre of Khmer classical romance and a source of Buddhist literature written by learned men or monks in the period from the 14th to the end of the 19th century (Pakdeekam 84, Thierry 43). A common feature of stories from *sastra Ibaeng* is that they are composed with a combination of different forms of traditional Khmer poetry. The purpose of these texts was intended for public recitation by Buddhist monks, or occasionally performed in a theatre. Additionally for the purpose of entertaining audiences, the stories were also told through visual representations such as murals and through theatrical performances such as shadow puppetry (Pakdeekam 84, Thierry 43, 45). Although *sastra Ibaeng* draws upon the Khmer oral storytelling tradition embedded in communities, the approach to the genre was not solely folkloric to explain the origins of a practice nor was the approach entirely for moralistic intentions. Despite the resemblance to epics, *sastra Ibaeng* also do not function exclusively in the role of true stories to explain the world. The most important function of *sastra Ibaeng* is to give the readers access to an imaginary representation of the world (Thierry 45). The cultural producers and consumers who engage with *sastra Ibaeng* can thus propose influential alternatives to society through these stories.

Sastra Ibaeng demonstrates how cultural artifacts from the past can enrich the formation of newer cultural artifacts throughout time. In the literary genre of *sastra Ibaeng*, writers draw upon preexisting cosmology and mythology to transmit the collective imagination of the Khmer people (Thierry 45, 48). According to Vincent Cheng, cultural, ethnic, and racial heritage inherited from the past strengthens and enriches a person's identity that is still based on their lived experiences in the present

moment (Cheng 178). Khmer poets of *sastra lbaeng* recognize that stories are composed by retelling some previous version of these stories or drawing upon a repertoire from Khmer storytelling tradition of the past. Poets often encourage other scholars to correct and improve upon their works (Pakdeekam 85). The themes and plots from *sastra lbaeng* come from a cultural heritage that predates the manuscripts, which are in themselves copies of copies (Thierry 43).

The change in purpose, themes, social messages, gender ideals, and cultural identities in storytelling tradition can be traced through cultural production. Authenticity and authority are not primary in the transmission of a story, as versions multiply through the many retellings. Therefore, people of different gender, age, and social class remember and transmit different versions of the same story (Than 68). Even in Khmer oral storytelling tradition, a story changes each time it is retold due to the change in narrator, time, place, and other factors. For Khmer audiences and readers, the single authenticity of a story is not as important as the entertainment, learning, and communal aspect of the act of storytelling itself. Storytelling is a space to explore morals and values through the supernatural and thus through the imaginary, propose a better change for society.

Storytelling as A Conversation

Khmer storytelling is an adaptable tradition that cultural producers use to evoke productive conversations around identity and other social issues relevant to contemporary society. The tradition of storytelling serves as a means for conversations between creators and consumers of these cultural artifacts. The evolving social messages and changing gender ideals transmitted through literature and performance arts towards the intended audience during each period contributes to the flexible tradition of Khmer storytelling. Hence, tradition is a concept that is not fixed in the past; rather tradition constantly changes throughout time. In the case of Khmer storytelling tradition, the various ways in which Khmer culture is reshaped and created can be traced through the evolving themes and character tropes. Specifically, the changes in characterization of the protagonists in Khmer stories depict changing sentiments towards gender roles in Khmer society throughout time.

Important characterization in Khmer storytelling centers on the belief system of animism. Before the introduction of major religions such as Theravada Buddhism into Cambodia, the belief system of animism was widely practiced among Khmer people (Ok 1:14). In the belief system of animism, a soul or spirit existed in all beings, even in inanimate objects (Brickell, *Gender Relations* 104). Animism is portrayed in various Khmer stories ranging from folktales to founding legends; specifically, an important trope in ancient tales about the origins of Khmer lands is the shape-shifting serpentine water spirits called *naga*. In one Khmer founding legend from the Angkorian Period about the origin of the first dynasty and formation of land in Cambodia, the male protagonist is a king, who sleeps at night in a golden tower with the female protagonist. The twist is that the female protagonist is a nine-headed serpent, and she is the lord of the kingdom (Gaudes 334).

In the Angkorian founding legend, the nine-headed serpent has supernatural abilities to transform beyond the human form which in turn gives her the mobility to transcend mortal and immortal realms. The form of the *naga* does not conform to the performance of gender. According to Judith Butler, gender is performative because the individual acts out their gender in daily habits and choices, subconscious instincts, and reactions within a constructed set of hierarchies (Butler 519). Butler further claims that social structure bestows gender, and that the individual is groomed into gender roles by society (Butler 526). The female protagonist in the founding legend is not constricted by the performance of the gender binary because she can shape-shift and choose to appear in the form of a beautiful woman or transform into a nine-headed serpent. Khmer stories challenge the performance of a gender binary through tropes such as shape-shifting and transformation that are metaphors for the concept of gender pluralism.

Michael Peletz defines gender pluralism as characteristics and qualities regarding bodily practices, attire, mannerism, embodied desires, social roles, sexual relationships, and ways of being that are linked to all possible realm of identities such as femininity, masculinity, and androgyny. Peletz further defines the term pluralism as social fields, cultural domains, and other systems in which two or more categories, groups, or ways of being in the world are present, tolerated, and granted legitimacy (Peletz 310). The characterization of the nine-headed serpent in the founding legend as a powerful ancestress who has supernatural abilities to transcend mortal and immortal realms is a portrayal of gender pluralism (Gaudes 337). There are portrayals of gender pluralism in other genres of Khmer stories. In *The Glory of Rama*, a Khmer epic poem composed by multiple anonymous authors between the 16th and 18th century, the female protagonist, Sita, also has supernatural abilities that allows her to seek refuge in the *naga* realm and live separately from her husband, Rama (Marrison 126, 127). Similar to the nine-headed serpent from the founding legend, the female protagonist, Sita can also reside in the underground realm of the *naga* and live separately from the male protagonists. The two stories portray gender pluralism through their behavioral practices (Marrison 124).

Another trope related to gender pluralism is the trope of the animal-groom. In the Khmer folktale, “The Story of Kengkang Snake,” the female protagonist, Nhi has an affair with a snake spirit while her tradesman husband is away for a long period of time (*Khmer Legends* 10).¹ The theme of the animal-groom from “The Story of Kengkang Snake” also appears in some stories from other cultures such as in the *zhiguai* and *chuanqi* genres of traditional Chinese stories (Hsieh 116). Animal-groom stories hint at the sexual repression and longings of females, and the few examples of animal-groom stories written by the authors in the *zhiguai* and *chuanqi* genres show male awareness of the difficulties of being a woman (Hsieh 117, 120). In some animal-groom stories,

¹ The works from the source, *Khmer Legends*, are only available in original Khmer. The discussion and analysis in this paper are based on my own English translations.

authors speak on behalf of women and explore, in a sympathetic way, women's desires, anxieties, and yearnings for romance, signifying proto-feminist interpretations (Hsieh 120).

Proto-feminist refers to the representation of changing attitudes toward the rights of women and the term encompasses the roles women play in society prior to the modern feminist movement of the 20th century ("Proto-feminist Literature"). There are proto-feminist portrayals in *The Glory of Rama*, because Sita is portrayed as a strong heroine who overcomes injustices inflicted upon her by her husband. For instance, Sita is portrayed as a self-sufficient single mother raising her sons in the woods without reliance on her husband's support. The final part of *The Glory of Rama* may have been composed to empathize with Cambodian palace women because the story portrays the unmerited suffering of the heroine caused by the husband's selfishness. Rama accuses a pregnant Sita of infidelity and orders his younger brother to kill her (Marrison 124, 125). In the "Story of Kengkang Snake," Nhi's husband waits to take revenge when his wife is in a vulnerable state and about to give birth (*Khmer Legends* 10). In both *The Glory of Rama* and the "Story of Kengkang Snake," the male protagonists are depicted as unmerciful. The characterization of the male protagonists as cruel and cunning is a proto-feminist portrayal that evokes sympathy and empathy with female hardship.

The female protagonists from the Angkorian founding legend, discussed earlier, and "The Story of Kengkang Snake" engaged in a romance with partners from another species but meet different fates. In the folktale, Nhi, has an affair with a snake spirit and was punished for her actions (*Khmer Legends* 10). In the Angkorian legend, however, successive kings are required to have regular sexual intercourse with the nine-headed serpent in order for there to be water and rice on earth (Knappert 182). Compared to Nhi, the nine-headed serpent is in a greater position of power for society's survival is dependent on her supernatural abilities (*Khmer Legends* 10, Gaudes 334). In an official report by Zhou Daguan, a Chinese envoy who stayed in the capital of the Khmer Empire also known as the Angkorian Empire, Zhou provided a full account of the lives of Khmer women. Zhou claims that pre-marital promiscuity was common and did not carry the same social stigma as in other cultures (Zhou 25). Zhou states there was also no prohibition against adultery per say but there was a disincentive. Moreover, Zhou implies that the husband will be abandoned if he does not fulfill his wife's wishes (Zhou 64). The changing powers of female protagonists may give insight into the changing powers of Khmer women in society.

Although different gender ideals and social norms are promoted by authors and other cultural producers in Khmer stories, tropes related to gender pluralism such as transformation, shape-shifting, and animal-groom challenge not only the gender binary but the binary status of Khmer women either having agency or being oppressed throughout history. Further, evolving characterizations and proto-feminist portrayals in Khmer stories challenge gender norms. In Khmer storytelling tradition, the female protagonists can exert agency within and beyond prescribed social roles for women as

wives and mothers because they can move across domestic, mortal, public, and supernatural realms. The wide array of representations of the female protagonists aligns with the complexity of Khmer cultural identities that can be reproduced and negotiated through the versatility of the storytelling tradition.

The Blur of Tradition and Modernity

Tradition is flexible, because it is continuously created and added on through the form of cultural production. The ambiguities and fluidity between modernity and tradition can be reshaped through Khmer cultural production, such as in Khmer literature. Cambodia has a long literary history and there has always been ambiguity in categorizing Khmer stories according to genres such as fiction, romance, or adventure because many texts fall into multiple genres (Chigas 14). In the 1930s, scholars divided Khmer literature into two broad categories: 1) traditional works produced in the 14th – 19th centuries; 2) modern works produced in the 20th century (Chigas 15, Thierry 43).

Khmer modern novels first emerged in the 1940s and 1950s (Chigas 44). During the Post-Independence period (1955-1970), a genre of Khmer modern literature that gained popularity and had the most readers was sentimental novels or *pralomlok*. *Pralomlok* translates literally to mean “stories that seduce the human heart” (Hutinta 72). Some authors in their novels frequently criticized the concept of a perfectly virtuous woman and various social conventions such as arranged marriages (Hutinta 72). For example, the theme of arranged marriages is prevalent as a focus and major obstacle in the plot of *pralomlok*. The plots of *pralomlok* also present problems that women faced such as urban migration to work, sexual abuse, and unfair treatment in a patriarchal family (Hutinta 73). Even though *pralomlok* is literature based on the contemporary world, the stories were still influenced by traditional literature. In the early decades of the 20th century, some of the first Khmer contemporary works still reflected themes of the past (Chigas 15). Therefore, the distinction between tradition and modernity in literature and other forms of cultural production are ambiguous.

The Perfectly Virtuous Woman

The first significant cultural identity discussed in this paper is that of the perfectly virtuous woman. The perfectly virtuous woman was derived from the oral tradition and shaped through 400 years of literature since the 14th century; the concept has been interpreted, adjusted, and added to throughout Khmer history. A perfectly virtuous woman is beautiful, intelligent, and able to advise their husband; they are also a good daughter, wife, and mother (Hutinta 63, 64). The perfectly virtuous woman can be compared to the ideal Confucian woman who had filial behavior, maintained chastity,

motherhood, and benevolence (Hsieh 35). During times of violence and post-violence, traditions such as the concept of the perfectly virtuous woman were reinstated and redefined to fulfill the needs or purpose of the time (Hutinta 64, 65). In the 14th – 17th centuries, Cambodia experienced political turmoil due to wars with Ayudhaya (present-day Thailand) and internal conflicts between various Khmer dynastic families. In the middle of the 18th century, Khmer poets emphasized the concept of the perfectly virtuous woman in their works by advocating that women had to behave themselves properly to preserve the Khmer cultural identity and to protect the Khmer race against assimilation (Hutinta 64, 69). In different eras throughout Khmer history, cultural production such as literature can be utilized to rebuild national identity and explore shifts in morality and values.

During certain conditions, such as in a time of national threat, cultural identity and memory of the past related to tradition are invoked for the purpose of recovering the community. From the genre of *sastra lbaeng*, a significant poem that promoted the preservation of Khmer race and protection against assimilation is *Lbaeng Kakei*. *Lbaeng Kakei* was composed by Khmer King Aung Duang in 1815, when Aung Duang was a prince living under the protection of the king of Siam (present-day Thailand) (Pakdeekam 86). Aung Duang wrote the poem about a queen, named Kakei, who commits adultery, and the king sentences her to die by stranding her on a raft (Harris 46, Hutinta 66). The two men with whom Kakei had affairs with were a musician of heaven and an eagle-like being or *garuda*, both who are not of the human race. Aung Duang presents that Kakei's obvious crime is not only the violation of taboo of having extramarital sex but having sex with men from other species. In *Lbaeng Kakei*, Aung Duang warns Khmer women of the time to maintain the purity of Khmer blood by opposing marriage with other ethnic groups. Aung Duang exhorts Khmer women not to have sex with or marry foreigners. The social message conveyed in *Lbaeng Kakei* is relevant to the state of Cambodia during the time of the poem's composition owing to the increased presence of unwelcomed foreign men, specifically Thai and Vietnamese men (Hutinta 66).

There is a historical context for the anti-Thai and Vietnamese sentiments. A prominent event in Cambodia during the early 19th century was the Siamese-Vietnamese War (1831 – 1834). During the time, there was Thai and Vietnamese involvement in Cambodian political affairs leading up to almost a loss of Cambodian sovereignty. From 1834 – 1840, the Khmer court was divided, and the unmarried Queen Ang Mei's ascendancy to the throne was supported by the Vietnamese faction of the Cambodian court. The Cambodian court remained under Vietnamese control until 1846, and during the time, there was the "Vietnamization" of Khmer culture through forced assimilation of Vietnamese clothing, language, religion, and ideology into Khmer society (Jacobsen 112, 113). Although the Vietnamese interference into Cambodian social, political, and economic life began before Ang Mei's reign, there was still a negative association between the Vietnamese dominance and a female sovereign that

contributed to a dichotomy between women and power during the 19th century (Jacobsen 106).

In the 19th century, the negative association between women and power and the fear of assimilation and loss of Khmer culture were reflected in didactic codes for women or *Cpap' Sri*. *Cpap' Sri* dates to the 15th to 17th centuries. However, following the composition of *Lbaeng Kakei*, Aung Duang developed his own didactic codes which were used to encourage Khmer women to preserve the pureness of Khmer race and prevent the assimilation of other cultures through marriage with men from other ethnic groups. *Cpap' Sri* was passed down through domestic education and these didactic codes listed various social rituals for women as well as dictating how they should perform in relationships, behave with their relatives, and conduct themselves to become perfectly virtuous women (Hutinta 67). Texts associated with Khmer tradition such as *Cpap' Sri* and cultural identities such as the perfectly virtuous woman have changed throughout different centuries as shaped by the relevant current events of the time.

In the post-Khmer Rouge (1975-1979) era, the traditional concept of a perfectly virtuous woman was reinstated in support of nationalism. During the People's Republic of Kampuchea (1979-1989), the government published pamphlets with stories of patriotic women who fulfill their social roles of the time by supporting their sons to be soldiers for the nation (Hutinta 78). In the pamphlets, the government portrayed the ideal Khmer women as someone who sacrificed herself by dedicating to motherhood and showing kindness to their family members. Women were praised for aiding men who served in the army especially those who took care of wounded veterans. This entailed nursing and even marrying handicapped soldiers. Such acts were praised because they alleviated the responsibility of the state (Hutinta 75). Globalization through global markets, global media, and neocolonial economies cause the heterogenization of culture in the postmodern era. There is pressure to define a unique and authentic national character that are sometimes influenced by premodern roots such as the perfectly virtuous woman in Khmer society (Cheng 5).

During the People's Republic of Kampuchea, Khmer women also participated in the construction and performance of gender. One underground writer, Mao Samnang, did not follow the socialist agenda. Handwritten underground novels were a space for other writers to escape the socialist framework put forth by the government (Hutinta 77). Her underground novels healed war survivors and brought attention to men controlling society and bending women to their will (Hutinta 79). The flexibility of literature, cultural identity, and gender ideals portrayed in the stories prove that tradition is influenced by current events while still drawing upon preexisting ideas of the past.

The Modern Woman

The second significant cultural identity in Khmer stories discussed in this paper is the constructed cultural identity of the modern woman. The image of the modern woman was first introduced by the French during the French Protectorate of Cambodia (1863–1953) as part of their civilizing mission to change the ideal Khmer women to fit Western standards of femininity while still drawing upon some aspects from the perfectly virtuous woman (Hutinta 69). During World War II (1939-1945), the French influence was weakening in Indochina (present-day Vietnam, Laos, and Cambodia). Therefore, the French implemented more flexible policies towards the Khmer people (Hutinta 69, 70). In Cambodia, one of the French policies was a campaign to promote national identity through Khmer women. In their campaign, the French promoted that Khmer civilization peaked during the Angkorian period, and that Khmer women were an important part in the prosperous past of the Khmer Empire. The French claimed that the status of Khmer women had declined over time, and that they intend to return Khmer women to their rightful position. Thus, the ideal image of Khmer woman during World War II changed to a Neo-Angkor identity because the French linked the ideal Khmerness to the culture from the Angkorian Empire which they claimed was a time of prosperous Khmer civilization (Hutinta 70).

After Cambodia's independence from France in 1953, Prince Sihanouk who governed during the time, intended to develop the nation into a modern state. During the post-Independence era (1955-1970), Sihanouk wanted Cambodia to appear civilized to the west, therefore, the ideal image of the modern woman was reinstated to help promote this nationalistic agenda (Hutinta 71). The government encouraged Khmer women to be modern women who received education and worked outside of the home. Conversely, family asked that women become a housewife and continue the tradition of being a perfectly virtuous woman. The contrasting images of the perfectly virtuous woman and modern woman are also reflected in two types of female characters in *pralomlok*. First, the virtuous woman who behaves strictly in the traditional view. Second, the modern woman who displays behavior similar to Western women, such as drinking alcohol, smoking cigarettes, and dressing in a sexually provocative style (Hutinta 72). This is a prominent example of Khmer storytelling being a powerful platform to instigate socio-political change through cultural identities that are presented in the female protagonists.

Cheng raises the issue of attempting to freeze imagined authentic cultural identities by preventing the change or evolution of culture into something that is considered less authentic (Cheng 179). Hall proposes cultural identity is a concept that is not eternally fixed or rediscovered through archeology, but rather, cultural identity is produced through retelling of the past and is a matter that transcends place, time, and history (Hall 236). Ideal images related to gender have undergone a shift in Khmer stories and adaptations. For example, in *The Glory of Rama*, Sita is a prominent female protagonist who embodies the image of the perfectly virtuous woman from Khmer

tradition, yet she enacts agency within her prescribed role erasing the boundaries between the modern woman images and idealized traditional images of women. Sita embodies the concept of the perfectly virtuous woman because she is the idealized wife and mother who is faithful and loyal to her husband by sharing his happiness, sadness, and hardships (Hutinta 65). Yet, Sita projects characteristics associated with the modern woman because she raises her children in the woods without her husband's support. The ideal image of the perfectly virtuous woman continues to change; thus, tradition is not static. An adaptable cultural identity that is not fixed can be conceptualized within a flexible tradition. Similar to how ideal images related to cultural and national identities constantly change, tradition is also a fluid concept that constantly adapts in response to contemporaneous issues.

Conclusion: Hybridity of Tradition and Modernity in Khmer Storytelling on the Stage

Cultural production serves as a continuity of Khmer storytelling tradition, and there is an important reason for why old stories and their themes are retold many times. Cultural producers and consumers negotiate cultural identities and social values through Khmer storytelling. Cheng's work on cultural identity recognizes that the people are active agents who not only retrieve culture but reshape culture (Cheng 179). The changing social messages in stories communicate to the audience the evolving social values throughout time. Characterization of the female protagonist can be manipulated so that the audience associates the protagonists' actions with right and wrong. Aung Duang portrayed Kakei's character in the 19th century poem, *Lbaeng Kakei*, to symbolize images of women who are impure, flirtatious, and have been dishonored (Hutinta 66). Deviating from Aung Duang's original intention, in the 2017 *yike* or Khmer traditional musical called the *Yike Story of Kakei*, the director, Uy Latavan, challenged the centuries-old notion that Kakei is a villain by presenting a sympathetic portrayal of her character. Latavan highlights Kakei's injustice because she was a victim of her time who not only suffered the mortal consequence of being sentenced to death but also the immortal consequence of having her name branded throughout Khmer history as a derogatory term for a woman who has many lovers (Kuch, *Yike Story of Kakei*).

In the *yike* version, Kakei is the embodiment of both the perfectly virtuous woman and the modern woman. She is a well-educated and beautiful young woman who was raised by a hermit and then married to the king. The plot of the musical, the *Yike Story of Kakei*, differs from the poem, and the changes reveal the flaws of the male protagonists who inflicted suffering and blame upon Kakei (Kuch, *Yike Story of Kakei*). In the *Yike Story of Kakei*, Latavan tells the story through Kakei's perspective as a woman who was taken advantage of by powerful male figures. One day, the *garuda* kidnaps Kakei from the palace, and she becomes fond of the *garuda* after being forced to live with him. When the king's servant who was sent on a mission to find Kakei discovered her sharing the *garuda's* bed, the servant threatens her into sleeping with him, and Kakei complies out of fear. In the *yike* adaptation, Latavan wants the Khmer audience to reevaluate what motivates Kakei's actions. For instance, Latavan provides

that the reason for Kakei's naïve behavior is because she was raised in seclusion by a hermit and has never been in the outside world (*Yike Story of Kakei*). Although Kakei is not completely faultless, the *yike* production depicts the complexities of Kakei's characterization. Through the musical production of the *Yike Story of Kakei*, Latavan wants to depict that the blame should not be solely on Kakei. Latavan encourages the audience to understand every nuance of a person's life before judging them (Kuch, *Yike Story of Kakei*).

Storytelling is a way for people to not only recall the past but to also write their personal history of the present into existence. The stories from tradition are still used in people's everyday expression and have a significant influence in society, especially in negotiating social morals and gender norms. Cultural production of literature and performance arts may be used as a tool to broadcast nationhood and prescribe social roles, but it can also be used as a platform to subvert master narratives imposed by hegemony. Adaptations of Khmer stories reflect the non-static and ever-changing beliefs, history, and life of Khmer people. Modern readaptations of Khmer stories are suggesting compromises such as still holding social values and tradition without the sacrifice of an individual's agency. The ambiguities of tradition and modernity in retelling Khmer stories continue to coexist in Khmer performance arts. The Khmer word for performance arts is *selepak*, and the prefix of the word, *se/* means magic (Ok 3:53). Through the tradition of storytelling, the magic of Khmer performance arts can be used to process prescribed gender norms of the past and to address social issues of the present. Thus, the Khmer storytelling tradition continues to hold an important place in contemporary Khmer society.

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Minority Stress Digital Dating Abuse Among Gay and Bisexual Men

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Digital dating abuse (DDA), a manifestation of intimate partner violence (IPV), is becoming more relevant. Despite elevated rates of IPV among sexual minority individuals and increased experiences of DDA, research has focused largely on face-to-face forms of IPV (e.g., physical assault) among presumed heterosexual couples. The minority stress theory offers a lens through which we can understand elevated rates of IPV, including DDA, among sexual minority individuals. The purpose of this study was to explore the role of minority stressors in DDA victimization and perpetration among sexual minority men. A sample of 491 cisgender gay and bisexual men was recruited online. Consistent with prior research, discrimination was associated positively with internalized homophobia. Discrimination and internalized homophobia were directly linked to DDA victimization and perpetration. Indirect effect from discrimination to DDA victimization and perpetration, mediated by internalized homophobia, were significant. This study highlights the relationship between minority stressors and DDA among sexual minority men and indicates the need for more work on DDA among marginalized groups including sexual and gender minorities.

Keywords: Internet and abuse, dating violence, GLBT.

Intimate partner violence (IPV) is a major public health issue. IPV is linked to negative health outcomes including low self-esteem, depression, physical injuries, self-harm, and mortality (Devries et al., 2013). Increasingly, there are calls to focus IPV research with sexual minorities and queer couples (Ard & Makadon, 2011; Bacchus et al., 2016; Baker et al., 2013; Stephenson & Finneran, 2017) as sexual minority individuals face minority stressors that may increase risk for IPV (Badenes-Ribera, et al., 2019; Meyer, 1995). One manifestation of IPV that is increasingly relevant is digital dating abuse (DDA). DDA is the use of technology to enact forms of IPV (Hinduja & Patchin, 2020; Powell et al., 2018). The aim of the present study was to explore the role of minority stressors in DDA among sexual minority men.

As among presumed heterosexual couples, IPV is an all-too-common occurrence among queer couples. A study of 16,507 participants of various sexual orientations from the U.S., 7,421 of whom were men, indicated that lifetime prevalence rate of experiencing rape, physical violence, and/or stalking by an intimate partner was 26%

among gay men and 37.3% among bisexual men. The lifetime prevalence rate of experiencing physical violence (e.g., being slapped, pushed, or shoved) by an intimate partner was 24% among gay men and 27% among bisexual men. The lifetime prevalence rate of experiencing psychological aggression (e.g., being told they were loser or not good enough, threatened of physical harm) by an intimate partner was 59.6% among gay men and 53% among bisexual men (Breiding et al., 2013).

Another study of 41,174 U.S. adults across sexual orientations found the lifetime prevalence of experiencing IPV among bisexual men was 37% and among gay men was 51.5%. More gay men (14.3%) than heterosexual men (7.1%) reported experiencing contact sexual violence (i.e., completed or attempted physical rape or being made to penetrate someone else, unwanted sexual contact, sexual coercion), whereas bisexual men had a prevalence rate of 11.1%, which was not statistically different from gay men or heterosexual men. Additionally, the prevalence of any form of contact sexual violence, physical violence, and/or stalking was higher among gay men (18.1%) compared to heterosexual men (11.14%); again bisexual men had a prevalence rate [13%] that was not significantly different from heterosexual or gay men, Chen et al., 2020). Thus, IPV in its many forms is present, and may even be elevated, among queer couples.

Prior research on IPV, such as that cited above, has focused largely on face-to-face IPV such as physical assault (Carvalho et al., 2011). Beyond physical violence, IPV can be enacted through technology such as text-based abuse or cyberstalking, or, broadly, DDA. DDA is common and has many of the same consequences as face-to-face IPV. In a systematic review of 44 articles focusing on cyber dating abuse (CDA; a construct akin to DDA), the rate of perpetration of any type of CDA (e.g., cyber psychological control/monitoring, online direct aggression) in the U.S. from the past year ranged from 8.1% to 62.6%. The rate of victimization of any type of CDA ranged from 18.0% to 68.8% in the U.S. from the past year (Caridade et al., 2019; Reed et al., 2016; Yahner et al., 2015). Given the ubiquity of online interactions, it is vital to continue to study DDA, particularly among populations at risk for elevated IPV (Caridade et al., 2019). The minority stress theory (Meyer, 1995, 2003) offers a possible framework for understanding elevated rates of DDA among gay and bisexual men within the context of social stigma and discrimination. The goal of the present study was to examine the relationship between minority stress and DDA among gay and bisexual men.

Minority Stress Theory

Minority stress theory (Meyer, 1995) originated from the idea that sexual minorities face chronic stress related to stigmatization in a heterosexist society. Minority stress processes include distal stressors that occur in the environment, such as experiences of discrimination, and proximal stressors that occur within an individual, such as internalized homophobia. Across myriad studies, these processes have been associated with greater mental health symptoms and lower well-being (e.g., English et al., 2018; Pachankis et al., 2018).

Discrimination and IPV

Discrimination is a distal stressor in minority stress theory. Discrimination includes experiencing violence or rejection by others due to one's status as a minority (Meyer, 2003). Experiencing discrimination has been linked to face-to-face IPV. A study of 2,368 men who have sex with men from six countries indicated that experiences of homophobic discrimination were linked to more experiences of physical IPV in the last year in five of six countries, including the U.S. (US sample $OR = 1.41$, 95% CI [1.11, 1.78]; Finneran et al., 2012). In a study of 1,075 gay and bisexual men from Atlanta, discrimination was linked with experiencing any form of IPV, including monitoring cellphone and online activity (behaviors consistent with DDA), in the past 12 months ($OR = 1.11$, 95% CI [1.05, 1.17]). Experiencing homophobic discrimination was also associated with perpetration of physical/sexual ($OR = 1.13$, 95% CI [1.05, 1.22]), monitoring ($OR = 1.10$, 95% CI [1.02, 1.18]), and HIV-related ($OR = 1.12$, 95% CI [1.00, 1.26]) IPV in the past 12 months (Stephenson & Finneran, 2017). In a systematic review of 10 articles examining the relationship between IPV in queer relationships and sexual minority stressors (e.g., experiences of discrimination) an association was found between discrimination and IPV (Longobardi & Badenes-Ribera, 2017). This link has also been found in other studies (Finneran & Stephenson, 2014; Finneran et al., 2012). However, there have also been mixed findings regarding this relationship. One study of sexual minority respondents to a Canadian national survey indicated the relationship between discrimination and IPV was not statistically significant (Barrett & St. Pierre, 2013). Given that the preponderance of prior work has linked distal minority stressors with IPV in sexual minorities, these same factors are likely to play a role in DDA.

Internalized Homophobia and IPV

Internalized homophobia refers to sexual minority individuals' adoption of societal negative attitudes towards their own identities (Meyer, 1995). Internalized homophobia is associated with feelings of aggression and violence towards members of one's own group because the negative attitudes towards an individual's sexuality are integrated into one's identity. Internalized homophobia may be linked with both IPV victimization and perpetration, as some individuals may express their aggression due to internalized homophobia towards their partner while other individuals may see themselves as deserving of such abuse, or both (Badenes-Ribera et al., 2019; West, 2012).

As previously discussed, one study of 1,075 gay and bisexual men from Atlanta examined the relationship between IPV and minority stress factors including internalized homophobia. Internalized homophobia was associated with increased odds of experiencing any form of IPV in the past year ($OR = 1.02$, 95% CI [1.01, 1.03]). Additionally, internalized homophobia was associated with reporting perpetration of any form of IPV ($OR = 1.01$, 95% CI [1.01, 1.02]), and experiencing physical/sexual IPV ($OR = 1.01$, 95% CI [1.00, 1.03]), controlling IPV ($OR = 1.03$, 95% CI [1.01, 1.04]), and

emotional IPV ($OR = 1.02$, 95% CI [$1.00, 1.03$]; Stephenson & Finneran, 2017). However, these relationships are each relatively weak.

In another study of 1,575 U.S. men who have sex with men examining IPV prevalence and the relationship between reporting IPV and minority stress, men who reported perpetrating sexual violence also reported more internalized homophobia compared to men who did not report perpetrating sexual violence. Internalized homophobia was linked with increased risk to commit sexual IPV ($OR = 1.08$, 95% CI [$1.03, 1.13$]; Finneran & Stephenson, 2014).

In a meta-analysis of eight articles examining the relationship between internalized homophobia and IPV in queer relationships indicated significant relationships among internalized homophobia and any IPV, physical/sexual IPV, and psychological IPV. The pooled effect size of the relationship between internalized homophobia and all forms of IPV perpetration was $r_+ = .147$, 95% CI [$.079, .214$]; $p < .0001$. The mean effect size of the relationship between internalized homophobia and physical/sexual IPV was $r_+ = .166$, 95% CI [$.109, .221$]; $p < .0001$. The mean effect size of the relationship between internalized homophobia and psychological IPV was $r_+ = .145$, 95% CI [$.073, .216$]; $p < .0001$. The mean effect size of the relationship between internalized homophobia and any type of IPV victimization was $r_+ = .102$, 95% CI [$.030, .173$]; $p = .006$. The overall data showed a consistent significant positive relationship between internalized homophobia and IPV victimization and perpetration, albeit with relatively small effect sizes, suggesting internalized homophobia is associated positively with IPV perpetration and victimization (Badenez-Ribera et al, 2019). Given that prior research has linked proximal stress factors to IPV, it is important to investigate whether proximal stress factors such as internalized homophobia are linked with DDA.

Digital Dating Abuse

DDA (Hinduja & Patchin, 2020; Reed et al., 2017) refers to the manifestation of intimate partner violence (IPV) in technology-mediated contexts, by way of use of digital means (e.g., texting and social media) to engage in problematic behaviors within an intimate relationship such as monitoring a partner's location, engaging in coercion, or being directly aggressive (Hinduja & Patchin, 2020; Powell et al., 2018; Reed et al., 2017; Van Ouytsel et al., 2017). DDA is linked with mental health issues, including depressive symptoms, anxiety, anger, and suicidal ideation, and has been linked with involvement in face-to-face IPV, including psychological IPV and sexual coercion (Zweig et al., 2013; Zweig et al., 2014).

Broadly, a study of 696 U.S. young adults across sexual orientations indicated a lifetime prevalence of 76.1% for experiencing and/or perpetrating DDA among participants. Forty-three percent of respondents engaged in digital monitoring and control perpetration, 25.0% of respondents engaged in digital direct aggression perpetration, and 12.4% of respondents engaged in digital sexual coercion perpetration. Additionally, 58.3% of respondents reported experiencing monitoring and controlling behaviors, 49.2% of respondents reported experiencing digital direct aggression, and

36.4% reported experiencing sexual coercion. Among male participants 59.8% reported experiencing digital monitoring and control behaviors, 46.7% reported experiencing digital direct aggression, 22.7% experienced digital sexual coercion (Ellyson et al., 2021).

One recent study examined the prevalence of DDA (e.g., psychological and sexual) victimization among a sample of 71 gay men and 41 bisexual men from the U.S. The lifetime prevalence rate of sexual DDA (i.e., pressuring partner to send sexual content against their wishes and sending unwanted sexual content to others) victimization was 41% and psychological DDA was 61% among gay men. Among bisexual men the lifetime prevalence rate of sexual DDA victimization was 41% and psychological DDA (i.e., using information from technology to cause emotional harm to partner; Watkins et al., 2018) victimization was 49% (Trujillo et al., 2020).

Prior research has indicated that face-to-face IPV among sexual minorities is linked to minority stressors (e.g., experiences of discrimination, internalized homophobia; Badenes-Ribera et al., 2019; Meyer, 1995). Given the elevated risk of IPV among sexual minority men and the ubiquity of digital interactions (e.g., cellphone, online) it is crucial to extend our understanding of this relationship to DDA in this population. While DDA has been fruitfully investigated among adolescents, it has not been adequately applied to understanding dating experiences of adults. As online interactions are a critical part of the most individuals' experiences, including adults, it is crucial to examine the minority stress model, as it relates to DDA, among sexual minority men. To this end, we had the following hypotheses:

Hypothesis 1: Discrimination and internalized homophobia will both be uniquely, significantly, and positively associated with each of the three forms of DDA (i.e., digital sexual coercion, digital direct aggression, and digital monitoring and control), in terms of both perpetration and victimization.

Hypothesis 2: Internalized homophobia will mediate the relationships between discrimination and each of the three forms of DDA (i.e., digital sexual coercion, digital direct aggression, and digital monitoring and control), in terms of both perpetration and victimization.

Methods

Participants

Participants were 491 cisgender men. The participants ranged in age from 18 to 79 ($M = 31.35$, $SD = 11.60$). The majority identified as gay ($n = 307$, 63%), with a minority identifying as bisexual ($n = 172$, 35%); 2% of the sample identified as a non-heterosexual identity other than gay or bisexual (e.g., queer; $n = 12$, 2%). Regarding race/ethnicity, 67% ($n = 329$) of participants reported being White, 11% ($n = 52$) Asian/Asian American, 8% ($n = 38$) Hispanic/Latino, 7% ($n = 32$) Black/African American, 6% ($n = 31$) multiracial, 1% ($n = 4$) another identity, 1% ($n = 3$) American Indian/Native American, and less than 1% ($n = 2$) Native Hawaiian or Pacific Islander.

Measures

Experiences of Discrimination (EOD)

Experiences of discrimination were measured based on items from the EOD scale (Krieger et al., 2005) per recommendation from McCabe et al., 2010. The EOD scale consists of seven items that ask about discrimination based on sexual orientation in specific contexts over the past year (sample item: “Discrimination or harassment in public settings such as on the street, in stores, or in restaurants”; an item on discrimination in encounters with law enforcement was added as that was not captured among the original six items). Responses are made on a dichotomous scale (0 = No, 1 = Yes). In prior research using a sample from the 2012-2013 National Epidemiologic Survey on Alcohol and Related Conditions-III (NESARC), scores on the EOD were associated with greater odds of alcohol use disorder (McCabe et al., 2019). In that sample, the Cronbach’s alpha for responses to items was .89 in the past year. The Cronbach’s alpha for responses to items in the current study was .78.

Internalized Homophobia Scale (IHP)

Internalized homophobia was assessed with the IHP (Herek et al., 1998). The IHP consists of nine items (sample item: “I avoid other LGB people”). Responses are made on a 5-point scale (1 = Strongly disagree to 5 = Strongly agree). In prior research using a sample of 474 self-identified LGB individuals, the scores on the IHP were associated positively with depression, anxiety, and stress (Walch et al., 2016). In that sample, the Cronbach’s alpha for responses to items on the IHP was .88. The Cronbach’s alpha for responses to items on the IHP within the current study was .81.

Digital Dating Abuse (DDA) Scale

DDA was measured with the DDA scale developed by Reed et al. (2017). The DDA scale consists of 36 items (18 victimization items and 18 perpetration items with parallel content) on three subscales (Digital Sexual Coercion [DSC], sample item, “Pressured [you/them] to “sext”; Digital Direct Aggression [DDA], sample item, “Shared an embarrassing photo or video with others without permission”; Digital Monitoring/Coercion [DMC], sample item, “Used an online account to pretend to be [you/them]”). Responses are on a dichotomous scale (0 = No to 1 =Yes). In the developmental study for the DDA scale, adolescent boys endorsed experiences of digital sexual coercion (30% victimization and 34% perpetration), digital direct aggression (44% victimization, 37% perpetration), and digital monitoring or control (52% victimization, 41% perpetration). In the developmental study, Cronbach’s alphas for responses to DDA scale items ranged from .67 to .81. The Cronbach’s alphas for response to DDA items the current study were: .76 for DSC-victimization, .79 for DDA-victimization, .71 for DMC-victimization, .59 for DSC-perpetration, .72 DDA-perpetration, and .67 for DMC- perpetration.

Procedure

This study was approved by the institutional review board at REDACTED. Participants were recruited from Prolific.co, a crowdsourcing research web site. Prolific is similar to crowdsourcing sites such as Mturk (Buhrmester et al., 2011; Goodman et al., 2013) but prolific.co users enter demographic data upon enrollment and only see studies for which they are eligible. This approach decreases the risk of participants impersonating identities to enroll in a study, a notable problem with Mturk (MacInnis et al., 2020; Sharpe Wessling et al., 2017).

The study was made available to cisgender men who identified as gay or bisexual and who lived in the U.S. Participants viewed the informed consent page online and could elect to participate in the study. The study materials were hosted online on Qualtrics. Participants were compensated with \$3 credited toward their Prolific.co accounts.

Results

Means, standard deviations, and intercorrelations among variables are presented in Table 1. The prevalence rates in the sample for any form of DDA victimization was 52.1%, and for any form of DDA perpetration was 26.7%. The prevalence rates in the sample for each form of DDA (i.e., the proportion of participants who responded affirmatively to at least one item on each subscale) were, for victimization, 37.3% for digital sexual coercion, 24.4% for digital direct aggression, and 35.0% for digital monitoring and control; for perpetration, 16.3% for digital sexual coercion, 10.2% for digital direct aggression, and 16.1% for digital monitoring and control.

Data were analyzed using structural equation modeling, using Mplus v 8.4 (Muthén & Muthén, 1998-2017). For the discrimination, internalized homophobia, digital direct aggression (victimization and perpetration), and digital monitoring and control (victimization and perpetration) variables, we created item parcels. Item parcels were created using Little's method of conducting a single-factor factor analysis on the item sets and assigning items to parcels in countervailing order. For digital sexual coercion, because the subscale had only four items, those four items were used as indicators of the latent digital sexual coercion variable.

The model was coded using internalized homophobia as a mediator of the relationship between discrimination and the forms of DDA (victimization and perpetration), consistent with the minority stress model. DDA scales were allowed to covary. The model was analyzed using WLSMV estimation using 5000 bootstrapped samples to estimate indirect effects. Missing data were low (69 of 25,532 data points, or 0.3%, missing) and all available data were used in analyses (Asparouhov & Muthén, 2010; Parent, 2013).

The overall model was an acceptable fit to the data, $\chi^2(271) = 553.95, p < .001$; CFI = 0.92; RMSEA = 0.046 (90% CI = 0.041, 0.052). All item parcels and items loaded onto their intended latent variables at $p < .001$.

Consistent with work on minority stress theory, discrimination was associated positively with internalized homophobia. Consistent with hypothesis 1, all of the direct links from both discrimination and internalized homophobia to all forms of DDA victimization and perpetration were significant; path coefficients and standard errors are presented in in Figure 1. Indirect effects are presented in Table 2. Consistent with hypothesis 2, all indirect effects from discrimination to each of the DDA variables, via internalized homophobia, were significant.

Discussion

Findings from this study advance the literature on minority stress theory in the context of DDA. These findings extend previous research on DDA by applying minority stress theory to DDA in the context of adult sexual minority men's dating relationships. The results suggests that experiences of discrimination and internalized homophobia are associated with all three measured forms of DDA perpetration and victimization among sexual minority men. These findings advance research on minority stressors and DDA and increase understanding of the relationship between minority stressors and DDA among sexual minority men.

Our findings support the hypothesized associations among discrimination, internalized homophobia, and DDA. Both discrimination and internalized homophobia were linked with DDA including direct effects and mediation via internalized homophobia, consistent with the minority stress theory model. Our analysis indicated direct links from experiences of discrimination and internalized homophobia to DDA victimization and perpetration including all three aspects of DDA (sexual coercion, digital dating aggression, and digital dating monitoring and control).

Additionally, the results provide further support of the need to address DDA, both victimization and perpetration, among sexual minority men. Within the current study, approximately one in two participants (52.1%) reported experiencing some form of DDA, which is similar to or higher than prevalence rates for face-to-face IPV (e.g., physical, sexual, and psychological; Breiding et al., 2013; Chen et al., 2020) among gay and bisexual men. Furthermore, the rate of perpetration of DDA within the current sample fell in the middle of prevalence rates of DDA within the U.S. (8.1%-62.6%; Caridade et al., 2019; Reed et al., 2016; Yahner et al., 2015). Interestingly, previous research investigating DDA among various populations (Ellyson et al., 2021; Reed et al., 2017; Trujillo et al., 2020; Watkins et al., 2018) has consistently identified sexual coercion DDA as the least prevalent form of DDA. However, within the current sample sexual coercion DDA was the most frequent form of DDA for both victimization (37.3%) and perpetration (16.3%). This highlights the importance of attending to this particular manifestation of DDA among sexual minority men and the need for IPV programming to

be developed for and by queer men as their needs may significantly differ from the existent programming, which has overwhelmingly focused on violence perpetrated by men against women.

The present study may have implications for clinical work. Clinicians should consider the impact of distal (e.g., discrimination) and proximal (e.g., internalized homophobia) stress factors when working with survivors and perpetrators of IPV, including DDA. Prior recommendations for clinicians who work with sexual and/or gender minority individuals emphasized the need for clinicians to be aware of and responsive to IPV, given the increased rates of IPV within these communities (Murray et al., 2007); the present work suggests that this need extends to DDA, particularly sexual coercion DDA. This prior work emphasized the roles of both environmental and internal sources of shame and stress in shaping both risk for IPV and challenges in reporting and/or seeking help for IPV (Murray et al., 2007). It is possible that DDA may be particularly challenging to seek help for, in that DDA alone does not cause direct physical harm and thus victims may struggle to validate their own victimization and/or receive validation from others. Prior research indicates that clinical practices for the assessment of IPV among presumed heterosexual couples is highly variable despite being rated as important by clinicians (Alvarez et al., 2017); given the lack of emphasis on DDA as a form of intimate partner aggression, it is likely that DDA flies further under the radar. Nevertheless, it would be fruitful to apply existing recommendations (Miller et al., 2015; Swales et al., 2016) for the assessment of and intervention for IPV to DDA, with an emphasis on sexual and gender minority inclusivity (Cannon & Buttell, 2020; Ford et al., 2013; Murray et al., 2007), including the roles that social and internalized stress may play in increasing risk for DDA or IPV in general.

The present findings must be considered in light of the study's limitations. Our study used a cross-sectional design which does not allow for inferring causality. Our data did not include data from partners; it may be important to understand how the reciprocal partner's experiences of discrimination and degree of internalized homophobia interacts with DDA perpetration and victimization. Our measures included self-reported DDA perpetration, which participants may be reluctant to admit to or perhaps may be resistant to even recognize in their own behavior. Future research may use data collected longitudinally from couples to address the aforementioned limitations. Finally, some of the assessments of DDA perpetration had alphas at the lower end of acceptable levels; improved instrumentation could assist in constructing measures of DDA that have improved psychometric properties.

Our findings suggest the utility of using minority stress theory to understand DDA perpetration and victimization among sexual minority men. Given the ubiquity of online interactions, DDA is a crucial manifestation of IPV that can have important influence in the lives of those who experience it. Outside influences, for minoritized individuals, may exacerbate existing risks for engaging in and being victim to IPV, including DDA.

Table 1. Descriptive statistics and variable intercorrelations

	2	3	4	5	6	7	8	<i>M</i>	<i>SD</i>
1. Disc.	.12*	.27***	.32***	.29***	.18***	.16**	.22***	1.22	0.25
2. IH		.25***	.15**	.13**	.15**	.13**	.14**	1.87	0.72
3. DSC-Vict.			.55***	.63***	.42***	.30***	.26***	1.19	0.29
4. DDA-Vict.				.67***	.35***	.47***	.39***	1.07	0.16
5. DMC-Vict.					.38***	.39***	.39***	1.11	0.19
6. DSC-Perp.						.55***	.50***	1.06	0.16
7. DDA-Perp.							.56***	1.02	0.09
8. DMC-Perp.								1.05	0.13

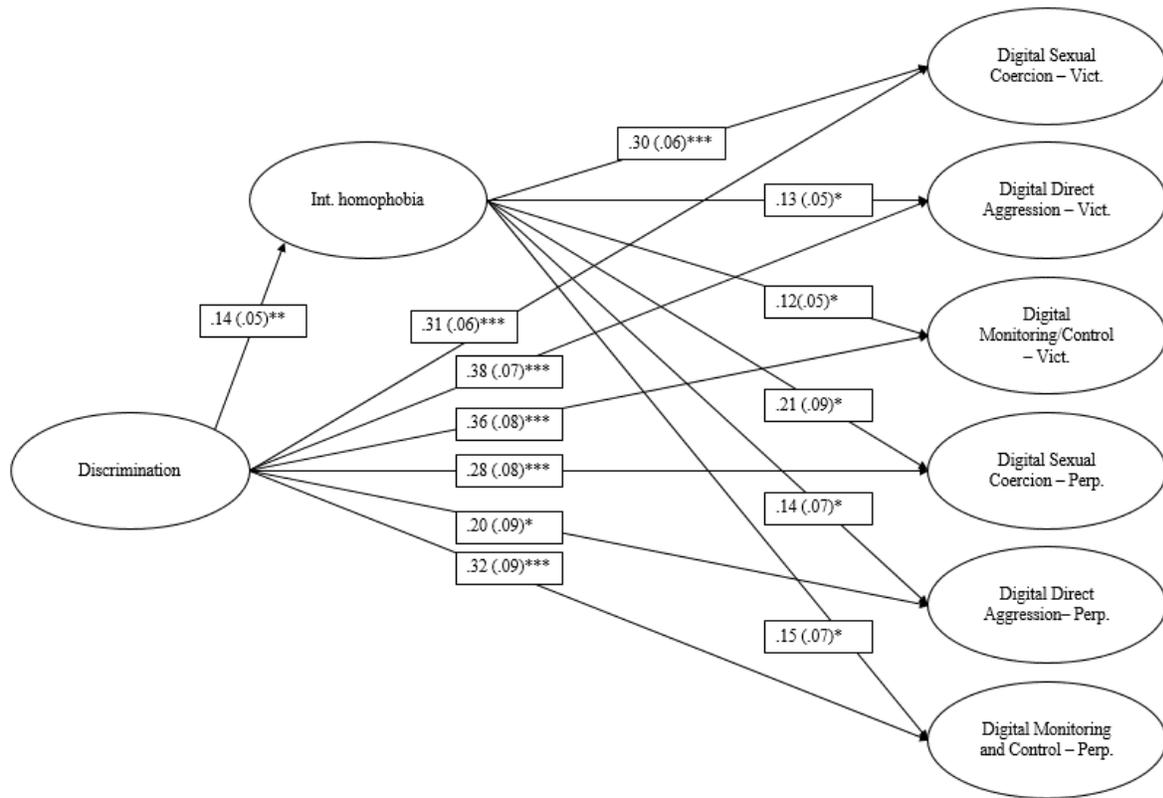
Note. Disc. = Discrimination. IH = Internalized homophobia. DCS = Digital sexual coercion. DDA = Digital direct aggression. DMC = Digital monitoring and control. Vict. = Victimization. Perp. = Perpetration.

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 2. Indirect effects

IV	M	DV	<i>B</i>	<i>SE</i>	95% LB	95% UB
Discrimination	IH	DSC-Vict.	0.179	0.081	0.035	0.355
Discrimination	IH	DDA-Vict.	0.010	0.005	0.001	0.023
Discrimination	IH	DMC-Vict.	0.014	0.008	0.001	0.033
Discrimination	IH	DSC-Perp.	0.093	0.053	0.001	0.205
Discrimination	IH	DDA-Perp.	0.009	0.005	0.001	0.022
Discrimination	IH	DMC-Perp.	0.012	0.007	0.001	0.029

Note. IH = internalized homophobia. DCS = Digital sexual coercion. DDA = Digital direct aggression. DMC = Digital monitoring and control. Vict. = Victimization. Perp. = Perpetration.



Note. * $p < .05$, ** $p < .01$, *** $p < .001$. The DDA measures were allowed to covary (the latent variable correlations not presented in the figure for clarity; the latent variable correlation matrix is included in online supplemental table 1).

Supplemental Table 1. DDA scale latent variable intercorrelations and standard errors.

	2	3	4	5	6
1. DSC-Vict.	.48 (.05)***	.66 (.05)***	.68 (.07)***	.22 (.08)**	.20 (.07)**
2. DDA-Vict.		.79 (.06)***	.30 (.07)***	.52 (.10)***	.39 (.10)***
3. DMC-Vict.			.44 (.07)***	.46 (.09)***	.48 (.11)***
4. DSC-Perp.				.43 (.14)**	.52 (.13)***
5. DDA-Perp.					.76 (.11)***
6. DMC-Perp.					

Note. DCS = Digital sexual coercion. DDA = Digital direct aggression. DMC = Digital monitoring and control. Vict. = Victimization. Perp. = Perpetration.

* $p < .05$, ** $p < .01$, *** $p < .001$

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Understanding Academic Adversity: Familial Stressors and Academic Achievement Amongst Various Undergraduate Racial Minority Students

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Within higher education, a likely consequence of being a racial minority is having lower economic, social, and cultural capital. When coupled with distinct shifts in the traditional family structure it may result in decreased academic well-being in students. In this study, I seek to discover if a relationship exists between the academic achievement of racial-ethnic minority, first-generation, and low-income students and adverse familial experiences. More specifically, I seek to unpack the ways adverse familial issues may compound with students' social identity markers, such as racial minority status, to ultimately impact students' academic achievement. I measure academic achievement through The University of Texas at Austin's grade point average (GPA) scale. I use students' reported racial minority status, first-generation status, socioeconomic status, familial issues, and academic achievement to determine the extent of adversity they face. Participants include 7 students who are currently enrolled at UT. Data sources include surveys and interviews followed by an analysis with elemental methods such as *InVivo*, descriptive, emotion and inductive/deductive coding. Along with second cycle pattern analysis, this method ensures that the conclusions drawn are a direct result of the data collected. I hypothesized that a pattern of adverse familial issues coupled with first-generation status and low socioeconomic status would negatively impact academic achievement. I concluded with themes that were drawn from the categories of data that demonstrated that it is unlikely to be able to draw an absolute conclusion on whether having adverse familial issues compounds with being a minoritized student to impact academic achievement. This is due to the many environmental factors at play, including the COVID-19 pandemic. To gain a more accurate understanding of the relationship between being a minority student and academic achievement, I would like to conduct a long-term study to interview students every year along their academic journey.

Introduction

A likely consequence of being a racial minority is having lower economic, social, and cultural capital. This inequity has been exacerbated across a majority of social domains and is especially prevalent within higher education. Since their initial establishment in 1636, in the form of Harvard University, colleges and universities have been places of exclusivity where only those privileged enough can attend. Looking back from 1636, little has changed with today's higher education access only being available to individuals who have the academic smarts or financial means to attend. Holding this in line with current family dynamics poses serious concerns. Divorce rates are on the rise with upwards of 40 to 50 percent of married couples separating. The overall structure of families has evolved to include nuclear families, single-parent households,

and being raised by extended family members. These distinct shifts in the traditional family structure can often cause adverse familial outcomes that result in decreased well-being in children. The stark realities of the class gap in education, unstable family dynamics, and the polarized experiences of racial minorities in the United States led me to inquire about the academic achievement of university-level minoritized students. Further, I hope to explore how familial issues and instability affect racial minority students' engagement. In doing so, I hope to shed insight into the academic adversity of being a racial minority student and having adverse familial experiences.

Literature Review

Introduction

Within this review of literature, I will be presenting an array of information adapted from journal publications that depict the first-hand experiences of racial minority students, including those who are first-generation and low-income. I will focus on students who face challenges due to a lack of economic, social, and cultural capital in addition to adverse familial experiences. Throughout the review, I hope to present the various domestic and academic environmental factors that influence school achievement. Lastly, I will present information regarding their non-racial minority peers to explore whether or not race is a defining factor in dealing with academic adversity. The scope of this paper will include supplementary social factors that may aid in understanding the types of adversity various racial groups experience in college as a barrier to success.

Defining Factors that Affect Racial Minority Academic Achievement

Regarding student engagement, some publications focus on racial minority students who face academic adversities while others focus on non-racial minority students. Topics geared towards racial minorities include the first-gen experience at primarily white institutions (Guiffrida, 2005). In this article, the amount of opportunities that racial minority students have is presented as a reflection of both parental income level and level of parental support-- two variables that are positively correlated with one another (Guiffrida, 2005). To take this a step further, Moore and Herndon (2002) address the various kinds of support received by African American students. The campus environment as well as the guidance of college counselors is another factor presented as a remedy for existing strains in family relationships (Moore and Herndon, 2002). Similarly, the type of relationships black students have with their family from home and how that serves to advance or derail their academic success is discussed. Once again, relationships with faculty, specifically counselors, affect their persistence in school (Guiffrida and Douthit, 2010). Acculturation is another topic that is discussed at

large amongst the racial minority community. It's mentioned in the context of the cultural differences in the transition between secondary school and college, and how counselors can influence this transition. I would like to consider how variations in family cultural ties may affect students' academic engagement (Brilliant, 2000).

As it relates to the profile of students facing adverse issues, first-generation, racial minority, and low-income students will be the focus of the study. Research has shown that first-gen status has a significant impact on cumulative GPA in college and can cause a variance between racial minority and non-racial minority students (Strayhorn, 2006). As mentioned in the Guiffrida article, first-gen students consequently have limited access to resources about college and are perceived to receive less support from their family members. In their article, they draw the hypothesis that students who are privy to information about college have parents with prior college experience. Because of their parents' exposure to higher education, they are assumed to be higher incomes (Guiffrida, 2005). This leads to less advantaged, first-gen racial minority students having to take on part-time or full-time jobs in addition to full-time coursework. Ultimately, this can derail their academic progress. In their article on the dangers of Academic Probation in schools, Tovar and Simon claim that the difficulties of having little to no academic and financial resources in college cause racial minority students to attend schools that provide the most flexibility allowing them to take on more hours at work (Tovar, 2006). While these factors suggest a racial minority disadvantage in education, research also points to the potential for a non-racial minority disadvantage.

Adverse Familial Issues

In a study on Adverse Childhood Experiences and Protective Factors with School Engagement, Robles et al found that as Adverse Childhood Experiences (ACEs) increase, school performances decrease (Robles et al., 2019). On the other hand, they found that as protective factors increase, negative school outcomes decrease. This was a result of studying children aged 6 to 17 and focusing on if a relationship exists between adverse childhood experiences and school performance and student attitudes. Examples of protective factors listed in the article include having a safe, clean neighborhood and a parent who can talk with their child. ACE's include physical abuse/neglect and household dysfunction such as divorce. Although there are not many articles published in this content area, Robles et al provide an appropriate illustration of the effects of negative childhood experiences and how they can be combated with protective factors (Robles et al., 2019). This is where the majority of my research project is focused and will be emphasized within my interview questions.

Non- Racial Minority Findings

As a challenge to my research question, the literature suggests that non-racial minority students are not exempt from facing academic adversity and suffer similar

consequences of having low social capital. In their article, Moschetti and Hudley define social capital as “the value of a relationship that provides support and assistance in a given social situation” (Moschetti and Hudley, 2015). According to Moschetti and Hudley, the first-generation status serves as a strong enough marker on its own, despite racial ethnicity, and can equally derail non-racial minority students from attaining academic achievement. They note that social capital is an extremely useful tool in understanding the wellbeing of low-income and first-generation students specifically. In their study, they focus on white students from working-class backgrounds whose parents did not attend college. They extend the previous literature mentioned as they study community college students instead of 4-year university students (Moschetti and Hudley, 2015). In this way, they challenge my research goals and prompt me to expand the scope of my research question.

Summary of Additional Relevant Literature

The remaining literature that my search yielded further supports those mentioned on academic adversity as it relates to a racial minority, first-gen, and low-income students. In their article, Greene and Marti (2008) discuss the achievement gap amongst African American and Hispanic community college students specifically. Their research extends to cover school engagement, and they offer the finding that, contrary to what one might conclude, racial minority community college students report being more engaged than non-racial minority students (Greene and Marti, 2008). However, they agree that African American and Hispanic students are at greater risk of being underprepared to handle college-level coursework, being on financial aid, and managing a full-time job in addition to family responsibilities (Greene and Marti, 2008). In this way, they address an additional environmental factor that can exacerbate academic adversity: living at home. In the case that the student is having negative experiences with their family members, living at home can be a stressor that living away from home at a 4-year university can alleviate. Hernandez and Lopez write on issues that impact the academic retention of Latino Students from the view of what they call the “Leaking Pipeline”. Their article challenges College and University staff to take responsibility for issues that affect this group of students' academic achievement. It's structured as a review that analyzes the current state of understanding all the factors that affect student retention. These factors include but are not limited to personal, environmental, involvement, and socio-cultural factors. Finally, the article gives suggestions for increasing the persistence of Latino students in higher education (Hernandez & Lopez, 2019).

Another source I've decided to implore is the 68th volume of the Journal of Negro Education. As a whole, the Journal aims to recognize the issues that influence the education of Black people in the United States and other nations. It seeks to present a work of literature where these issues are both addressed and solved in ways that advance the African American education experience. In the excerpt titled 'Preparing Students for the New Millenium: Exploring Factors that Contribute to the Successful Education of African American Students' the Journal presents information on how to

equip students to learn in the new millennium where critical appraisals, proposals, and policies are constantly changing. Similar to the style of the Hernandez and Lopez article, this Journal gives us a comprehensive view of the education system by noting how educators contribute (The Journal of Negro Education, 1999).

The final source that I'll be including addresses what is known as 'black cultural identity on Black Canadian students. Because of its focus on the cultural identity of being Black, it addresses common stereotypes portrayed onto black individuals via society. According to Codjoe (2006), these stereotypes include being "loud, lazy, criminal, dumb, dangerous, and deviant". They all work to discourage black individuals from advancing both academically and socially. To shed light on these "affirmed" yet inaccurate stereotypes, the article emphasizes those who've managed to progress in their academic disciplines. It offers "pride in heritage and knowledge of one's culture" as a remedy to this bias. Because of its entire approach to education, Codjoe's article urges me to consider how culture and heritage act as factors to predict the likelihood of adverse family experiences and academic achievement (Codjoe, 2006).

Conclusion. Making connections between race, social status, family life, and academic achievement is necessary for developing an effective approach to education. For the classroom to be a fair playing field for all students, it's imperative that educators, as well as peers, understand the inequities at play within the higher education system. Doing so will advance our prejudiced society and create more opportunities for these students to succeed despite their adverse family backgrounds. The sources I chose to incorporate in structuring this research proposal align with this conclusion and serve an integral part in achieving my research goals. Whether supporting, challenging, or expanding my research question, these sources shed insight on the vast subject matter of racial minority academic achievement and adverse familial issues. Moving forward, I hope to use the literature available to develop a stepwise and realistic plan for carrying out my research goals.

Methods Review

Data to be Collected

I plan on collecting qualitative data on a group of 7 students who are currently enrolled at The University of Texas at Austin. I've decided to include only this category to measure achievement because I believe that, along with GPA (grade point average), they will present the clearest illustration of academic adversity in the time frame that is

allotted. I will seek samples of students whose GPAs are 2.0 and under, between a 2.0 and a 3.0, and have a 3.0 or above. Participants joined the study solely based on interest when information was advertised either through social media, group chats, or sent personally. The general age of participants can range between 18-22 with mostly female participants.

The question that I will ask may be manipulated depending on the specific situations of the participants, more questions may need to be elaborated upon. As a measure of adverse familial issues, I will ask students to complete an initial survey that lists various familial challenges, adapted after ACEs, and ask them to answer by checking boxes of which issues best fit their situation. With this information, I will group students into different categories of adverse family issues ranging from no adverse issues to extensive family issues. Lastly, I will collect other general demographic information including their race or ethnicity, year classification, first-gen or non-first-gen status, and family income level. My goal is to have an even distribution of student academic profiles, family backgrounds, and race. To achieve this I'll be accepting as many survey responses as possible, then further narrow them for the interview phase.

Data Collection Materials

The materials that I incorporated for this project are entirely found virtually except for the two books I utilize for framing my interview questions and analyzing the data. I will be using Google Form for my surveys, Google Email services for communicating with participants, Zoom for all video interviewing, Google docs for note-taking, and lastly UT Box for keeping all participant information sealed and secure. The two books I utilize throughout my project are 'Doing Interviews' by Svend Brinkmann and Steinar Kvale and 'The Coding Manual for Qualitative Researchers' by Johnny Saldana.

Data Collection Procedures

In carrying out social science research relating to student achievement and adverse familial issues, it's important to employ a well-rounded qualitative or quantitative method. I've chosen to embark on the qualitative route as I would like to maintain high communication with the participants in my study. This way I'll be able to focus on individual cases and what they imply for the general population. It also helps me understand the differences between the participants. Because my research is centered on issues that often occur on a spectrum, such as feelings of belonging at one's University and the nature of familial relationships, I must include detailed and thorough guiding questions to lead the interview responses. I plan on tailoring follow-up interview questions to fit the survey responses of individual students to yield the most substantial results. For example, given I was interviewing a racial minority, first-generation, low-income student, who reports having little to no adverse familial experiences and is a high achiever, I would ask questions that allow me to explore what

specific factors about their environment contribute to their academic success. To analyze my findings I used inductive/deductive, descriptive methods as well as the InVivo approach and emotion coding. These elemental methods helped me draw conclusions solely based on information collected in the data.

Preliminary results

Initially, I set out to discover if adverse familial issues compound with racial minority status to significantly impact academic achievement. Firstly, I conducted a mock interview in preparation for my upcoming interviews, where I received feedback from a male student who is an African American, first-generation, and low-income student. The familial issue he faced was the death of his father and his overall response was that he didn't believe that his racial status, first-generation status, or low-income status had significantly impacted his academic achievement. He also didn't believe that he needed any additional social, financial, or academic support because of his identity. He expressed that doing this will make the playing field unequal for his non-racial minority, non-first generation, and middle to high-income peers. This ultimately illustrated that the people's experiences are not one-sided and can be truly discovered in the absence of leading or coercive questions. Since then, I've carried out all of my interviews totaling up to 7 and I've found an array of experiences from minority students here at UT. I plan on editing, coding, and interpreting this data throughout Spring 2022 to conclude on final results.

Data and Analysis

Within the following sections, I will discuss the data analysis methods used for each section. As a reminder, my research project seeks to discover if a relationship exists between the academic achievement of racial-ethnic minority, first-gen, and low-income students and adverse familial experiences. More specifically, it seeks to discover if adverse familial issues compound with racial minority status to significantly impact academic achievement. To collect the data needed to answer this question, I employed several different research methods.

For the first cycle of coding, I used descriptive and InVivo coding, along with emotion and inductive/deductive coding. I went this route because I found that each method had a key component that was useful to my project. The majority of codes used were descriptive and InVivo to let the responses speak for themselves and hold the interviewee's words as accurately as possible.

Collection of Initial Demographics

I initially began by collecting a demographic survey of the participants to understand who fell into what category. I ended up having a mix of students who fell into being first-generation, low-income, racial-minority, and having adverse familial issues with some who did and others who did not. There was also some variation in the extent to which they fell into these categories. For instance, 71% of the interviewees were first-generation students, with 71% of participants being male and 29% being female. The sample also consisted of 29% Hispanic or Latino, 57% Black/ African American, and 14% Multiracial. The income level was split across all groups, 16.7% less than \$20,000, 33% between \$40,000-\$60,000, 17% between \$80,000-\$100,000 and another 33% between \$100,000 and \$120,000. 14.3% of interviewees identifies as going through parental divorce or separation, 28.6% identified going through adoption or foster care and 57% identified not going through any adverse familial experiences. Lately, 29% of interviewees had a GPA between 3.0-3.5, and 71% had a GPA between 3.5-4.0.

Table 1

Descriptive and InVivo Codes of Academic Achievement

Category	Code	Description
Prioritizing School	1—parent prioritizing school 2—getting the most of the educational experience 3—freedom to focus on school	All codes in this category describe student responses related to their academic achievement.
Academic Resource Supports	4—program that helped pick classes for you 5—honors program 6—relationship with professors 7—professors that care about educational success 8—academic success contingent on professor being more understanding/compassion to family drama 9—academic support isn't easily available, UT is improving	

<p>Academic Resource Fails</p>	<p>10—didn't utilize/see the available program was helpful</p> <p>11—affluent cohort</p> <p>12—being an imposter/ feeling alone in honors environment</p> <p>13—not going to school in person improved academic achievement</p> <p>14—online experience vs. in person experience</p> <p>15—suggestion to help improve academic achievement</p>	
<p>Social Resource Supports</p>	<p>16—Social clubs help academic success, social support, and mental health</p>	
<p>Social Resource Fails</p>	<p>17—mixed priorities</p>	
<p>Multitasking</p>	<p>18—focus on making use of time</p> <p>19—redefining achievement because more factors at play</p> <p>20—attachment back home while in school</p> <p>21—helping parents</p> <p>22—shifting between two different worlds</p>	

Financial Resource Supports	23—receive state and federal aid/earning merit-based scholarship	
Financial Resource Fails	<p>24—high academic achievement combatting with having to make a living</p> <p>25—less time to do school work than peers</p> <p>26—severity of stressors are significantly different</p> <p>27—peers have different struggles and better results after exams</p> <p>28—peers not being able to relate to level of difficulty/ being overwhelmed</p> <p>29—responsibilities outside of school</p> <p>30—part-time mom</p> <p>31—intersections between financial and academic</p>	
Self Motivation	<p>32—high achiever</p> <p>33—excitement to learn</p> <p>34—valuing remaining at UT all four years/succeeding academically</p> <p>35—achieving besides difficulty</p> <p>36—running off spite</p> <p>37—desperation to achieve</p> <p>38—university career is entirely self motivated</p> <p>39—continues to remind themselves of their own achievement to maintain course/continue to achieve</p>	

Mental Health Supports	<p>40—mental health being prioritized</p> <p>41—able to get the help needed for mental stability</p>	
Family Supports	<p>42—understanding parents</p> <p>43—emotions are reflective and encouraging</p>	
Family Support Fails	<p>44—little to no support or understanding from family members</p> <p>45—great family support and academic social life to help college experience</p>	
Cultural Differences	<p>46—spelling words</p> <p>47—academic environment etiquette</p>	
College Benefits	<p>48—marketing for future career field</p>	
High school experience	<p>49—SAT</p> <p>50—high GPA</p> <p>51—sad recalling the difficulty of her high school career</p> <p>52—college was not a priority for the candidate</p>	

Academic Takeaways	<p>53—redefining achievement</p> <p>54—quality learning vs. regurgitating information</p> <p>55—doesn't have a clear university achieve weight</p>	

Table 2

Descriptive and In Vivo Codes of being a Racial/Ethnic Minority

Category	Code	Description
Environmental Comfortability	<p>1—familiarity with environment</p> <p>2—out of place</p> <p>3—comfortability with being in the majority</p>	All codes in this category describe student responses related to being a racial/ethnic minority.
Microaggressions	<p>4—minority student</p> <p>5—skin color</p> <p>6—academic distractions/adversities: getting overlooked as another statistic</p> <p>7—negative group activity as underhanded discrimination</p> <p>8—racial discrimination</p> <p>9—racial discrimination: has to work harder than a minority</p> <p>10a—emotion: social discrimination as a minority</p>	

	<p>10b—emotion: unhappy with white behavior/white students advantages</p> <p>10c—emotion: projecting microaggression towards friendship with whites</p> <p>11—academic distractions/adversities: getting overlooked as another statistic</p> <p>12—historical controversies in UT history</p>	
Cultural Differences	<p>13—cultural similarities</p> <p>14—non-racial minority peer differences</p> <p>15—detachment from ethnic identity</p> <p>16—cultural identity</p> <p>17—mistaken for being white</p> <p>18—immigration status</p> <p>19—international student</p> <p>20—racial minority: indigenous descent</p> <p>21—lack of diversity lead to lonely experience at UT</p> <p>22—emotion: unsatisfied with lack of representation of African Americans in classrooms</p> <p>23—racial inequality: whites don't struggle as much as minority groups</p>	
Social Resource Supports	<p>24—forming a mini family amongst other minorities</p> <p>25—support helps foster change</p>	

Structural Barriers	<p>26—system is broken not helping minority students</p> <p>27—structural racism</p> <p>28—structural barrier</p> <p>29—inability to work</p> <p>30—jumping through hoops</p> <p>31—emotion: frustration with inability to affect change</p>	
Familial Expectations	<p>32—first-generation: pursuit of academic success the purpose of being in America</p>	
Underrepresentation	<p>33—minority student: black allies underrepresented in classroom</p>	
Emotional Strains	<p>34—emotion: accusatory</p>	
Racial Non-differences	<p>35—doesn't believe non-minorities have easier time adapting to UT rigor</p> <p>36—no non racial minority friends and cant speak to their experience</p>	

Racial Inequity	37—UT's less transitional support for rigor of the courses to support minority students	
Mental Health Fails	38—emotion: psychological trauma due to discrimination	

Table 3

Descriptive and In Vivo Codes of being a First-generation student

Category	Code	Description
Family Expectations	1—college attendance expectation because siblings attended 2—parental expectation 3—setting an example for siblings 4—not thinking about college growing up 5—understanding lead to expectation 6—utilizing opportunity provided is an expected family priority 7—family expectation: grandparents were supportive but did not require university education	All codes in this category describe student responses related to being a first-generation student.

<p>Differing Family Expectations</p>	<p>8—differences in family college attendance level on both sides</p> <p>9—family member associate's degree, no desire to continue</p> <p>10—candidate: only student in the family/only first gen-traditional student</p>	
<p>Parental Misunderstandings</p>	<p>11—lack of education in parents</p> <p>12—parents surface level understanding of what it takes for college</p> <p>13—burden of explaining/burden of proof of how college works</p> <p>14—family members with parents who finished back home</p> <p>15—parents misunderstanding college</p>	
<p>Differences with Non-first-generation students</p>	<p>16—stability in families with parents who attend college</p>	
<p>Academic Resource Fails</p>	<p>17—not knowing some of the resources because of first-generation</p>	
<p>Parents College Experiences</p>	<p>18—family members with parents who finished back home</p> <p>19—parents attend college so candidate is not first-generation student</p>	

Cultural Resources	20—cultural connection to gain understanding	
Good Academic Experiences	21—first-gen status not affecting achievement	
Emotional Strains	22a—emotion: frustration 22b—emotion: loneliness in the college application process	
Preparing for College	23—college research 24—SAT 25—late start to college search	
Positive Family Experiences	26—continual support from parents 27—emotion: tone of voice convey love and respect for parents 28a—good family experience: student receives parental encouragement and support 28b—good family experience: parents understand and very supportive	

Table 4

Descriptive and In Vivo Codes of being a low-income student

Category	Code	Description
Parental/family Provision	1—financial provision from parents 2—older siblings as additional financial supports 3—parents give financial support for food and rent 4—parental sacrifice in loans 5—asking parents for expenses 6—good family experience: family paying for housing, food, and money	All codes in this category describe student responses related to being a low-income student.
Good Independent Money Habits	7—good money habits 8—financial independence 9—candidate hasn't had low income experiences 10—low-income: student doesn't receive financial assistance from UT	
Parental Lack of Support	11—parents helping out during the first year and then removing help 12—false promises from parents 13—emotion: hurt by mothers accusations	

<p>Emergency Financial Need</p>	<p>14—emergency situation 15—emergency relief funds 16—rent relief during pandemic 17—unexpected/emergency expenses 18—emergency funds used 19—saving emergency funds 20—lack of options available for emergencies 21—unexpected expenses</p>	
<p>Low Income Status</p>	<p>22—low-income student 23—low income student: affordability 24—parents making enough to get by/allocating resources 25—academic adversities: lack of meals combatting with having to make a living 26—academic adversities: lack of meals</p>	
<p>Money Saving Experiences</p>	<p>27—transferring from community college to save money 28—applying to schools that have more generous financial aid 29—staying at home to support her family vs. of going to college 30—seeking out programs that help college be more affordable 31—valuing saving money more than taking additional classes 32—not wanting to take out loans 33—side hustles 34—having money to go to school vs. dropping out 35—baking easy desserts and selling to wealthy people</p>	

	<p>36—making every penny count</p> <p>37—stretching out funds</p> <p>38—UT as a cost effective choice</p> <p>39—likelihood of going to community college</p> <p>40—responsibilities outside of school</p>	
Structural Barriers	41—financial complications due to immigration status	
Social Resource Fails	<p>42—different realities with peers</p> <p>43—not fitting in socially</p> <p>44—feeling welcomed</p>	
Financial Resource Supports	<p>45—high financial aid award</p> <p>46—expectation to get financial aid because of family income</p> <p>47—financial aid assistance better over time</p> <p>48—cohort is helping to pay for schooling at UT</p> <p>49—high financial assistance from UT</p> <p>50—low income: high financial assistance</p> <p>51—scholarships and financial aid</p> <p>52—used loan assistance</p> <p>53—emotion: gratitude for offering financial aid</p> <p>54—UT financial aid makes education a possibility for this student</p>	

	55—emotional: glad to have more financial support from the institution	
Financial Resource Fails	56—low financial aid assistance, mostly loans 57—more financial aid needed 58—differences in expectation and financial aid award 59—inaccuracy in financial aid award 60—financial aid doesn't care about concerns 61—feeling like resources available were inaccessible 62—low income: financial support needed 63—restricted access to scholarships	

Table 5

Descriptive and In Vivo Codes of Adverse Familial Issues

Category	Code	Description
Type of Adversity	1—lack of presence of parent 2—abuse 3—emotional abuse 4—conversion therapy abuse 5—threatened to be displaced 6—homelessness 7—emotional manipulation: parents using help against him in the future	All codes in this category describe student responses related to having both adverse and positive family experiences.

	<p>8a—bad family experience: biological mother no support for candidates education pursuit</p> <p>8b—bad family experience: unhealthy family relationship, spite</p> <p>8c—bad family experience: neglected by parents at a younger age</p>	
Parental Responsibility Shifted	9—dependency on sibling	
Using Negative Experience for Career	<p>10—majoring in something related to family experiences</p> <p>11—siblings sharing same career passions based on family experiences</p>	
Parents lack of Awareness	<p>12—social cues</p> <p>13—using America to describe reasoning for bad choices</p>	
Foreshadowing of Adversity	<p>14—glimpses of adverse issue</p> <p>15—older siblings having harsher experiences than younger</p>	

<p>Long Term Effects</p>	<p>16—adverse issues affecting daily choice</p> <p>17—fear of becoming like father</p> <p>18—adverse issues affecting daily choice</p> <p>19—potential threats of adverse family issues for college</p> <p>20—mental illness due to family setting that have affected the candidate for years</p> <p>21—seems to have made her peace with the neglect and mental imbalances</p> <p>22—siblings who were ever more affected by the negative upbringing</p>	
<p>Differing Experiences Within Family</p>	<p>23—different sides of the family having different beliefs about divorce and marital commitment</p>	
<p>Emotional Toll</p>	<p>24—depression</p> <p>25—sad about the lack of support and understanding from family members, specially her parents</p>	
<p>Protective Factors</p>	<p>26a—older siblings being protective over younger siblings</p> <p>26b—understanding parents 27—financial and emotional support</p> <p>28—raised by grandparents</p> <p>29—understand not all families are like hers</p>	

Individual Response	<p>30—understanding of parents faults</p> <p>31—adverse familial issues motivation to attain higher grades, not a deterrent</p>	
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Table 6

Other Descriptive and InVivo Codes

Category	Code	Description
Pandemic Situation	<p>1—uncertainty of answer due to pandemic</p> <p>2—lack of school involvement due to pandemic</p> <p>3—fear preceded by unexpected event of pandemic</p> <p>4—student utilizes the support system in the university and social support to cope during the pandemic</p>	All codes in this category describe other descriptive codes that were found within the data.
Indifferent Parents	<p>5—leniency</p> <p>6—lack of parental support with non-educational things</p> <p>7—relaxed parental approach over time</p>	
Emotional health	<p>8—emotional needs</p> <p>9—alienated, preceded by being a minority</p> <p>10—made room to address the deeper issues</p>	

<p>Parental interactions</p>	<p>11—acting first and telling parents later</p> <p>12—correcting parents</p> <p>13—parents drawing conclusions quickly</p> <p>14—using America to describe reasoning for bad choices</p> <p>parents making requests on which college to attend</p>	
<p>Religion</p>	<p>15—christianity</p> <p>16—faith</p>	
<p>Achievement barriers</p>	<p>17—immigration status</p>	
<p>Social Resource Supports</p>	<p>18—abundance of social connections</p> <p>19—friends who can relate</p> <p>20—social club seems to have a positive response from the interviewee</p> <p>21—actively involved in a handful of clubs and orgs</p> <p>22—student participates in academic orgs and clubs which produced a more robust university experience</p>	

Social Resource Fails	<p>23—location: access to certain programs</p> <p>24—high school district is a factor in helping minority students transition from high school to college</p>	
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Results

Analysis of Academic Achievement

Beginning with themes noticed from participants' high school experiences there are two distinct experiences with students. One of them being high achievement and the other being insecurities and uncertainty over a college career. A theme throughout the data was that those with more uncertain experiences, who even expressed sadness when recalling the difficulty of their high school career experienced more adverse familial experiences such as being in the adoption/foster care system, parental drug addictions, and abuse in conversion camps.

Another area to mention is Academic Resource Supports. Most of the supports listed were in regards to relationships with professors being a big determinant of academic success. One student notes that having professors who care about your educational success leads to educational success. When it comes to areas in which academic resources have failed, students spoke a lot about their in-person experiences vs. online experiences due to the COVID pandemic. A lot of students felt like an imposter, especially within an affluent cohort of honors students. Some students went as far as to say that their academics improved greatly during the pandemic when there were not as many points of intimidation in their learning environment. A theme that was noticed here is the natural nature of ethnic minority students to multitask in their day-to-day lives, taking on extracurricular activities and family responsibilities.

Analysis of Racial/Ethnic Minority

When looking at the Racial/Ethnic minority factor many students spoke to microaggressions as well as cultural differences felt in their day-to-day learning. There was a strong correlation between having a different cultural identity because of being an international student or not yet being a full citizen and having felt microaggressions of which the most popular was the discrimination of many forms (see Table 2).

Analysis of being a First-Generation student

Family expectations were the most prevalent factor in being a first-generation student. Many students spoke of how there is an expectation to attend college because of being the first in the family to have an opportunity at American Education. Some students also spoke to the added expectation because of a sibling who attended college. One clear thing was that the more parents knew about the potential of their students to attend college, the more expectation there was for them to attend college.

Analysis of Low-Income Status

The clearest themes in low-income status were the links between Financial resource supports, money-saving experiences, and emergency financial need during the time of the pandemic. Students had shared a variety of money savings experiences that they had undergone including having side hustles and making every penny count by not making unnecessary purchases. Many students expressed gratitude for the financial aid support that they had received such as scholarships and grants which made it possible for them to attend university.

Analysis of Familial Issues

The students who did experience adverse familial issues also had long-term emotional and psychological effects. These included fears of becoming like their parents, potential threats towards college education, mental distress from students as well as their siblings. In these cases, students expressed both gratitude and lack of results that they experienced when visiting campus resources such as the UT Counseling and Mental Health Center (CMHC).

Analysis of Other Descriptive and InVivo Codes

The biggest factor at play here was the COVID-19 pandemic that impacted the lives of many students. Some students interviewed have never even been to campus in person which impacted their ability to answer the questions about their peers accurately. Some students feared the pandemic would get in the way of them being able to go back to school fully. These students were able to utilize support from the University to cope during these times.

Discussion

Limitations

I would like to emphasize that all my samples were limited to current students at the University of Texas at Austin. To ensure the quality of my interview sessions, I did not exceed 7 samples. The timeline for my project included the preliminary screening and categorizing process (1 week), the interview process (2 weeks), and finally the analytical process which can vary depending on the accuracy of my final results (2 weeks).

Something I noticed while conducting such an in-depth project was the number of factors I wanted to incorporate and study. Because I wasn't only focusing on one factor, I had to ask many questions during the interviews which lengthened the process. The lengthy interview questions lead to many codes to be interpreted. This was a limitation to my project because I was not able to primarily focus on one component of student lives.

Another area of improvement was to include more types of racial minority students. Although I had a good mix of African American, Hispanic, and students of more than one race, I neglected to interview any Asian students, for example. This certainly would have helped my project to be more well-rounded and accurate.

It was evident that many factors were at play in these student's lives outside of academics. Students were also involved in extracurricular activities, responsibilities within their families, romantic relationships, part-time work, and the list goes on. I cannot draw an absolute conclusion on all the relationships that exist between the academic achievement of racial-ethnic minority, first-gen, and low-income students and adverse familial experiences, but I was able to draw a few. I also was not able to conclude whether adverse familial issues did compound with racial minority status to significantly impact academic achievement because of the other factors at play within students' lives.

Preliminary Findings were the main goal of Summer 2021, as much time was spent gaining IRB approval and the project will be completed by April 2022 after all interviews have been finally analyzed. The ultimate goal of this project is to advance the work done in creating safe and equitable learning environments for racial minority students. I hope that as introductory as my research project is, it's able to contribute to the body of literature surrounding African American student achievement. If I am to amplify voices to students who have been underrepresented and possibly wrongly victimized, I will accomplish my research quest.

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APPENDIX

Interview Guide

Racial Minority Status

Do you identify yourself as a racial minority? Why or why not?

1. How, if at all, do you think your experience as a racial minority student at a Predominantly White Institution differs from other students? (Clarity: Is it different from other racial group students?)

Do you think it is difficult to be a racial minority student on this campus? How so?

2. How do your parents understand your life as a college student? (Are there particular processes regarding your academic and social life that are hard for them to understand)
3. Are there particular academic, social, or financial supports that benefit you at UT? How so? Do you think these benefits give you an advantage over other students? (Examples: FLI, ULN, McNair, Heaman Sweatt, HAVEN, DDCE)

First-Gen Status

1. Did your family or caregivers expect you to attend college after high school? Do you think this was important to them because you are a first-generation student?
2. Do you know of any other family members in your age group that are first-generation students?
3. How do your parents understand the process of being a college student? Is there anything your parents struggle to understand regarding the college process and provide support with because they did not attend college?
4. Do you find that you need particular academic, social, or financial support compared to other students as a first-generation student?

Low-Income Status

1. Did the financial cost of college influence your college choices? Did you think it would be difficult going to college due to the cost?
2. Are you currently working a job in addition to school to support tuition or living expenses?
3. Do you find yourself being overworked so you can make ends meet for rent/ tuition, etc?
4. Have you ever had to use the university's emergency loan assistance for paying for housing, food, etc?
5. Do your parents send you money for expenses like housing, tuition, food, etc?
6. Did your parents influence, in any way, your choice to attend university because of a lack of income?

7. Do you find that you need particular academic, social, or financial support compared to other students as a low-income student?

Familial Issues

1. Have the familial issues that you've experienced impacted you as a person? (remind them of what they selected in the survey)
2. Did those familial issues ever threaten your chances of attaining a higher education?
3. How common is it amongst your extended family or friends to experience similar familial issues? Are the effects similar to yours?
4. Do your familial issues affect how your parents/ guardians understand the college process and provide support?
5. Do you find that you need particular academic, social, or financial support compared to other students as a student with familial issues?

Effects on academic achievement

1. Did you find that your non-racial minority peers had an easier time adapting to the pace and rigor of UT Austin's coursework?
2. Has being a first-generation student distracted you in any way from attaining high-achieving grades in your college classes?
3. Has being a low-income student distracted you in any way from attaining high-achieving grades in your college classes?
4. Has having familial issues distracted you in any way from attaining high-achieving grades in your college classes?
5. Is there anything else that you'd like to say about your experience as it relates to academic achievement?

The School-to-Prison-Pipeline: How it Diverts Students from Education into the Criminal Justice System

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A key contributor to juvenile incarceration rates in the United States is a trend called the school to prison pipeline. The school to prison pipeline refers to the idea that schools push students of color as well as students with disabilities into the juvenile and adult justice system. A primary mechanism to the school to prison pipeline is the use of “zero tolerance” policies as a form of discipline. Zero tolerance is used as a way to discipline students in the same way no matter how small or large the indiscretion is. These policies have shown to have no positive effect on students’ safety and have significantly hurt minority communities. The negative impact is shown through increased dropout rates as well as outstanding numbers of expulsions and suspensions in schools where the community is mostly minority students. Because of these negative outcomes, many have called for the reform of policies like “zero tolerance” and offered alternative disciplinary procedures. In this paper I will critically review in detail the research concerning key disciplinary contributors to the school to prison pipeline and assess alternative solutions that educational institutions may use to help keep students who misbehave from being introduced to the juvenile justice system early on in life and help keep them from being incarcerated in the future.

The School to Prison Pipeline: Introduction

In today’s world one of the most significant problems is what many people refer to as the school to prison pipeline. The term “school to prison pipeline” first started to raise awareness and shine light upon the several different school disciplinary policies that negatively affect low income and students of color. The school to prison pipeline is described as policies that are made to help discipline students (specifically minorities and students with disabilities) (Elias, 2013, Tobacman, 2020, Laird, 2019). The unintended consequence of these policies is that they end up negatively affecting students. Many have called for the elimination of these policies and offered alternatives in their place.

Marilyn Elias (2013), in *Teaching Tolerance*, a publication of the advocacy group, Southern Poverty Law Center, argues that there are more effective ways of disciplining students who have bad behaviors. But before addressing solutions, it is important to understand why the school to prison pipeline has become so significant in our world today. As I will discuss below, the school-to-prison pipeline disproportionately affects low-income people of color, black males in particular, reflecting the problem of discrimination and prejudice on the part of teachers. The key points characterizing the school to prison pipeline are that (a) zero tolerance policies are prevalent, (b) students are introduced to the juvenile justice system too early on in life, and (c) schools are not provided with enough funding to adequately train teachers on things such as stereotypes and racism in the classroom. Thus, in order to help end the school to prison pipeline, the recommendations that emerge from the research are policy changes and increased school funding to provide adequate training to faculty and staff.

As a primary mechanism driving the school to prison pipeline, I am studying how Zero Tolerance results in so many young students of color ending up in the juvenile justice system early on in their life. This is so that I can increase our understanding—especially among communities of color—of how students are greatly affected by the current school disciplinary policies that are consistently being used today. In the last part of the research paper, I lay out lessons learned from the research and proposed a model for change based on the literature review.

Background and Literature Review

The most affected

The school to prison pipeline targets low-income students, students of color, and students with disabilities (Laird, 2019, Tobacman, 2020, Quely, 2018). According to Laird (2019), “research has shown that each group individually is punished disproportionately to its share of the student population.” This is significant because it emphasizes different treatment for different groups, which is unfair and cruel especially in situations when a small indiscretion leads to a large punishment. As mentioned previously one of the groups that is disproportionately affected by the school to prison pipeline is students with disabilities. The US Commission on Civil Rights (2019) explains that students with disabilities are overrepresented in the school to prison pipeline where children with special needs, physical, and learning disabilities represented 26% of students referred to law enforcement, yet overall school enrollment of students with physical, psychological, or learning disabilities represented 14% of the population. Another group that I mentioned was students of color. Students of color are the most affected by the school to prison pipeline where black children constitute 18 percent of

students, but they account for 46 percent of those suspended more than once (U.S. Department of Education, 2010).

The zero-tolerance policy

Zero Tolerance was first created by the Navy and referred to as the no nonsense act to keep sailors from doing drugs (Skiba, 2019). It was later introduced in legislation during President Ronald Reagan's administration to be implemented in school discipline practices. Although this policy was created to decrease the amount of violence and disruptive behavior in the classroom, over the years it has shown to have a negative effect on students' education. The term as well as the idea of zero tolerance policy stemmed from the development of an approach to drug enforcement which is nothing like school disciplinary enforcement. The main argument to zero tolerance practices is that if you remove students who create disruptive behavior it will keep other students from becoming bad and keep the school climate positive. (Skiba, 2008).

Educational Institutions are so focused on maintaining a "positive environment" that they are being careless about how they approach disciplinary practices. Therefore, the approach that zero-tolerance policy takes is not to benefit troubled students but to make the schools and educational system look as if they are perfect. Zero Tolerance Policy is the most prominent part of the school to prison pipeline because it has been connected to the increase of young children growing up to be incarcerated or dropping out. This policy is a form of one size fits all, it basically means that no matter what the indiscretion is, everyone will get the same punishment no matter the case (Tobacman, 2020). Although this seems like a good thing, the article, "Stop the School to prison pipeline" emphasizes that this is not the case because it makes small indiscretions seem like they are a bigger deal due to the punishment that is given to the student. (Tobacman, 2020). It also takes away a teaching opportunity from students who could have instead been penalized at a smaller level that equaled their behavior and could have also been given the opportunity to learn from their mistakes and grow as people (Tobacman, 2020)

The school to prison pipeline can be seen as a domino effect. As young students are disciplined early on in education and because of how zero tolerance policies affect their mentality, they are more likely to drop out (Cramer, 2014). Once they drop out, data shows that they are then more likely to possibly be incarcerated, thus explaining a domino effect starting from bad discipline practice and leading to incarceration.

Stereotyping and racism in schools

Another key element of the school to prison pipeline is the presence of racism and stereotyping in schools. Research has shown that the educational system favors white people and sets people of color, particularly black men, up to fail and maintain a lower position in society (Quealy, 2018). Racial discrimination in schools leads to stereotypes that people of color are criminals. Smith (2014) explains how stereotypes and racism play a big role in the school to prison pipeline, and it is primarily because educators are not being properly trained on topics such as race. This is due to the fact that many teachers are middle class white women from suburban upbringings who think that it is better to not accept the differences of race but rather see everyone the same by being colorblind (Quaylan, 2014). This leads to many teachers automatically stereotyping their students without even realizing it and putting them at more risk of falling into the school to prison pipeline.

Quaylan (2014) explains how enhancing teacher preparation programs to better understand that low-income people of color face many challenges just due to their skin color as well as teaching educators in the school system the negative effects that stereotyping and racism has on students of color, students with disabilities, and students from low-income communities can help in reducing the number of students that fall into the School to Prison Pipeline pathway. Because educators are the first people to help influence and better students' lives, they can play a key role (Quaylan, 2014).

Recommendations based on the research evidence

Experts agree that eliminating the school to prison pipeline is essential to ending the cycle of students entering the juvenile as well as the adult justice system repeatedly and often. Key ideas that stood out to me from my research to help end the school to prison pipeline was better funding the educational system, developing more thought-out disciplinary techniques, decreasing police presence in schools, and eliminating the use of metal detectors as well as other things that are set to criminalize children in the educational system.

Better Funding for Education

Better funding for education is a key point because it gives people working for the educational system the opportunity and funding to provide programs to all faculty and staff that will enhance the overall school environment (Quaylan, 2014). Programs that will help do this are training on specific real-world problems that are working against students who are the most affected by the school to prison pipeline (Quaylan, 2014). Some topics of focus could be racism, stereotyping, equality for all, and how to teach students about other cultures so that they are shown that everyone is different in a good way. One article reports on an analysis of how dropout rates and

incarceration rates are connected and aims to explain a better approach where teachers are promoting experiences to students that relate to equity, access, and culture (Cramer, 2014). The model that this study explains is significant in that it is a new approach that aims to use students' experiences and cultural backgrounds as the base to creating a successful teaching and learning environment not just for one particular group of students but for all different groups of students (Cramer, 2014).

Stopping the use of zero tolerance policies

Another way to help end the school to prison pipeline is to stop the use of zero tolerance policies and practices (Cramer, 2014, Tobacman, 2020, Skiba, 2008, Skiba, 2019). Instead, there should be well thought out disciplinary techniques that follow a rule that each level of indiscretion has its own consequence (Tobacman, 2020). For example, a small indiscretion would be categorized as a low-level action which therefore would result in a small disciplinary action from preferably the teacher since they are the first people that students trust and follow (Tobacman, 2020).

The right to a good quality education is essential for upcoming generations to succeed in the working world, and zero tolerance policies are impeding on this right. In order to change the harsh disciplinary practices required by zero tolerance policies, the education system in America should set their focus on creating alternatives to the current disciplinary policies in place. (Bucchio & Cheek, 2017) on-campus intervention programs (OCIP) provide counseling services that help students learn to recognize, acknowledge, and modify behaviors that impede on their personal development and academic success. OCIPs allow students to learn effective communication skills, make decisions, and set goals. A Harvard report concluded that OCIPs showed improved behavior and a significant decrease in disciplinary referrals among students.

Decreasing police presence in schools

Decreasing the amount of police that are present in school and instead having teachers or bringing in social workers (people who are more trained to work at the micro level) would help in ending the school to prison pipeline (Tobacman, 2020). This is because it would give educational institutions less of a reason to have police in their schools, therefore helping lower the number of students who are introduced to the criminal justice system at a young age.

Eliminating the use of metal detectors in schools

The last key point is eliminating the use of metal detectors as well as other things that are set to criminalize children in schools. Removing metal detectors from schools is significant because they are not as effective as they should be. Schildkraut (2019) explains the ineffectiveness of metal detectors proven by data that suggest schools are more effectively able to find weapons by searching students rather than using a scanning device. Another essential reason to get rid of metal detectors is because they criminalize students. Many students who have attended schools with high security

(metal detectors, searches, school police, and sweeps) have explained feeling like a criminal while walking through their schools. Criminalization of students is why metal detectors should be abolished. In eliminating metal detectors, we are setting the tone for schools so that students don't feel as though they are in prison when they attend school. Treating students like prisoners influences bad behaviors in those same schools which is why it is essential that we make sure students are not being criminalized.

Discussion and Lessons Learned

Eliminating the school to prison pipeline may not be easy, but there are multiple reasons why the school to prison pipeline should not be as prominent as it is today. The school to prison pipeline is used to define the several ways that schools have increasingly paved the way for many minority students to become a part of the juvenile and criminal justice system. Criminalizing education can have a toll on students of color and students with disabilities in terms of dropout rates and youth incarceration rates. The data has shown us what is contributing to the school to prison pipeline but getting rid of those aspects that create it is not very easy. It is not as easy because when you get rid of one policy you must have another policy that is ready to take its place so you can have a better outcome than what the policy now currently has. Although there is no easy way to solve the school to prison pipeline it has continuously been shown through data and research that when using school discipline there is no benefit to criminalizing it.

After much research and lots of data it is clear that the use of zero tolerance policies does not have a positive effect on students as it was supposed to. Instead, it is one of the key factors behind the school to prison pipeline. An infographic by the American Civil Liberties Union (ACLU 2020), reveals that "students suspended or expelled for a discretionary violation are nearly three times more likely to be in contact with the juvenile justice system the following year." This is essential data to keep in mind when thinking about why and how the problem of the school to prison pipeline should be solved.

A proposed model for change

It is obvious that the criminalization in education is pushing students to become criminals instead of encouraging them to succeed in school. My method is to create a model that eliminates the idea that schools are just like criminal justice systems. To do this I would like to start small by implementing only one school district in a very prominent community that is increasingly being affected by the school to prison pipeline so that I can collect data to see what parts of my model are working and what needs to be changed. I got this idea from a method that has been created called "The Teske

Model” (Teske et al., 2013). The Teske Model was coined by a Chief Juvenile Court Judge by the name of Steve Teske. The model aimed to disrupt the motion of students from schools to the juvenile justice system by creating a program that was county funded and focused on that specific county. I would like for my model to have the same aim as “The Teske Model”

My method of creating a model that helps reframe the idea of what schools are like as well as disrupting the flow of students going from school to the juvenile and criminal justice system starts with implementing alternative options to the main contributors to the school to prison pipeline. Instead of keeping the zero tolerance policies that are in effect in schools right now I would like to give an alternative disciplinary option that instead goes by a three-step rule.

The three-step rule

The model would include a three-step rule inspired by a variety of methods such as The Teske Model, multi-tiered alternative models, and restorative practices (Hirschfield, 2018, Teske et al., 2013). The three-step rule would be implemented as a disciplinary procedure for students who misbehave so that they have a lower chance of being introduced to the juvenile justice system at an early age. It will be used as a 3-strike rule where a student has 3 chances to correct their behavior before they get sent to the principal’s office.

The difference between my 3-step rule and related disciplinary procedures that others have attempted to implement would be that getting a first strike would result in speaking to a social worker or trained professional that can help the child understand why what they did is wrong. The second strike would result in the student having to attend a mandatory workshop (during school hours so that they do not have to go out of their way to attend). The workshop will be focused primarily on conflict management. This is so that students are being taught how to manage conflicting events in order to prevent conflicts from happening in the future. The last strike would result in being sent to the principal’s office where the principal along with the rest of the administration will decide if a student should be expelled for their behavior or disciplined in a different way.

An alternative discipline that will help keep students at school would be something I like to call volunteer discipline. I would describe the term “Volunteer discipline” as a way for students to in a sense be “disciplined for their actions” while at the same time introducing them to several different opportunities that the school provides. This type of disciplinary process would mean that a student would have to do volunteer work for a club, organization, event, or class that they have not already volunteered for or are currently a part of, in order for them to be disciplined correctly. This idea is a great way to help students become more active in their community so that they are increasingly doing better for themselves as well as others around them.

Including social service providers, police, faculty, and staff

Although the disciplinary technique of zero tolerance is the main driver of the school to prison pipeline flow, changing the technique will only go so far. I would also like to make my model more focused on trained professionals, including a mental health professional, a social services professional, and a school social worker. It is important to me that a social worker is included in my model because their main goal is to always act as a guide and advocate for their client. Implementing social workers into my model will be for the betterment of the students because the social worker will have the opportunity to help guide students, especially those who are really struggling or going through a tough time.

On top of the previous professionals that I had mentioned being a part of my model, I would also like for police officers to be included, too. It is true that police presence is a contributor to the school to prison pipeline but that is because they feed into the idea that schools are criminal institutions. Police officers in my model will be different from what they currently are now. I got this idea from a school-to-prison researcher who recommended to decrease police presence but not eliminate it (Raufu, 2017) Police Officers in my model will be told to minimize their presence within the school. What I mean by this is they will no longer be lingering around as if they are in a prison watching their inmates. They instead will have an office area where students can stop by if they have questions about being a cop or in the case of an emergency where a police officer may be needed, such as a fight, active school shooter, or any other emergencies. These police will also be trained along with the other professionals that will be implemented in my model which includes the trained professionals I mentioned before and all faculty and staff at the school. The training will be primarily focused on the 3-step rule, racism and discrimination in schools, and the overall need for equality in the school setting. All employees in my model will be trained to not discriminate or be racist but instead to be equal to all students no matter their background. Research shows some ways that we can try to stop stereotyping and racism in schools. The first plan of action would be to get educators trained to become more informed on why racism and stereotyping has a negative effect on students (Elias, 2013, Quaylan, 2014).

My method has all the parts needed to keep students from becoming a part of the flow from school to the juvenile and criminal justice system. It will also implement better equality in schools and will eliminate the criminalization of schools in today's modern America.

Conclusion

In conclusion, through my research I have found that the school to prison pipeline is a major problem happening in society that needs to be addressed. I chose to study this

topic of how the school to prison pipeline affects students of color, low-income students, and students with disabilities because I wanted to find out the main reasons that so many young students in those categories were going through the juvenile justice system very early in life and later going into the adult prison system. My goal was to better understand why many students from those specific demographics are being affected due to the current disciplinary policies that are in place for schools to use today. This knowledge can be used to inform the community, especially parents, who have children in those categories of the overall outcome that their children may or may not experience based on how they are being disciplined in schools. Ultimately gaining this knowledge can help educators and parents become more aware of how current school disciplinary policies can affect their students and what they can do to prevent future students from falling victim to the pipeline.

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Social Welfare and Equity Evaluation of Roadway Toll Pricing Techniques

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This paper aims to determine the relationship between assigned toll rates on frequently traveled links in a simulated transportation network and the impacts on roadway congestion and, secondly, equity effects as a result of vehicle transportation patterns through the metrics of miles traveled, cost incurred, and travel time using the framework of Pigouvian taxes to address the deadweight loss from roadway congestion. Toll rates are assigned at various costs and are held constant throughout the morning, afternoon, and evening peak times of the day with outputs provided for vehicles in different income groups with different trip purposes and destinations. Congestion is measured through trends in vehicle travel time at different toll rates and equity is determined by income group and reflected in the behavior of these simulated trips to convey accessibility of goods and resources. This work addresses the disproportionate effect of tolling policies and compares these results to the theoretical implications of reducing congestion to an optimal social allocation of vehicles on a road to convey how a socially efficient market outcome fails to consider where the toll burden is experienced once the social optimal level is achieved. The evaluation of social welfare contributes to the discussion because a higher toll cost or cost incurred does not inherently make a population worse off. There are individual considerations to make (that are outside the scope of this work) such as the value of time lost that truly convey who is the worst off when added to monetary costs incurred. A preliminary conclusion is that as the toll rate increases, the distance traveled decreases and time spent on the road increases. Lower income groups have a greater cumulative decrease in distance traveled and a much higher toll cost incurred for increases in imposed toll rates, supporting the hypothesis of higher tolling policies contributing to inequities among society despite reducing congestion.

Introduction

The goal of this paper is to investigate the effects of roadway tolling policies on transportation patterns and trip distributions, represented as congestion, in a simulated transportation model in the Dallas/Fort Worth metropolitan region. Transportation engineering principles of roadway capacity and saturation are adhered to while concerning the project scope with economic concepts of externalities and equilibrium to gauge the effects of the toll on different neighborhoods and communities by income group in the metrics of total miles traveled, total time spent on the road, and total cost endured from tolls. Analysis will occur by simulating traffic situations for various tolling scenarios over the Dallas/Fort Worth (DFW) metropolitan region in pre-existing modeling software obtained through the University of Texas Department of Civil, Architectural, and Environmental Engineering as prepared for the Texas Department of Transportation (TxDOT). The simulated model represents the DFW region in its entirety and links (roads) will experience tolls at varying rates and times of the day to analyze traffic patterns as a result of varying tolling scenarios.

The two economic criteria of concern are social welfare and equity. Social welfare is defined by the societal deadweight loss endured from the presence of a toll and the reduction in equilibrium number of trips. Running numerous simulations at varying toll rates allows for an optimization of toll rate to the least detrimental societal deadweight loss. Changes to traffic patterns from the base case scenario of no roadway tolling beyond what already exists and the amount of tolls incurred are metrics used to analyze equity by sector as defined by the simulation, identified by one of four income groups. Equity is considered to ensure the effects of any tolls are not disproportionately experienced by any geographic region or income group to affect future policy or implementation decisions. Ultimately, social welfare and equity are both considered when a simulation reaches a user equilibrium state where agents individually do what is best for themselves as the network fails to achieve system optimum and experiences equilibrium efficiency as commonly seen in traffic assignment problems.

Motivation for this project derives from the need to precisely evaluate the effects of distance tolls on the general population to visualize the social effects of roadway tolling on individual usage. Additionally, ensuring equity in low-income and minority neighborhoods in the realm of transportation is a critical issue today. There are dozens of toll roads in Texas and a better understanding of optimal societal pricing will contribute to public toll rates that are both more efficient and equitable given known roadway characteristics of capacity, demand, and location. At a microeconomic level, pricing can be improved and then implemented into a traffic assignment model to determine the effect of results and inform future decision making. The results of this project can additionally be applied beyond the scope of the conducted experiments when making route choice decisions and comparing alternatives, if more information is known at a macro-level such as deciding between two roadways when one is tolled and the other is not, similar to deciding between IH-35 and SH-130 in Austin, Texas.

This paper intends to determine if the tolling method contributes to social disparities along communities or income groups in roadway usage or toll charges aligning with demographic borders in the population affecting the maximum amount of social welfare within this modeling framework. Time and resources can be employed to analyze the effects of these toll road pricings on different communities in the Dallas/Fort Worth metropolitan area. This topic can be expounded to examine the effects of the tolls around the region and who bears the consequences of higher or more frequent tolls through an urban economics and equity lens. This research seeks to analyze if regions experiencing a higher cumulative toll burden, whether time, miles traveled, or cost, are economically distinct from other communities to examine the extent to which minority and low-income communities in the Dallas/Fort Worth metropolitan area are being disenfranchised. The next section will review previous literature and the extent to which equity and congestion has been discussed in tolling techniques, citing studies reviewing Pigouvian taxes, transportation engineering principles, and equity.

Literature Review

Pigouvian Taxes

Economic transportation research has historically focused on determining an efficient congestion pricing scheme with various methods being employed to either reduce roadway congestion or optimize toll revenue dating back to Pigou proposing road pricing for the two-road model in the form of *Pigouvian taxes* (Pigou, 1920). Studies since have argued the degree to which Pigou's initial assertion was correct and expounded on economic analysis of the success of tolls at eliminating congestion (McDonald, 2013). McDonald addresses the introduction and history of the two-road model Pigou introduced in 1920 to mitigate traffic congestion while recounting Pigou's assertion of a required output tax in the presence of decreasing returns. McDonald conveys the overall strengths and effectiveness of Pigouvian taxes et seq. in relieving negative externalities, such as congestion, and provides mathematical evidence in a relevant transportation market model to communicate the empirical effect of Pigouvian taxes and roadway tolls at reducing congestion through user demand and modeling the effects of behavior theory. McDonald's analysis works to indicate the growing knowledge and understanding behind the individual choice patterns inspiring Pigou and the two-road model by furthering the conversation behind the principle of roadway pricing and recounting the aspect of pricing for diminishing returns proposed initially by addressing the gap in understanding through a theoretical market model. The simulated DFW model implements economic aspects from Pigou and built upon by McDonald to lower congestion and determine an optimal price given user demand and social welfare.

Additional economic studies in transportation economics analyze the effects of Pigouvian taxes and roadway pricing on railways (Walters, 1954), equilibrium (Beckmann et al., 1956), and social cost (Walters, 1961). Walters has published many instances of literature on roadway pricing in determining the necessity of Pigouvian

taxes, the first I will discuss examines the validity of implementing roadway tolls on highway users. Walters analyzed the need for taxes to reduce negative externalities and attempted to determine a pricing method, but ultimately determined that toll pricing should not be related to the cost of the road installation and maintenance, leaving much more room for discussion into which toll rate should be charged. The main message Walters conveyed supports the conceptual idea behind Pigouvian taxes where the cost of an implemented toll should bring “the marginal private cost of vehicle operation” closer to “the marginal social cost and [reduce] the degree of congestion on our roads” (Walters, 1954).

Beckmann et al. analyze reductions in the queue of cars on a roadway due to the presence of roadway pricing and found the higher the toll cost, the smaller the flow. This implies equilibrium exists if the flows produced from toll costs are the same as the free saturation flow rates noting the same roadway usage with the freedom of choice in the presence of a toll. Their research suggests a mathematical way of citing a decrease in congestion with increasing toll rates and even hints at a method of determining an optimal toll rate for a predetermined simulated model. Walters produced an additional study related to Pigouvian taxes and social cost referencing the theory of marginal cost to estimate an efficient theory of highway road pricing. Walter ultimately found in this research that current toll rates are much lower than the efficient amount meaning there is a lot of existing congestion and deadweight loss in the current system. These studies work to highlight the effectiveness of Pigouvian taxes through a theoretical implementation and emphasize a different aspect of changes to congestion and roadway user behavior as a result. The proven effectiveness of Pigouvian taxes at reducing the saturation of vehicles and therefore limiting congestion conveys the accuracy of Pigou’s claims 100 years ago and allows for inclusion of other variables, such as equity, in future research.

Literature considering Pigouvian taxes indicate how roadway pricing methods are successful at eliminating congestion but fail to determine an optimal toll rate to reduce congestion with respect to deadweight loss, or the variable of concern of equity. There are many aspects to consider in charging a toll rate based on roadway characteristics, such as number of lanes, time of day usage, and average saturation, as well as variability by individuals in trip generation, traffic alternatives and choices of others. Equity as well is difficult to consider when addressing the effectiveness of Pigouvian taxes and very little literature analyzes road pricing impacts on equity with this condensed scope. Tolls have shown to have disproportionate effects, as will be discussed in this research, based on site and distance of implementation (Franklin, 2007) and because of these limiting factors, there is not a standard optimal toll or even determination of toll by road which makes policy implementations difficult and deadweight loss fluctuate. Further research in transportation engineering, however, has made strides in implementing different tolling methods and examining the social welfare implications.

Roadway tolling research in other fields, including engineering, utilizes Pigou's concepts and findings without objectively stating them, but rather including the idea of disincentivizing roadway usage as variables in formulas and software to reflect and correlate congestion/demand with saturation. Existing engineering literature evaluates the need to include road pricing from an engineering economics sense of limited resources and controlling for existing infrastructure (Winkler et al., 2013). Winkler et al. cite roadway pricing (and Pigouvian taxes without explicitly referring to them as such) as effective methods at relieving overcrowded networks and attempts to derive a roadway pricing plan on two sample modeled networks. They fail to establish a holistic pricing framework but concludes with the variability in implementing toll rates by location and traffic assignment citing time of day travel on congested links as critical determinants to the relocation of vehicles on neighboring roads with lower capacity. Ultimately, they fail to prove more than the fact that a complex tolling system is required to capture demand and navigate deadweight loss while leaving traffic patterns relatively unaffected.

A study at the Ben-Gurion University of the Negev in Israel (Zuk et al., 2021), similar to the research conducted in this analysis, utilized similar methods to the Dallas/Fort Worth simulation model and analyzed when, where and by which price to charge users and the degree to which the price of Pigouvian taxes contributed to achieving the determined optimal social welfare in the form of deadweight loss on a roadway in Israel. A fixed toll rate, proportional toll to the unit of distance traveled, and proportional toll to the contributed delay in time (the difference between the travel time in a saturated network and the free flow time) were all evaluated to answer the economic question of which method and toll rate should be charged on an urban Texas tollway. This study specifically found a 15% lower than optimal social welfare in the lack of the presence of any toll. A fixed price toll, distance pricing toll, and contributed delay toll reduced this to 11.7%, 12.1%, and 10.2%, however the implementation of a delay-based toll, while most efficient, is the most difficult because of the incremental nature of roadway saturation. Both studies demonstrate the effectiveness of roadway taxes at reducing congestion and therefore increasing social welfare by establishing deadweight loss in the presence of congestion as a negative externality.

Civil engineering techniques of traffic assignment (Boyles et al., 2021) cite methods for user decision making and equilibrium travel times and volumes given congestion as behavior theory is influenced by exogenous changes, such as traffic and the institution of a toll. Boyles et al. convey fundamentals of transportation using the four-step travel demand forecasting model of trip generation, trip distribution, modal split, and traffic assignment, and expounds on the choice of transportation given factors such as traffic and congestion in the form of saturation and capacity and tolling as a deterrent to roadway selection. This literature suggests as links (vehicles traveling on roads) between nodes (destinations) are established and furthered, and equilibrium is reached, individuals make decisions to reduce their own travel time given roadway capacities and perceived notions of roadway availability. There exist additional scenarios discussed in this literature where improving the capacity of links in a network

and allowing more vehicles to travel on a non-saturated (non-congested) road transfers volumes from congested links and decreases overall travel time. The tendency is to improve congested links to provide more capacity to saturated roadways, so this method invites discourse on the effect of a roadway policies and tolling practices to offset congestion on congested links with high capacity.

Equity Effects of Roadway Tolling

Other literature examining the equity effects of tolling charges have analyzed the effects of externalities composing the external marginal damage (Taylor et al., 2010), the economic impact of public-private partnerships (Kalauskas, 2010), and the specific London case of a flat rate radius toll (Willumsen, 2004). The biggest debate in existing literature regarding road pricing is the perception of fairness in tolling. Fairness has proven difficult to measure as there is a subjective barrier separating this from the inherent equity effects of those incurring the tolls by distribution and demographics. Taylor et al. address the discernable gap in research of previous discussions of optimal road pricing on equity by discussing literature and examining case studies where equity debates played a prominent role. They found "four strategies have proven important to mitigating equity concerns and overcoming opposition to road pricing: addressing equity issues in planning, building support from the public and interest groups, establishing trust between elected officials and transportation agencies before project development, and enlisting the support of influential constituencies for toll revenues" (Taylor et al., 2010). Ultimately, the biggest hindrance to equity in the implementation of tolls lies in policy and political disputes more than anything insinuating the possibility of a scenario where the impacts of tolls are evenly distributed in the presence of an established toll rate.

Kalauskas aimed to identify an optimal combination of site characteristics and tolling infrastructure technologies to implement tolling systems in California "in the form of public-private partnerships" (Kalauskas, 2010). Kalauskas analyzed motivations behind tolling and operation practices beyond installation to receive insight on the effect of a toll collection system after implementation. The nature of public-private partnerships to provide a for profit service to the public lead to equity concerns given the monopolistic limitations of a previously public resource. Willumsen studied innovative pricing mechanisms for urban transport on existing infrastructure citing the London flat-rate radius-based toll as a viability but evaluating the effects of a uniform toll regardless of distance driven or delay contributed by the generation of the trip. Willumsen found the London Congestion Charging (LCC) yielded significant benefits for infrastructure provision and resource allocation and accredits this to London's economic and political success but admits there is variability as other countries look to implement this system. The London system works well because of the very high toll rate and the radius being around the central business district. If other locations attempt to implement this system, the results would likely not be the same and experience rates of higher tolls incurred for different demographics if the radius is drawn without careful consideration for the locations conditions and political and economic atmosphere. While these studies

evaluate various methods of equity, they all have scopes failing to consider or completely neglecting the distribution of toll impact on specific communities that are incurred as trips are generated and performed. This research will conduct work utilizing the basis of all these studies and evaluate the common theme of equity at a microeconomic scope of consideration to contextualize the effect of a toll on those worst off in society rather than on society as a whole.

Additionally, the goal of equity in tolling is holistically difficult to achieve as there is a higher burden from a tax on those worse off in society due to the regressive nature of the tax taking a larger proportion of lower-income paychecks than their higher-income counterparts (Schweitzer et al., 2008). Schweitzer et al. compare the cost burden of a transportation sales tax to a road enduring a congestion tax and find that while sales tax distributes the costs of transportation facilities across a large population, millions of dollars are redistributed from less affluent residents to those with higher incomes in the process. They discuss in a pro-congestion charge argument how low-income drivers might save as individuals if they do not pay tolls but pay more in sales taxes when viewed as a group. In this argument, the occurrence of a roadway pricing is more equitable than funding transportation projects through a municipal sales tax. Furthermore, equity is difficult to ensure given how many are paying for a road they do not use, and the contributions are not representative of usage. These disparities are only exacerbated by variations in the amount of tolls and on which roadways these charges are incurred.

Duthie et al. focus on challenges of including environmental justice aims into metropolitan transportation planning (Duthie et al., 2007). They work to highlight the different approaches and instances of equity based on a city, organization, or entity's objectives and resources; namely how equitable distribution of projects does not translate to equitable effects, especially for low-income members of society in the face of gentrification. They share many arguments with Lugo, the author of *Bicycle / Race: Transportation, Culture, & Resistance*, a novel communicating the goal of equity for cyclists in urbanized and developing spaces (Lugo, 2018). Lugo conveys how minorities and low-income members of society often are the ones riding bikes out of necessity rather than choice and the need for safety and bicycle infrastructure is growing with these populations and the need for their safety. Both Duthie et al. and Lugo work to describe the need for equity in metropolitan settings and propose provisions to do so. This is reflective of equity in tolling due to 1) the emphasis of equality not being the same thing as equity and 2) the disproportionate impacts resources directed from and for all of society. Equality is often confused with equity and in the face of roadway pricing. While two users might travel the same distance and pay the same amount (equality), numerous scenarios exist where equity is not ensured if they might travel at different times of day and endure different amounts of congestion, drive at different speeds and emit different amounts of pollution or make severely different incomes and therefore the toll is more of one individual's budget than the other. The need for equity due to these different characteristics is important and is touched on by both Duthie et al. and Lugo. Additionally, while everyone is paying tolls and taxes, these resources are going to projects that not everyone will use, see, or reap the benefits of. Equity entails

no member of society is better off from the same resources and Lugo discusses this a lot in urban transportation through disparities in transportation infrastructure provisions.

In an additional study in equity in tolling, Franklin uses modeling to convey behavior theory by representing the effects of income on behavior choices (Franklin, 2007). Franklin quantifies welfare through the Gini Coefficient based on a toll, the travel time reductions due to variations in vehicle mode choice, and the social benefits accrued from collected toll revenue usage. Franklin found the reason roadway tolling is regressive is due to the burden of the toll charge itself, and “the benefits of the expected travel time savings are also likely to be regressive”. To treat all roadways users equitably, this regressivity can be repaid by redistributing toll revenue to the affected travelers in equal, lump sum payments. Franklin conveys mathematically how roadway pricing is not equitable due to redistributions in transportation patterns placing a higher burden on those utilizing a toll road and therefore experiencing less benefits through reductions in travel time. This works to demonstrate inequities in tolling and roadway usage by highlighting societal disparities in the means or resources, and therefore experienced benefits, of drivers in different income groups.

Theoretical Model

The theoretical model of a Pigouvian tax can be implemented to evaluate the effects of a roadway toll by the eliminated deadweight loss from the tax and the reflection of this on social welfare. The first step in understanding the theoretical model is classifying a road according to the four categories of: private good, natural monopoly, common resource, or public good. A public good is a nonrival and nonexcludable provision and many public roadways fall into this category. The presence of congestion (rival) or tolling (excludable) affect the road/highway classification to be anywhere in the matrix in the following ways: the road becomes a public good in the absence of congestion and tolls (nonrival and nonexcludable), a common resource with the presence of congestion (rival and nonexcludable), a natural monopoly with the presence of tolls (nonrival and excludable), or a private good with the presence of both tolls and congestion (rival and excludable) as conveyed in Table 1.

Table 1: Public good determination scheme

	Rival (congestion)	Non-Rival
Excludable (toll)	Private Good Tolled Congested Road	Natural Monopoly Tolled Uncongested Road
Non-Excludable	Common Resource Free Congested Road	Public Good Free Uncongested Road

An imposed toll creates an exclusion of a public good in the model scenario where the presence of a negative externality (congestion) is lacking as displayed in Figure 1 and institutes the deadweight loss measured by the area of the triangle between Q_e , Q_m , and the toll rate. The market quantity (Q_m) corresponds with where the societal demand curve intersects with the price of a set toll and this quantity is less than the maximum and efficient quantity (Q_e) where the demand curve intersects the x-axis. This occurs in the presence of no tolling (where price equals 0 and this line lies on the x-axis) because the roadway has a higher capacity (Q_c) but cannot achieve this due to the reduction in vehicles utilizing the road in the presence of the toll. The deadweight loss incurred in a natural monopoly (tolling when there is no congestion) conveys the societal inefficiency of extraneous roadway tolling when there is no negative externality to offset.

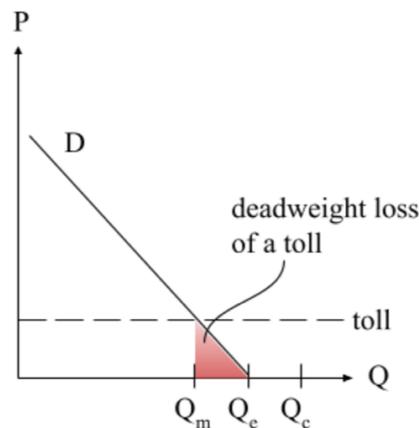


Figure 1: Deadweight loss inefficiency of tolling an efficient provision

The goal of a Pigouvian tax is to eliminate the deadweight loss of a negative externality as shown in Figure 2 where the toll rate is equal to the external marginal damage of negative externalities, such as congestion, noise, and pollution. Here the efficient quantity (Q_e) is equal to the optimal roadway capacity (Q_c) and an additional quantity of vehicles utilizing the road above this amount that would contribute to congestion is avoided due to the presence of the toll. The same deadweight loss of incremental capacity when congestion is not present in Figure 1 is converted to a deadweight loss of the negative externality and therefore efficiency of the Pigouvian tax when congestion is present as seen in Figure 2.

While the roadway is no longer a public good in the presence of tolls, the idea behind a Pigouvian tax is to only be incurred in the presence of congestion or a negative externality where the roadway is considered a common resource as determined by the categorization of rival and nonexcludable. A toll affects the public demand and decreases equilibrium quantity to be efficient and is necessary in the event of a negative externality. A Pigouvian tax converts the congested but free common

resource roadway to a non-rival but excludable natural monopoly roadway and this works to increase societal efficiency.

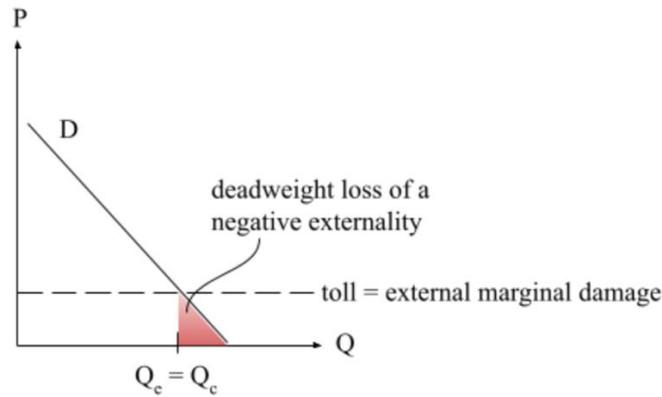


Figure 2: Deadweight loss of negative externality (congestion) through tolling

Taxation can have many societal benefits, such as raising revenue and alleviating a negative externality as seen through congestion, that convey the effectiveness and the merit of instituting a toll on a heavily utilized roadway. Benefits to taxation have been proven and many studies have been conducted to determine an optimal societal rate (Winkler, 2013). However, while Pigouvian taxes are the basis of this study, the inclusion of tolls is found to be regressive on lower income groups burdening the poor more than the rich (Schweitzer, 2008). Because of this, equity is an additionally considered component evaluated as both the cost of tolls incurred and change in distance traveled from a no toll scenario to ensure the optimal or efficient allocation and toll rate solutions are not instituting transportation disparities among income groups.

The data and results detailed in the **Empirical Model** and **Discussion** detail an extended application to the theoretical model discussed above. The determination of social welfare is derived from the travel time of an optimal toll rate and the deadweight loss is computed for this toll rate on the supply-demand curve. Travel time is used for social welfare rather than exclusively toll cost incurred because in the transportation system, tolls are considered a transfer payment that is not entirely lost once spent while travel time is irretrievable. This method reflects individuals' preferences based on a personal value of time.

Empirical Model

The theoretical model of a Pigouvian taxes is important to understand because of the implications on the empirical data being obtained from the roadway simulation. Using a model of the Dallas/Fort Worth Metropolitan Region, trials are conducted where trips of simulated vehicles occur, grouped in different categories of income group, time of day, mode of transportation, and trip purpose. The categories that every trip falls into helps convey the effect of the different toll rates as outputs from the simulation are analyzed in the metrics of cost incurred from the tolls, distance traveled, and time spent on the road.

Each trial that is run assigns a unique toll rate in morning, afternoon, and evening peak periods during the day on all links in the network. The imposed toll is enforced on all roads and added to the existing rate for roads that are already classified as toll roads. Tolls are determined and assigned at decreasing increments to draw conclusions on the effect, starting at \$1 per mile at all times of day. The assigned toll decreases from this value to \$0.50, \$0.25, and finally \$0.10 and results are compared to the base case of no toll rate. Single-, two-, and three-passenger vehicles are designated within each trip traveling on the simulated, tolled roadway and are held constant for every trial. The number of vehicle and passenger trips are provided in Table 2 in the Conclusions section. Results determined from the metrics help convey information on both congestion and equity.

Congestion is measured through the outputted travel time metric to convey the time in minutes of vehicles on the road. Congestion is analyzed to demonstrate how the implementation of a roadway toll will decrease a vehicle's travel time based on the theoretical model of Pigouvian taxes where a quantity of vehicles in the market are deterred due to the increase of the market price. Equity is analyzed as an externality of the effect of the toll rate and can be seen through all three reported metrics of travel time, distance traveled, and cost incurred. This will be measured and reported by income groups to convey the effect of the toll on different socioeconomic groups to represent who bears the burden, or more importantly the consequences, of an implemented toll. Time is measured and defined through the Bureau of Public Roads (BPR) function commonly used in various traffic assignment models and as noted in Equation 1:

$$t_{ij}(x_{ij}) = t_{ij}^0 \left(1 + \alpha \left[\frac{x_{ij}}{u_{ij}} \right]^\beta \right). \quad (1)$$

The BPR function is implemented in many models because of the function's continuous and decreasing nature. Time is the dependent variable as a function of demand (x_{ij}) that varies on the link demand, capacity (u_{ij}), and free-flow travel time (t_{ij}^0). α and β

values depend on the model and even links within the model and only affect the concavity of the function. Values of $\alpha = 0.15$ and $\beta = 4$ are commonly used.

In the simulation, these desired effects of roadway usage are normalized using vehicle trips with equity also normalized using passenger trips due to the extension of these metrics on the individual level to account for households where members carpool to derive costs per person as well as per vehicle. Normalization of the data allows for the reported metrics to be compared directly by category, in addition to cumulatively, to account for the number of trips taken as this is held constant throughout all the trials. Normalized results will be discussed in the **Conclusions** section and compared along all the trials.

Discussion

Preliminary conclusions convey the expected results of as toll rate increases, the distance traveled decreases, time spent on the road increases, and the toll cost incurred increases. At a refined scope, lower income groups have a greater cumulative decrease in distance traveled and a much higher toll cost incurred for imposed toll rates, supporting the hypothesis of higher tolling policies enforcing inequities among society despite reducing congestion. When the results are normalized using vehicle and passenger trip data as provided in Table 2, trends can be seen as viewed in Figure 3 and Figure 4. Normalization is necessary because the lowest income group in income group 4 reported the greatest cumulative values for all metrics but also has the most vehicle trips and passenger trips.

Table 2: Vehicle Trips and Passenger Trips by Income Group per Trial

Market	Vehicle Trips	Person Trips
Commercial Vehicles (COM)	1,820,000	1,860,000
Income Group 1 (IG1)	3,310,000	4,930,000
Income Group 2 (IG2)	1,850,000	2,560,000
Income Group 3 (IG3)	2,750,000	3,740,000
Income Group 4 (IG4)	7,160,000	9,830,000

Figure 3 demonstrates the travel time, toll cost, and distance traveled results, respectively, by income group. As toll rate increases as shown on the x-axis, the distributional effects are entirely experienced by income groups from low to high with commercial vehicles having the highest toll cost and distance traveled per vehicle trip due to the nature of their trip purposes. Figure 4 shows the same information but with respect to the overall market summation by metrics and helps to visualize the results and scale the share of each income group to another. The metric with the most trial variability is the toll cost incurred which makes sense as this is experienced by every vehicle in the network per mile so the asymptotic, decreasing nature of the toll will convey an exponential trend in the data.

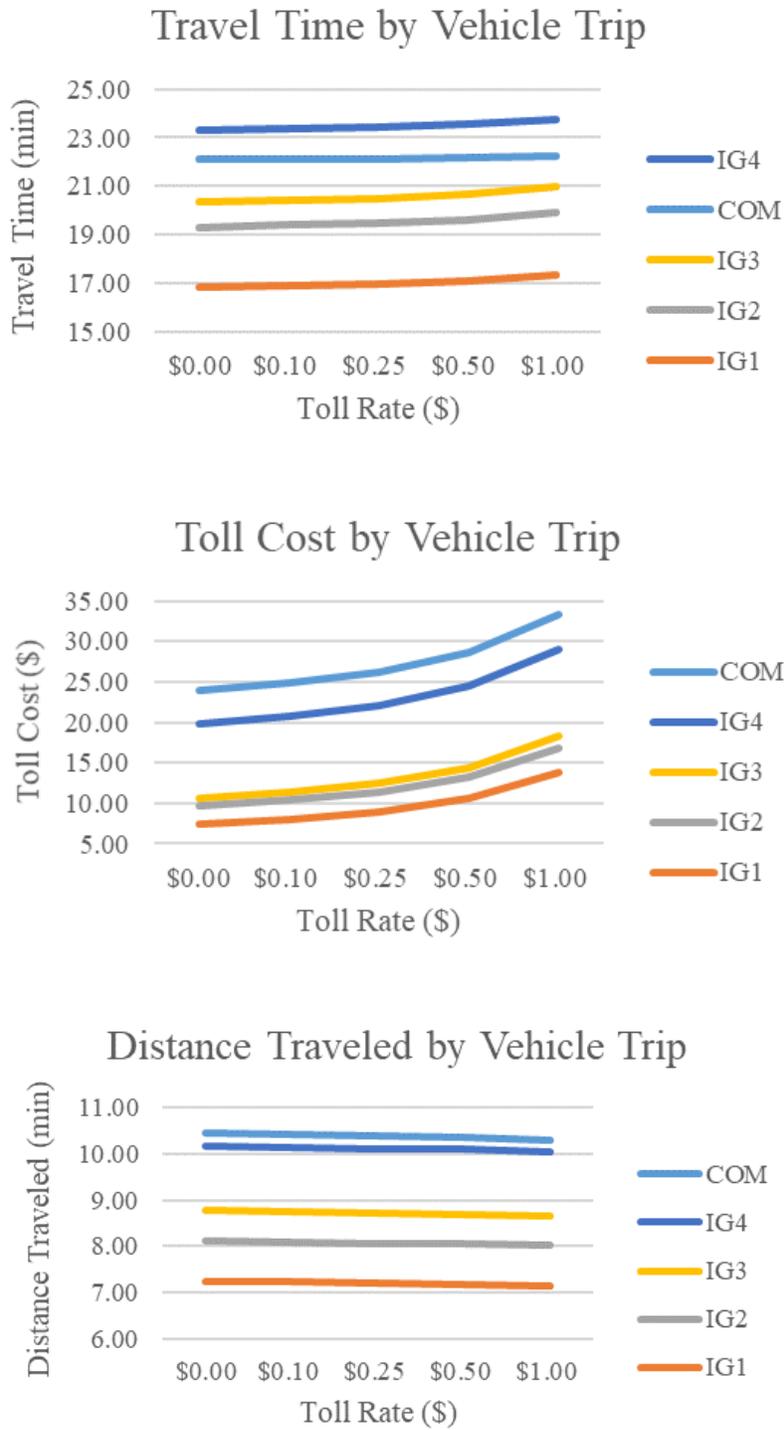


Figure 3: Metrics by vehicle trip separated by income group to show individual change

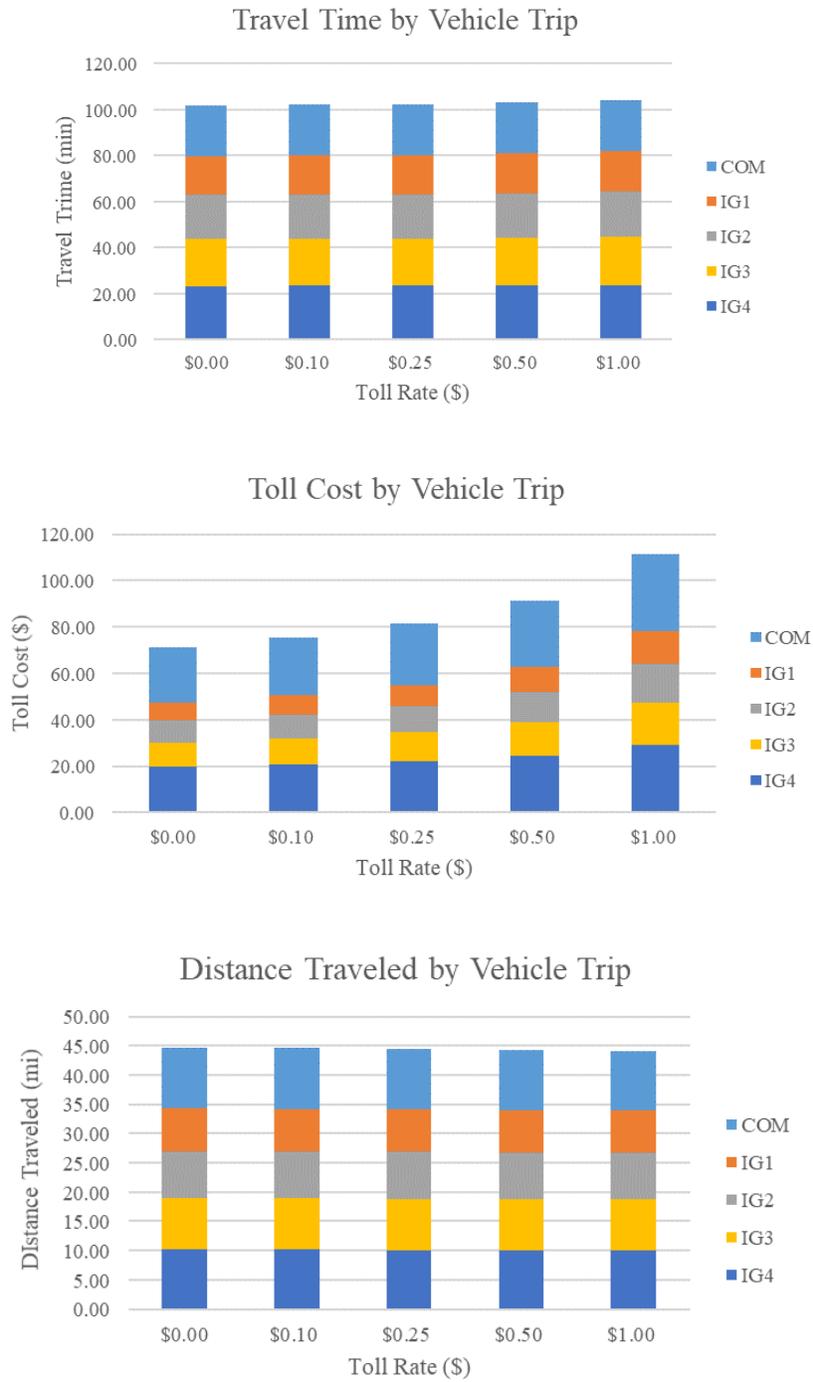


Figure 4: Metrics by vehicle trip separated by income group to show market change

These results work to show equity beyond the expected result of toll rate affecting driver decisions. One can rationally assume a driver will choose to drive less, travel for longer, and pay more as the toll rate increases. An equity-driven extension of this thought process is who is driving less, traveling longer, and paying more. The results show lower income individuals are doing so at both the individual and market level conveying that these \$1 and \$0.50 per mile rates do not affect every member of society to the same degree and should be considered when shaping and implementing policy decisions. Individual focused decisions are becoming increasingly common as equity becomes something we as an institution are more aware of and consider as more and more of a concern.

Conclusion

Further research and analysis can be conducted using this simulation to determine a socially optimal toll rate for the market considering trends identified in this analysis and information on individual and societal demand and elasticity. More data can be evaluated with additional time to modify and extend the scope of the simulation. A crucial aspect of equity is the distributional effect of decisions. This was analyzed at a societal level with regards to income, but geographical data opens the door to more analysis. Specifically, connecting the who and where of these results and analyzing by county, community, and community allows for race, ethnicity, age, gender, and many more demographics to be considered given public census data.

Additionally, there are many possibilities to expand the scope of this research with a method of quantifying the utility of drivers. A notable extension lies in the possibility of linking microeconomic principles with the traffic assignment process in determining a framework of modeling user mode choice through utility to identify a more direct application of analyzing user benefits. The application of this will have practical implications on traffic assignment and the utilized simulation software specifically because of the potential to directly compare trials and origin-destination choices of vehicles within trials through the matrix of choices.

This study is relevant because of the application to policy decisions and implementation. Characterizing individuals' travel time and preferences yields to more optimal and equitable decisions. Roadway tolling has important and overarching implications across all demographics and having a more user-based model and determination will contribute to economic and social progress in a positive way as transportation systems and management evolve.

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Childhood Family Cohesiveness Prospectively Moderates Risk for Warzone Psychopathology Among Deployed U.S. Soldiers

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Background: Several studies have robustly demonstrated the protective effects of childhood family support and cohesiveness on adult stress-related psychopathology. However, there is little evidence regarding the prospective relationship between the childhood family environment and the in-theater emergence of war-zone stress-related psychological symptoms. The present report is from data collected from the Texas Combat PTSD Risk Project, which aimed to identify risk and resilience factors at pre-deployment that predict the subsequent impact of war-zone stressors in terms of psychological symptom emergence in U.S. soldiers deployed to Iraq. **Method:** Soldiers ($N = 150$) completed a battery of standardized interview and self-report assessments at pre-deployment, including a measure of childhood family cohesion. Once deployed, they completed monthly web-based self-report assessments of war-zone stressor exposure and PTSD, depression, and anxiety symptoms. **Results:** Consistent with predictions, greater childhood family cohesiveness robustly mitigated subsequent in-theater symptoms. However, contrary to predictions, childhood family cohesiveness did not reliably moderate the linkage between war-zone stressors and in-theater symptoms. **Conclusions:** Consistent with a wealth of other evidence demonstrating protective stress-resilience effects of childhood family cohesion that extend across the lifespan, the present findings suggest they also extend to the war-zone environment among deployed soldiers. Findings also point to the potential utility of early family interventions to promote stress resilience and thereby mitigate risk for stress-related psychopathology.

1. Introduction

Posttraumatic stress disorder and other forms of trauma-related psychopathology remain leading health complaints among U.S. service members (Burnam et al., 2009; Hoge et al., 2004; Seal, Bertenthal, Miner, Sen & Marmar, 2007), and are linked with substantial distress and disability (e.g., Schnurr, Lunney, Bovin & Marx, 2009; Jakupcak et al., 2010), while placing a heavy burden on health care systems (Possemato, Wade, Andersen, & Ouimette, 2010). Whereas most deployed soldiers exhibit resilience, combat exposure has been reliably demonstrated to be among the most potent risk factors for persistent PTSD following war-zone deployment (e.g., Armenta et al., 2018).

Thus, in addition to efforts to bolster evidence-based interventions, there is a pressing need to identify prospective factors associated with risk and resilience for war-zone stress-evoked psychopathology, especially factors that are potentially modifiable and amenable to early intervention (e.g., Cobb, Lancaster, Meyer, Lee & Telch, 2017). In this regard, while there is ample evidence supporting a link between the childhood family environment and risk for adult stress-evoked psychopathology, there is a dearth of evidence regarding how such variables relate to the in-theater emergence of stress-evoked psychological symptoms in the war-zone.

Diathesis stress models are useful towards this aim, as they reveal pathways through which pre-disposing factors operate with stressors in conferring risk or resilience for adverse outcomes (e.g., Cobb et al., 2021; Cobb et al., 2017; Lancaster et al., 2016). Moreover, these frameworks posit that whereas stress is a major contributor to negative outcomes, stressor effects are subject to several moderating individual differences and contextual factors (McKeever et al., 2003). Accordingly, such models attempt to explain why some but not all individuals develop post-trauma psychopathology. For instance, childhood adversity has been consistently demonstrated to confer subsequent risk for trauma-related disorders and other negative mental and physical health outcomes (e.g., Blosnich et al., 2021; Zaidi & Foy, 1994). In fact, childhood adversity has been shown to reliably predict PTSD symptoms, even after controlling for the deleterious effects of combat stress (Cabrera et al., 2007; Voorhees et al., 2012; Donovan et al., 1996).

In contrast to the negative long-term impact of childhood adversity, a wealth of evidence supports the protective effects of a cohesive and supportive childhood family environment. These effects have been demonstrated to emerge in childhood (see Goodrum, Smith, Hanson, Moreland, Saunders, & Kilpatrick, 2020) and are apparent in adulthood, with linkage to lower levels of psychopathology and better general adjustment (e.g., Kamsner & McCabe, 2000). For instance, Daniels and Bryan (2021) conducted a large cross-sectional study of young adults ($N = 485$, ages 18-35) to elucidate the relations between trauma exposure and qualities of the childhood family environment, such as closeness, cohesion, adaptive management of conflicts, nurturance, and promotion of personal growth. They found that whereas complex /

multiple trauma exposures were linked to lower levels of resilience, a strong childhood family environment with high levels of cohesiveness buffered these effects, conferring resilience despite significant traumatization. Similarly, Uruk, Sayger, and Cogdal's (2007) study of an undergraduate university sample ($N = 189$) found that greater family adaptability and cohesion were associated with enhanced well-being and lower trauma-related symptoms.

In addition to the childhood family cohesiveness conferring long-term protection, it is worth noting that the relation between family cohesiveness and PTSD symptom severity appears bidirectional over time. For instance, longitudinal findings from a study of Israeli combat veterans ($N = 208$) revealed that PTSS predicted lower levels of family cohesion 2 years later, which in turn predicted PTSS nearly 20 years later (Zerach, Solomon, Horesh, & Ein-Dor, 2013). Taken together, this suggests that childhood family cohesiveness may have far reaching, resilience-promoting effects across the lifespan.

While it is well-established that a supportive and nurturant childhood family environment promotes stress-resilience, including among combat veterans, there is little extant research investigating how such effects may influence stress reactions within the war-zone environment. This study explores new data from the Texas Combat PTSD Risk Project (Lee, Goudarzi, Baldwin, Rosenfield, & Telch, 2011; Telch, Rosenfield, Lee, & Pai, 2012), which aims to identify multimodal risk and resilience factors associated with the in-theater emergence of war-zone stress-evoked psychopathology. The current study examined the effect of the childhood family environment on in-theater psychopathology in a sample of deployed U.S. soldiers. More specifically, the Deployment Risk and Resilience Inventory (DRRI-B) subscale B, which taps childhood family closeness and cohesiveness (D. W. King, King, & Vogt, 2003), was examined as a prospective pre-deployment moderator of the subsequent in-theater impact of potentially traumatic war-zone stressors on the emergence of PTSD, depression, and anxiety symptoms. Consistent with an abundance of prior findings, we predicted that childhood family cohesiveness would serve as a protective factor, both directly and indirectly, by buffering the negative impact of war-zone stressors on symptom expression in-theater.

2. Methods

2.1. Participants:

Soldiers must have met the following criteria to participate in this study: (a) Age 18 and above; (b) No previous military deployments; (c) a scheduled deployment to Iraq within three months of consent. Among participants briefed about the study, a total of $N = 184$ (82%) provided consent, whereas 6 never deployed, 1 withdrew, 16 failed to complete the pre-deployment assessments, and 12 did not provide in-theater measures, leaving viable data from 149 soldiers. Deployment lasted an average of 14.94 months

(SD = 2.42; range = 2.06-18.43). Furthermore, this sample was predominantly representative of young (M = 25.33 years, SD = 6.08, range = 19 to 49 years, white (83%), males (88.59%).

2.2. Procedures:

Michael J. Telch (PI) served as the principal investigator and project director. Army command selected soldiers from four combat units, four combat service support units, and one combat support unit. All were scheduled to deploy from Ft. Hood to Iraq within two years following August 2007. Those selected were briefed by the PI. Unit leaders were not present during the briefing and consent process. Soldiers were aware that participation was entirely voluntary and could be terminated at any time throughout the study without penalty. Moreover, participants were ensured that their data would be de-identified and confidential, and thus, the military would not have access to their data.

The Institutional Review Board approved all procedures of the Office of Research Support at The University of Texas at Austin and the Brooks Army Medical Center Scientific and Human Use Review Committee. Consented participants traveled to the University of Texas at Austin to complete a comprehensive pre-deployment assessment. As part of a broad pre-deployment battery spanning demographic, clinical, hormonal, cognitive, and neuroimaging domains, as described in previous reports from the parent project (Lee et al., 2011; Telch et al., 2012), soldiers completed the Childhood Family Environment subscale of the Deployment Risk and Resilience Inventory (DRRI-B). Once deployed, soldiers completed monthly self-report entries using the Combat Experiences Log (CEL), which is a web-based data collection tool for capturing a range of common deployment stressors, as well as symptom outcomes. These measures are described in more detail in the following sections.

2.4. Pre-deployment Measures:

Pre-deployment Demographics and Clinical Characteristics

Demographics, clinical characteristics, and childhood family experiences were captured as part of a larger pre-deployment assessment battery, as mentioned above. The presence of Axis I psychopathology was determined via clinical interview using the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I-IV; First, Spitzer, Gibbon, & Williams, 1996). The SCID-I-IV was administered by advanced doctoral students, and diagnoses were confirmed in a follow-up interview with the PI (MT).

Childhood Family Environment

Childhood family cohesiveness was measured via self-report using subscale B of the Deployment Risk and Resilience Inventory (DRRI-B; Vogt et al., 2013). Items were rated on a 5-point Likert scale reflecting the frequency of family unit characteristics (1 =

Almost none of the time; 5 = Almost all of the time), with higher scores reflecting greater childhood family cohesiveness, accord, and closeness. Internal consistency of this subscale was very good in the present sample ($\alpha = .86$).

2.5. Measures of Warzone Stressors and In-Theater Symptoms

On a monthly basis, participants received email reminders to complete the Combat Experience Log (CEL) throughout their deployment (Lee et al., 2011). The CEL is a de-identified, web-based assessment of warzone stressors and stress reactions. The specific instruments comprising the CEL are described in the following sections.

2.6. Assessment of Warzone Stressors

Exposure to a broad range of common warzone stressors was measured using the Deployment Risk and Resilience Inventory (DRRI). Participants were also given two free-response items that allowed reporting of stressors not included in the checklist. The PI and two doctoral students independently coded a subset of all stressors from the original checklist that met DSM-5 PTSD criteria for a traumatic event (“exposure to actual or threatened death, serious injury or sexual violence,” p. 271; American Psychiatric Association, 2013), with complete agreement among raters. As described in the analytic section below, potentially traumatic events (PTEs) were parsed into pure between- and within-soldier components, reflecting between-soldier differences in monthly average PTE exposure (PTE_{BP}) and within-soldier monthly deviations from their own average PTE exposure (PTE_{WP}).

2.7. Assessment of Post-Traumatic Stress Symptoms

PTSD symptoms within the last month were captured using the four-item version of the PTSD Checklist (PCL-Short; Bliese et al., 2008), which assesses re-experiencing, avoidance, and hyper-arousal symptoms associated with PTSD. Participants rated the intensity of their symptoms on a scale from 1 = not at all to 5 = significantly. Note that the PCL-Short has been demonstrated to be just as diagnostically accurate as the full 17-item version of the PCL (Bliese et al., 2008). Internal consistency for the PCL-Short was in the acceptable range ($\alpha = .86$) in the present data.

2.8. Depression Symptoms

The 10-item version of the Center for Epidemiological Studies Depression Scale (CES-D-10; Andresen, Malmgren, Carter, & Patrick, 1994) was used to assess Depression symptoms amongst participants. Core symptoms of Depression were reflected by items allowing participants to rate their severity on a 4-point scale. This scale ranged from 0: none of the time, 1: rarely, 2: most of the time, 3: All the time. The CES-D-10 was used due to its effective test-retest reliability ($r = .83$, Irwin, Artin, & Oxman, 1999), predictive accuracy ($Kappa = .82-.97$; Anderesen et al., 1994; Zhang et al., 2012) and correspondence with the 20-item version ($r = .97$, $p < .001$; Zhang et al., 2012). Internal consistency for the CES-D-10 was in the acceptable range ($\alpha = .72$).

2.9. Anxiety Symptoms

The 19-item Combat Experience Log Anxiety Subscale (CEL-ANX) was used to assess anxiety symptoms (Lee et al., 2011). The CEL-ANX is an author-constructed instrument developed for the parent study. Participants are tasked with rating the severity of general anxiety symptoms on a 5-point scale. 1 being “not at all”; 5 being “extremely”. Internal consistency was excellent in the current analysis ($\alpha = .92$).

2.10. Analytic Approach

All data were analyzed using multilevel models implementing the lme4 package in R (R Core Team, 2021; Raudenbush & Bryk, 2002). Modeling proceeded bottom-up, with initial derivation of fixed and random trajectories of change, followed by entering predictors of interest. Consistent with our prior reports, PTSD, depression, and anxiety symptoms were best modeled using fixed quadratic, random linear growth trajectories. Time was entered in its natural metric, and centered at 8 months, which served to stabilize residuals. Symptom outcomes were documented in raw form, whereas all predictors (except for time) were z-transformed to ease interpretation.

Predictors included (a) sex (male = 0), (b) any lifetime Axis I disorder based on the SCID-I-IV (absent = 0), (c) average monthly potentially traumatic events, reflecting between-soldier differences in overall stressor exposure (PTE_{BP}), (d) monthly within soldier deviation from their average monthly stressor exposure (PTE_{WP}), and (e) childhood family cohesiveness, reflecting the sum of scale B of the DRR1. Degrees of freedom were based on Satterthwaite approximations. Full maximum likelihood was used to compare nested models, whereas restricted maximum likelihood was used to produce the final effect estimates. All model assumptions were evaluated and were adequately met.

3. Results

Descriptive statistics, including demographics and clinical characteristics, are provided in **Table 1**. Main effects for the models of in-theater PTSD, depression, and anxiety symptoms are presented in **Table 2**, including all fixed effects, as well as local (r) and global effect sizes (Pseudo- R^2). Global effect sizes for the main effect models revealed 70%, 58%, and 79% of symptom variance was accounted for across models of PTSD, depression, and anxiety symptoms, respectively. Main effects revealed significant direct protective effects of family cohesiveness on PTSD ($b = -.34$, $se = .15$, t

= -2.35, $p = .020$, $r = .21$), depression ($b = -.80$, $se = .33$, $t = -2.45$, $p = .015$, $r = .19$), and anxiety ($b = -2.20$, $se = .65$, $t = -3.41$, $p = .001$, $r = .28$).

Fixed effect estimates, and local and global effect sizes for the diathesis-stress models are provided in **Table 2**. Estimates of global variance explained revealed the models captured 70%, 59%, and 79% of the variance in PTSD, depression, and anxiety symptoms, respectively. In contrast to the direct protective effects observed in the main effects models presented above, family cohesiveness did not reliably moderate the impact of war-zone stressors on in-theater symptoms across outcomes (all p 's > .05).

Table 1. Main effects on in-theater PTSD, depression, and anxiety symptoms.

DV: PTSD Symptoms	<i>b</i>	<i>se</i>	<i>df</i>	<i>t</i>	<i>p</i>		<i>r</i>
Intercept	5.44	0.24	127.23	23.02	0.000	***	0.90
Time	0.01	0.02	54.62	0.31	0.760		0.04
Time ²	-0.02	0.00	238.17	-5.36	0.000	***	0.33
Sex (male = 0)	0.47	0.42	94.97	1.12	0.267		0.11
Lifetime Axis I Diagnosis (absent = 0)	0.58	0.28	114.49	2.04	0.043	*	0.19
PTE _{BP}	0.55	0.16	150.97	3.55	0.001	***	0.28
PTE _{WP}	0.29	0.06	504.18	5.32	0.000	***	0.23
DRRI-B	-0.34	0.15	122.46	-2.35	0.020	*	0.21
	<i>Pseudo-R</i> ²	0.70					
DV: Depression Symptoms	<i>b</i>	<i>se</i>	<i>df</i>	<i>t</i>	<i>p</i>		<i>r</i>
Intercept	6.90	0.50	148.53	13.84	0.000	***	0.75
Time	0.06	0.05	284.06	1.22	0.222		0.07
Time ²	-0.04	0.01	583.93	-5.52	0.000	***	0.22
Sex (male = 0)	1.70	0.93	130.22	1.83	0.069	.	0.16
Lifetime Axis I Diagnosis (absent = 0)	2.18	0.63	143.16	3.49	0.001	***	0.28
PTE _{BP}	-0.21	0.35	205.12	-0.60	0.551		0.04
PTE _{WP}	0.35	0.15	567.06	2.37	0.018	*	0.10
DRRI-B	-0.80	0.33	158.96	-2.45	0.015	*	0.19
	<i>Pseudo-R</i> ²	0.58					

DV: Anxiety Symptoms	<i>b</i>	<i>se</i>	<i>df</i>	<i>t</i>	<i>p</i>		<i>r</i>
Intercept	9.07	0.99	145.89	9.15	0.000	***	0.60
Time	-0.18	0.06	67.39	-3.21	0.002	**	0.36
Time ²	-0.05	0.01	881.59	-6.38	0.000	***	0.21
Sex (male = 0)	1.19	1.93	123.04	0.62	0.537		0.06
Lifetime Axis I Diagnosis (absent = 0)	4.23	1.28	134.38	3.31	0.001	**	0.27
PTE _{BP}	0.77	0.68	161.73	1.13	0.259		0.09
PTE _{WP}	0.72	0.16	845.23	4.62	0.000	***	0.16
DRRI-B	-2.20	0.65	138.93	-3.41	0.001	***	0.28
	<i>Pseudo-R²</i>	0.79					

Note. The above table presents main effects for the model of in-theater PTSD, Depression, and Anxiety symptoms, as indexed by the PCL-4, CES-D-10, and CEL-ANX. PCL-4 = Post-traumatic Stress Checklist – 4-Item Version. CES-D-10 = Center for Epidemiological Studies Depression Scale – 10-Item Version. CEL-ANX = Combat Experiences Log, General Anxiety Scale. PTE_{BP} = Between-soldier effects of potentially traumatic events, reflecting average monthly stressor exposure. PTE_{WP} = Within-soldier effects of potentially traumatic events, reflecting time-varying monthly deviation from each individual soldier’s monthly average stressor exposure. DRRI-B = total score on subscale B, Childhood Experiences, of the Deployment Risk and Resilience Inventory, with greater scores reflecting greater childhood family cohesiveness, accord, and closeness. Global effect sizes (*Pseudo-R²*) were calculated by squaring the correlation between observed and predicted values. Local effect sizes (*r*) were derived from the t-statistics, using the following formula: $r = \sqrt{(t^2 / (df + t^2))}$, where *t* equals the value of the t-statistic for each parameter, and *df* equals the degrees of freedom associated with the t-statistics. · = *p* < .10, * = *p* < .05, ** = *p* < .01, *** = *p* < .000.

Table 2. Diathesis-stress effects on in-theater PTSD, depression, and anxiety symptoms

DV: PTSD Symptoms	<i>b</i>	<i>se</i>	<i>df</i>	<i>t</i>	<i>p</i>		<i>r</i>
Intercept	5.44	0.23	125.77	23.17	0.000	***	0.90
Time	0.01	0.02	54.81	0.29	0.777		0.04
Time ²	-0.02	0.00	236.64	-5.39	0.000	***	0.33
Sex (male = 0)	0.48	0.42	96.45	1.12	0.265		0.11
Lifetime Axis I Diagnosis (absent = 0)	0.57	0.28	116.00	2.00	0.048	*	0.18
DRRI-B	-0.31	0.15	122.26	-2.14	0.034	*	0.19
PTE _{BP}	0.56	0.15	151.63	3.59	0.000	***	0.28
PTE _{WP}	0.28	0.06	522.15	5.02	0.000	***	0.21
DRRI-B x PTE _{BP}	-0.14	0.13	154.70	-1.04	0.301		0.08
DRRI-B x PTE _{WP}	0.07	0.06	556.87	1.21	0.228		0.05
	Pseudo-R ²	0.70					
DV: Depression Symptoms	<i>b</i>	<i>se</i>	<i>df</i>	<i>t</i>	<i>p</i>		<i>r</i>
Intercept	6.90	0.50	143.36	13.76	0.000	***	0.75
Time	0.06	0.05	66.53	1.19	0.237		0.14
Time ²	-0.04	0.01	265.21	-5.51	0.000	***	0.32
Sex (male = 0)	1.71	0.94	128.58	1.82	0.071	.	0.16
Lifetime Axis I Diagnosis (absent = 0)	2.17	0.63	141.83	3.43	0.001	***	0.28
DRRI-B	-0.76	0.33	154.62	-2.31	0.022	*	0.18
PTE _{BP}	-0.19	0.35	202.33	-0.55	0.584		0.04
PTE _{WP}	0.33	0.15	567.07	2.28	0.023	*	0.10
DRRI-B x PTE _{BP}	-0.16	0.30	196.22	-0.54	0.590		0.04
DRRI-B x PTE _{WP}	0.12	0.14	586.44	0.84	0.402		0.03
	Pseudo-R ²	0.59					
DV: Anxiety Symptoms	<i>b</i>	<i>se</i>	<i>df</i>	<i>t</i>	<i>p</i>		<i>r</i>
Intercept	9.08	0.99	144.32	9.14	0.000	***	0.61

Time	-0.18	0.06	68.26	-3.19	0.002	**	0.36
Time ²	-0.05	0.01	881.99	-6.43	0.000	***	0.21
Sex (male = 0)	1.13	1.94	121.58	0.58	0.562		0.05
Lifetime Axis I Diagnosis (absent = 0)	4.25	1.28	133.69	3.31	0.001	**	0.28
DRRI-B	-2.20	0.65	134.13	-3.38	0.001	***	0.28
PTE _{BP}	0.77	0.68	159.53	1.13	0.261		0.09
PTE _{WP}	0.71	0.16	845.69	4.55	0.000	***	0.15
DRRI-B x PTE _{BP}	0.18	0.58	158.86	0.31	0.755		0.02
DRRI-B x PTE _{WP}	0.21	0.15	840.21	1.44	0.151		0.05
Pseudo-R ²		0.79					

Note. The above table presents Diathesis-Stress Effects for the model of in-theater PTSD, Depression, and Anxiety symptoms, as indexed by the PCL-4, CES-D-10, and CEL-ANX. PCL-4 = Post-traumatic Stress Checklist – 4-Item Version. CES-D-10 = Center for Epidemiological Studies Depression Scale – 10-Item Version. CEL-ANX = Combat Experiences Log, General Anxiety Scale. PTE_{BP} = Between-soldier effects of potentially traumatic events, reflecting average monthly stressor exposure. PTE_{WP} = Within-soldier effects of potentially traumatic events, reflecting time-varying monthly deviation from each individual soldier’s monthly average stressor exposure. DRRI-B = total score on subscale B, Childhood Experiences, of the Deployment Risk and Resilience Inventory, with greater scores reflecting greater childhood family cohesiveness, accord, and closeness. Global effect sizes (*Pseudo-R*²) were calculated by squaring the correlation between observed and predicted values. Local effect sizes (*r*) were derived from the t-statistics, using the following formula: $r = \sqrt{(t^2 / (df + t^2))}$, where *t* equals the value of the t-statistic for each parameter, and *df* equals the degrees of freedom associated with the t-statistics. · = *p* < .10, * = *p* < .05, ** = *p* < .01, *** = *p* < .000.

4. Discussion

This study aimed to determine the direct and stress-moderating effects of childhood family cohesiveness on the subsequent in-theater emergence of PTSD, depression, and anxiety symptoms in deployed U.S. soldiers. Consistent with predictions, greater childhood family cohesiveness robustly reduced risk for in-theater symptoms across outcomes. However, contrary to predictions, childhood family

cohesiveness did not reliably moderate the relationship between stressors and symptoms. These findings provide prospective evidence consistent with a wealth of other findings highlighting the importance of qualities of the childhood family environment for predicting the later emergence and course of stress-related mental illness.

For instance, the observed direct protective effects conferred by a cohesive childhood family environment are in line with a large body of work demonstrating protective stress-buffering effects conferred across the lifespan, from childhood (Goodrum et al., 2020) to adulthood, in Civilian samples (Kamsner & McCabe, 2000; Daniels & Bryan, 2021; Uruk et al., 2007) and combat-exposed Veterans (e.g., Zerach et al., 2013). As mentioned, childhood family cohesiveness appears to confer broad protection from a range of adverse outcomes. Moreover, there is abundant evidence that these protective effects are reliably expressed through buffering the negative impact of stress.

However, in contrast to the observed direct protective effects, childhood family cohesiveness did not moderate the relation between war-zone stressors and in-theater symptoms. This may logically be due to the inclusion or omission of important covariates. For instance, Goetter et al.'s (2020) cross-sectional study of previously deployed U.S. Veterans found that childhood family cohesiveness was positively associated with in-unit and post-deployment social support and was negatively associated with in-theater interpersonal stressors (i.e., harassment). However, childhood family cohesiveness was not found to incrementally predict PTSD or major depression when controlling for several pre-, peri-, and post-deployment variables. This suggests that instead of direct effects, childhood family variables may indirectly confer risk or resilience through other intervening variables. For instance, evidence suggests the protective effects of childhood family variables may be mediated through the stress-buffering effects of adulthood social support (e.g., Kang, Aldwin, Choun, & Spiro, 2016).

Limitations and Future Directions

There are a few notable study limitations and suggestions for future research. First, whereas most soldiers provided a sufficient number of monthly in-theater observations, missingness was not uncommon. However, there were no problematic patterns to missingness, and our analytic approach is robust to missing observations due to precision-weighted estimation (Raudenbush & Byrk, 2002). Second, we were not sufficiently powered to examine the potentially important moderating influence of certain sociodemographic variables, such as sex, race, and ethnicity. Future efforts should evaluate whether the present findings translate across racial and ethnic groups, each with unique culture-specific family norms and values, encompassing different sets of beliefs and strategies for enhancing stress-resilience. These variables are important in examining the relation between childhood family cohesiveness and in-theatre symptoms because they may vary in moderating effects. Third, we did not examine whether the

observed protective effects of a supportive childhood family environment were mediated through enhanced in-theater social support and unit cohesiveness, although we have cited evidence in support of this prediction (Kang et al., 2016).

Conclusions

The present findings are novel with regard to the in-theater aspect of our assessment of stressors and symptoms but are consistent with a large body of empirical evidence linking positive aspects of the childhood family environment (i.e., cohesion), with protection against a variety of forms of stress-evoked mental illness (Solomon et al., 1987; Tsai et al., 2012; Gold et al., 2007). Our previous findings identified risk factors that may be modifiable in evidence-based interventions, notably, anxiety sensitivity (Cobb et al., 2017). Similarly, the present findings support calls for community programs and family-level interventions that target the supportive and cohesive aspects of the family environment in the service of promoting stress-resilience, as these protective effects extend not only to the war-zone, but across the lifespan.

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Mangroves in a Changing Climate: Texas Freeze Events and their Impact on Mangrove Ecosystems

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Climate change is altering the ways ecosystems function and survive, leading to drastic changes in ecosystem composition and services. During the 2021 Texas freeze in February, many plant species died due to the extreme cold. One such plant that was negatively impacted by the storm was the mangrove trees (*Avicennia germinans*) along the Texas coast. Mangroves play an important role in coastal ecosystem dynamics such as carbon sequestration and coastal erosion prevention which will be needed to combat future anthropogenic climate change issues. These mangroves are restricted in their range by cold weather, which may prove to be an issue as Texas' climate changes. This paper assesses how two freezes in January of 2018 and February of 2021 impacted mangrove populations in Port Aransas, Texas by utilizing Google Earth Engine and the Normalized Difference Vegetation Index (NDVI) to classify mangrove's health. The freeze in February 2021 was found to have had a more devastating impact on the mangroves, leaving most of them dead even a year later.

Introduction

Mangroves are a type of tree that live in or near the ocean and play an important role in the complex species interactions and landscape of the coastal environment. Mangrove forests are a habitat for many kinds of organisms ranging from fish, insects, birds, and benthic invertebrates which all interact with one another, forming a complex web of interconnectedness. Along with supplying particulate organic matter to the ecosystem, mangroves provide shelter from predators to the organisms that occupy their space. Since fish live in mangrove forests for a portion of their life, taking advantage of the protection and food resources before they move to other parts of the ocean, mangroves are also said to be linked to fisheries (Nagelkerken et al. 2008). Another useful aspect of mangroves is their ability to store large amounts of carbon in their soil because fallen organic matter, such as branches, builds up since it can't be decomposed by bacteria in water easily due to lack of oxygen. This type of carbon

sequestered in a marine environment is known as “blue carbon” and makes mangroves a carbon sink, meaning they take carbon out of the atmosphere. This can be extremely useful in the effort to reduce CO₂ emissions caused by anthropogenic reasons (Mcleod, 2011; Howard, 2017). Mangroves are also important in protecting the coast against storm surges. In a 2012 study by Zhang et al., a mangrove forest on Florida’s Gulf Coast attenuated storm surges from Hurricane Wilma. The amplitude of the surge decreased at a rate of 40-50 cm/km across the mangrove forest and without the mangrove zone, the inundation area would’ve extended 70% more inland if the mangrove forest was not present (Zhang et al. 2012).

While mangroves live in or near the ocean, they are only found on coasts near the equator where temperatures do not reach extremely cold temperatures. This is because mangroves thrive in higher temperatures and do not have a strong tolerance for cold snaps or freezes. With climate change increasing the Earth’s surface temperature, there has been a latitudinal expansion of mangroves further north and south of the equator as winters increase in temperature. This phenomenon has been studied with the black mangrove species (*Avicennia germinans*) in the Gulf of Mexico. One example can be seen on the east coast of Florida where satellite imagery from 1984-2011 showed the mangrove area at the northern end of its historic range had doubled in size due to a decrease in extreme cold events (Cavanaugh, 2014). This expansion can cause problems for the native plants and animals living in areas where mangroves encroach. One such study has found that this mangrove expansion has taken over saltmarshes in northern Florida and will impact the biodiversity, habitat loss, carbon cycling, and other ecosystem interactions that take place in these areas (Osland et al. 2013). Similarly, along the Texas coast, black mangroves have been taking over some salt marshes, decreasing the area of *Spartina alterniflora*, a species of marsh grass (Armitage, 2015).

While global warming may cause issues for coastal ecosystems as mangroves expand, what happens when there are freezes that occur in the Gulf of Mexico? In 2021, Texas experienced winter storm Uri that lasted from February 10th - 27th that was so intense it caused massive amounts of damage to Texas’ energy infrastructure. I wanted to know how this extreme and rare freeze impacted mangroves living in Texas, specifically in Port Aransas where temperatures dropped to -5°C. I then compared the response of the same mangrove population to a less severe freeze in 2018 where temperatures stayed higher than -3°C. During this time, an experiment on black mangroves in the Gulf Coast discovered that this species of mangrove experienced leaf damage below -4°C and mortality in temperatures below -7°C (Osland et al. 2020). As the temperatures in Texas during the 2021 freeze were in this range, I expected to see more mangrove mortality in 2021 than in 2018. Along with temperature, I wanted to compare mangrove health to precipitation and vapor pressure deficit (VPD) since they both affect plant evapotranspiration, photosynthesis, and thus overall plant function and health (Ficklin, 2017; Grossiord, 2020; Novick, 2016).

Methods

In order to calculate and visualize the health of the mangroves, I used satellite imagery. Specifically, I used the Google Earth Engine (GEE) GIS to visualize and calculate the Normalized Difference Vegetation Index (NDVI) from data collected by the Landsat 8 satellite. NDVI is an index that uses wavelengths from the near infrared (NIR) and red light spectrums to calculate the density of green vegetation using the equation, $NDVI = (NIR - RED)/(NIR + RED)$. Producing numbers from -1.0 - 1.0, NDVI visualizes land as barren or lush and full of green vegetation respectively. Landsat 8 was a perfect satellite for this project as it has a 30 m² spatial resolution and a relatively short temporal resolution of 16 days.

Google Earth Engine provides a script on their database website that calculates NDVI from Landsat 8 (Gorelick et al., 2017). I ran this script twice for each winter storm, 2018 and 2021. The first script calculated NDVI values for 16 days from October 10th, 2017 through October 1st, 2019. These dates were chosen because they gave me data before and after the freeze in January of 2018. The second script ran from October 7th, 2020 through the 19th of December 2021. Just like the previous script, these dates were chosen to analyze the health of the mangroves before and after the February 2021 freeze.

Once I established how I would analyze the mangroves and the timeframe I would focus on, I needed to select a location. I decided to focus on mangroves in Port Aransas, Texas because The University of Texas Marine Science Institute and the Mission-Aransas National Estuarine Research Reserve had already been researching the mangroves and local wetland ecosystem as well as collecting meteorological data, which I needed for further analysis. As this project was short term, I decided to work on a 153,627.85 m² patch of mangroves, adjacent to the Aransas Pass Lydia Ann Lighthouse, instead of the entire Port Aransas area. This patch, highlighted in Figures 1a and 1b, was chosen because it encapsulates an Eddy Covariance tower, located at 27°51'45.76"N, 97° 3'27.86"W, that my lab group had been using it to collect carbon flux data. By using this patch of land, I would be allowed to visit the site in person as it was already being used for research purposes.



Figure 1a: Google image of the study site in relation to Texas.



Figure 1b: Google image of the study site in relation to Port Aransas, Texas.

After running each set of code, Google Earth Engine outputs a colorized image of the NDVI values. I ran the code six times to obtain six images of the mangroves, one right before, one right after, and one a year after each storm (Figures 3a-e). Google Earth Engine also generated a time series of the NDVI values for each pixel inside my study area. However, I needed the NDVI value for the entire area of mangroves, not just each pixel. Using excel, I averaged the NDVI values for each pixel within the highlighted area for each date the satellite produced a usable image within the range of dates I selected previously. This meant I downloaded NDVI values for 174 pixels in total and averaged them all for 37 dates pre- and post-2018 freeze and 27 dates pre- and post-2021 freeze. I then created a line graph for each set of data to visually compare how the NDVI values changed before and after each freeze (Figures 4a and 4b). I also have photos from visiting the site in person that show how the mangroves have changed before and after February 2021 (Figures 5a and 5b).

Next, I wanted to compare the average NDVI values from the 2018 and 2021 datasets to average temperature, total precipitation, and vapor pressure deficit (VPD). I chose these three variables because they control plant function and therefore health. In order to obtain this information, I downloaded the meteorological data from the Mission Aransas National Estuarine Research Reserve (NERR) for each year from 2017 - 2021. Unfortunately, data was not available before and during the freeze in January of 2018, so only 2021 was analyzed. This data contained daily measurements every 15 minutes for atmospheric temperature, relative humidity, barometric pressure, photosynthetically active radiation, precipitation, and solar radiation. Using Google Colab, I calculated the daily averages for each of the listed meteorological factors. I also found the daily average VPD values using two equations incorporating temperature and relative humidity (Figure 2).

```
df['esat']=610.78*e**(df['ATemp']/(df['ATemp']+238.3)*17.2694) #saturation vapor pressure
df['VPD']=df['esat']*(1-df['RH']/100)
```

Figure 2: VPD equation in Google Collab.

These daily values were downloaded into excel and the temperature (°C), total precipitation (mm), and VPD were compared to the average NDVI values for the 2021 freeze. Three time series double-line graphs were made to visually compare average NDVI to each of the three parameters (Figures 6a, 7a, and 8a). Separate linear regressions between average NDVI and temperature, precipitation, and VPD were also created to further analyze the relationship between NDVI and each of these three variables. A total of three linear regression graphs were made for the 2021 dataset (Figures 6b, 7b, and 8b).

Results

The colorized images before and after each freeze were meant to visualize the NDVI values of the mangroves. The green color represents an NDVI value of 1.0, dense vegetation, and orange an NDVI value of -1.0, barren landscape. Figure 2a and 2b are before and after the freeze in 2018, and figures 2c and 2d are before and after the 2021 freeze. The 2018 images look very similar to each other and both contain majority green pixels. In the 2021 pre-freeze image, Figure 3c, there are mostly green pixels with a few yellow and orange pixels. In the post-freeze image, Figure 3d, there are no green pixels and instead only orange.



Figure 3a: Colorized NDVI image of the mangrove site on 10/16/17.



Figure 3b: Colorized NDVI image of mangrove site on 1/9/19



Figure 3c: Colorized NDVI image of the mangrove site on 10/7/20.



Figure 3d: Colorized NDVI image of the mangrove site on 3/6/21.



Figure 3e: Colorized NDVI image of the mangrove site on 12/19/21.

The time series graphs for the two freezes show two very distinct changes in the average NDVI. For the 2018 freeze, Figure 4a, there are fluctuations in the NDVI values, and no long-lasting change after January of 2018. However, in Figure 4b, the NDVI values have significantly dropped below 0.2 after the freeze in February of 2021 and have not reached the same value of around 0.5-0.6 like it was before the storm. The pictures taken in person also show the same result. Before the freeze, seen in Figure 5a, the mangroves were alive and green and a year after, seen in Figure 5b, the majority were completely dead with no leaves.



Figure 5a: The mangrove site November of 2020.
Photo taken by Dr. Ashley Matheny.



Figure 5b: The mangrove site on February 11th, 2021.

In the timeseries for the 2021 NDVI data and atmospheric temperature, there is one significant point where the NDVI values drop and stay below 0.2 after the temperature takes a step decline (Figure 6a). This is around February 18th, 2021, when the freeze occurred. After this date, the NDVI values stayed low and the temperature continued to change. The linear regression showed the most correlation between the two variables and had a R-squared value of 0.1648 (Figure 6b).

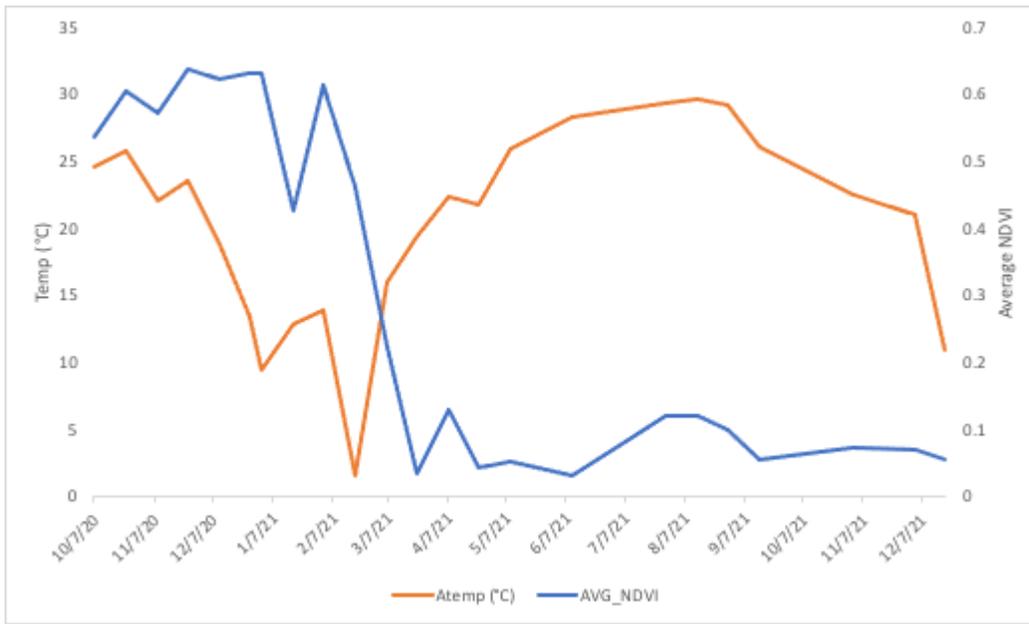


Figure 6a: Time series of temperature (°C) and NDVI from 10/7/20 - 12/19/21.

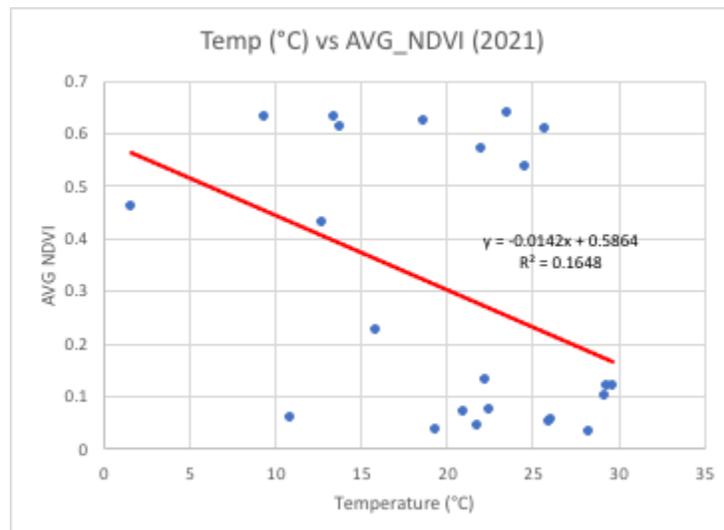


Figure 6b: Linear regression between temperature (°C) and NDVI from 10/7/20 - 12/19/21.

The 2021 NDVI data did not really change corresponding to the total precipitation over time (Figure 7a). There were multiple spikes in precipitation indicating multiple rain events, but it stayed low for the most part and NDVI did not seem to change at the same time as the precipitation. The linear regression also showed no correlation between the two variables and had a R-squared value of 0.0425 (Figure 7b).

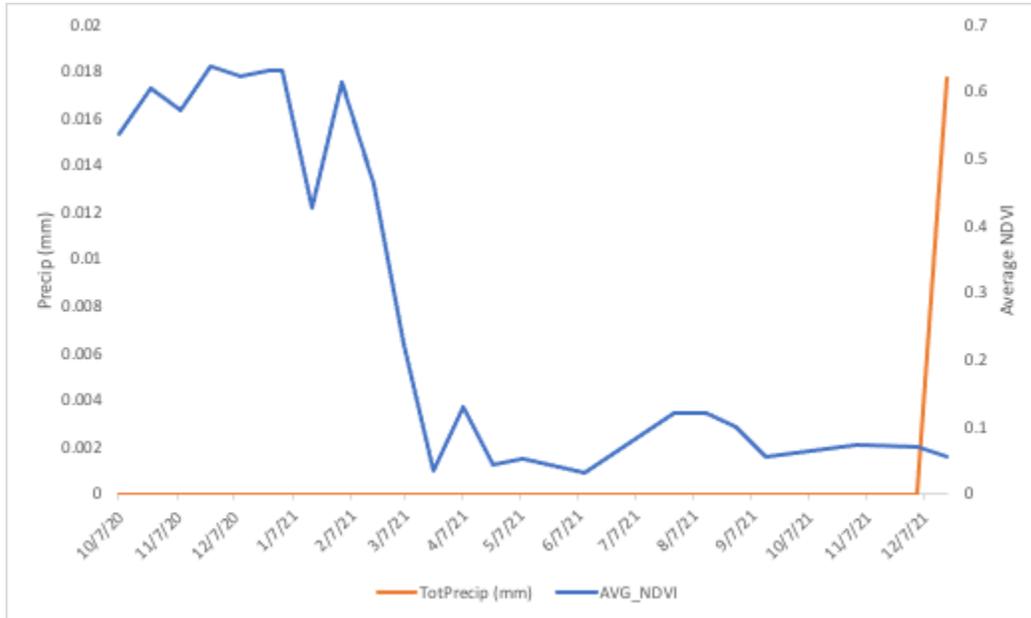


Figure 7a: Time Series of total precipitation (mm) and NDVI from 10/7/20 - 12/19/21.

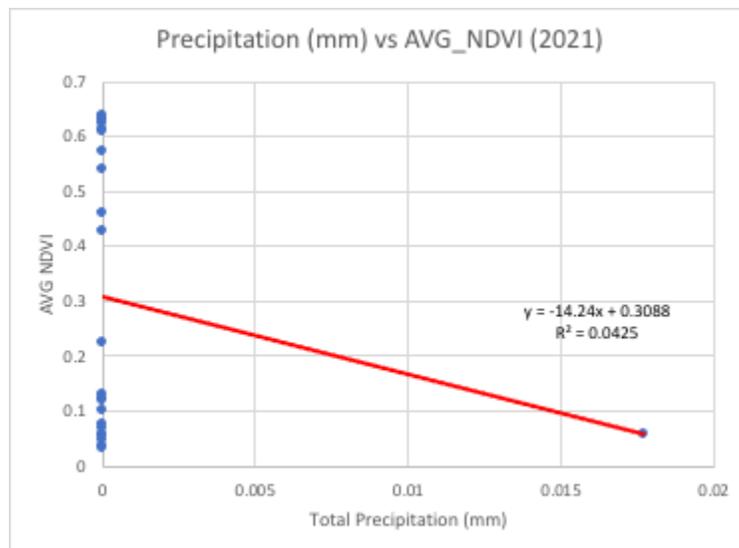


Figure 7b: Linear regression between total precipitation (mm) and NDVI from 10/7/20 - 12/19/21.

Finally, the timeseries for the 2021 NDVI data and VPD did not show much similarity either. After the NDVI dropped in February 2021, the VPD continued to spike and change, but the NDVI did not (Figure 8a). Just like the previous graphs, the linear regression showed no correlation between the two variables and had a R-squared value of 0.001 (Figure 8b).

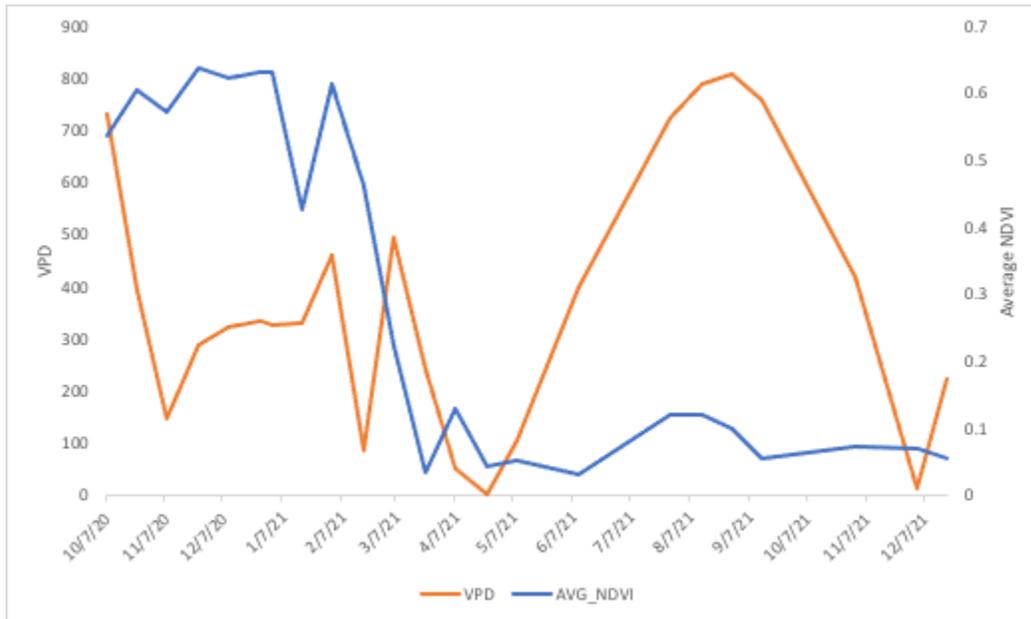


Figure 8a: Time series of VPD and NDVI from 10/7/20 - 12/19/21.

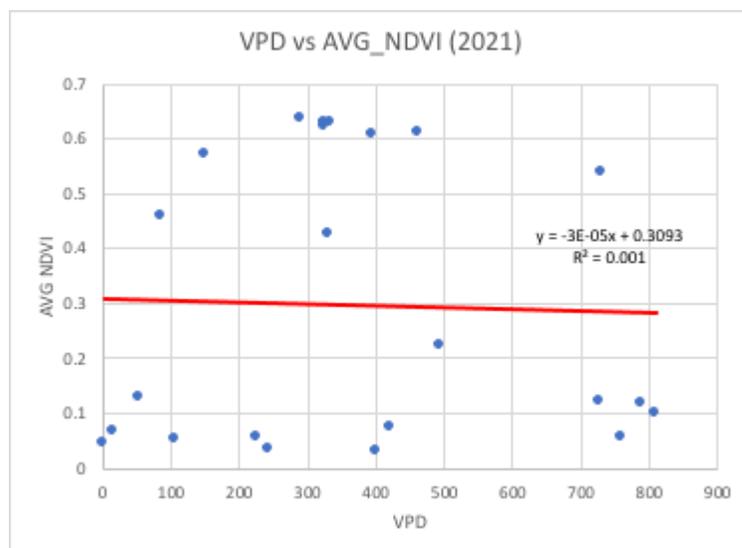


Figure 8b: Linear regression between VPD and NDVI from 10/7/20 - 12/19/21.

Discussion

The freeze in January of 2018 seemed to have had a more ephemeral impact on the mangrove population than the storm in 2021. The mangroves decreased in NDVI to about 0.1 around January of 2018, as seen in figure 4a. This means that their leaves dropped, and the satellite detected less green vegetation and more brown coloration from the bare leaves and soil. However, the colorized photos in figures 3a and 3b show that after a full year after the freeze the mangroves have bounced back and were as healthy and green in January 2019 as they were before January 2018. On the other hand, it is clear that the freeze in 2021 had devastated the mangroves in Port Aransas. In figure 4b the NDVI values drop around 0.6 to 0.03 after the storm in February of 2021 and have yet to rise back to the same values pre-freeze almost a year later. This storm killed such a large number of the mangroves in 2021 that there must not have been enough mangroves to repopulate the area in one year's time. Figures 5a and 5b show that the mangroves were indeed once green and thriving before February 2021 and have still not returned to that state as of February 2022. However, there is a small strip of approximately 20 mangroves that are alive on the edge of the study site. These mangroves may have been produced from seedlings that were buried in the ground during the freeze, able to stay safe from the chilling temperatures above ground. After the freeze had stopped, it's possible that the seedlings were able to sprout into the healthy trees. It is also interesting to note that as time went on after the storm the number of mangroves continued to decrease in NDVI. This could possibly mean that the mangroves took a while to drop their leaves or completely die off (Figures 3d, 3e, and 4 b).

Figures 7a-8b show that precipitation and VPD did not have any significant influence on the change in NDVI over time. This is likely due to the fact that precipitation is seasonal, and the mangroves had already died by the time the rain season in Texas started. Since they were dead, their NDVI values stayed constant as precipitation changed which gave the result of no correlation. Precipitation did not play a part in the mangroves dying after February 2021. VPD also did not play a major factor in the decrease in NDVI. This could be due to the fact that on a larger time scale, such as over a year, it can be difficult to show VPD's impact on NDVI as VPD changes very fast. Also, VPD is not fluctuating as much in Port Aransas because the location is on the ocean and the air is humid and full of moisture. Therefore, it is less likely that this would play a factor in causing stress for mangrove evapotranspiration and as a result mangrove health and greenness. Temperature and NDVI by far had the largest R-squared value at 0.1648. For meteorological factors, this R-squared value is good enough to show a significant correlation as there are many different factors that influence NDVI that work at different times of day and throughout the year alongside temperature. These other variables can influence the NDVI values as well, decreasing the correlation between temperature and NDVI. This result between temperature and NDVI is not shocking as the mangroves clearly lost their leaves and died following February 2021 when the major meteorological variable that changed was temperature.

The finding would align with the Osland et al. 2020 study stating that black mangroves experience leaf damage below -4°C and mortality in temperatures below -7°C which the temperature did reach during the freeze in February 2021.

Conclusion

Overall, the 2021 freeze had a harsher impact on the mangroves in this area than the 2018 freeze. Currently, one year later, the mangrove site has experienced very little to no growth of new mangroves except for the small patch on the edge of the study site. These mangroves might be enough to repopulate their immediate area, but this might take years to accomplish, especially if there might be an increase in the frequency and intensity of winter storms in the future (Cohen et al., 2021). The loss of so many mangroves in the Port Aransas area will no doubt have an impact on the local ecological system and function. How will coastal erosion be impacted by a loss of mangroves? Will marine life that rely on mangroves for habitat decline? Will the amount of carbon stored in coastal soil be released into the atmosphere? Perhaps the most interesting question is if mangroves will be pushed out of Texas completely and if so, will salt marshes regain the size they once had? The freeze in 2021 devastated the mangrove population in Texas and it will be important to study the long-term effects on Texas' coast.

Acknowledgments

Special thanks to Dr. Ashley Matheny, Maria Ulatowski, Ana María Restrepo Acevedo, Suvan Cabraal, and Caitlin Johnson for their advice and support while I worked on this project.

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The Historian as Curandera: Understanding Ethnic Studies as an Intervention to Curricular Violence

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Previous literature proves the curriculum in our K-12 classrooms teaches a set of ideals and principles that centers a white majority, enacting violence through acts of erasure. As a result, this research will survey the range of literature that shows white-majority curriculum enacting violence, suggesting Ethnic Studies as an intervention to this violence. The central question of my research asks, “How can secondary English and U.S. History teachers understand Ethnic Studies as a way to combat curriculum violence towards students of color?” This project will first define curricular violence, as it has not been defined in the context of academia/curriculum, and second leverage interviews from secondary English and U.S. History teachers to speak to curriculum violence towards students of color. I will generate various questions, gauging whether the participants' understand the curriculum as violent, and if so, what they think of Ethnic Studies as an intervention. I anticipate that my results could inform curricular development by providing a solution to the violent curriculum, and offer support for an Ethnic Studies centered curriculum in the classroom. The implications of my research look to give credence to the incorporation of Ethnic Studies into K-12 curricula.

Keywords:

Ethnic Studies, K-12 Public School, Classroom, Mexican American, Latinx, Education

Introduction

In the last year alone, attacks on Ethnic Studies have been constant as states like Texas actively try to pass legislation to ban Critical Race Theory from public education. Critical Race Theory (a term coined by Kimberlé Crenshaw) was a concept created to analyze the way race is socially constructed.² Through applying theories like Critical Race Theory scholars have revealed how much of K-12 education has

² Sawchuk, Stephen. “What Is Critical Race Theory, and Why Is It under Attack?” Education Week. Education Week, April 19, 2022. <https://www.edweek.org/leadership/what-is-critical-race-theory-and-why-is-it-under-attack/2021/05>.

contributed to a narrative that suggests only white European people are responsible for the creation of history. Being a Chicana and a woman of color, this meant that I didn't get to learn about my own community's successes until higher education. While in K-12 I learned that my Hispanic community was regarded as "lazy" and "illegal aliens"; terms, I realized, were meant to other Mexican Americans and use as a tactic of discrimination. I consumed stories that only taught me about my community in the context of oppression. Stories of success were saved for people who didn't live or look like me. Instead students like myself learned an official history that centers white values and perpetuates racial hierarchies. "Official history is designed to make sense of oppression, to say that the oppressed are oppressed because it is their nature to be oppressed"³, meaning, official history is crafting a narrative that leaves things out, on purpose. The official history of the United States begins in education. The stories that our curriculums offer credibility to are the ones taught to generations of students of color. These stories are rooted in whiteness that dictate our understanding of the nation. Examples of these stories include Columbus Day and the folklore of Christopher Columbus himself. Take to Google and you'd find that Columbus is described as an "explorer" who discovered America, which is a leap and a step away from what description he best fits, that being "colonizer", i.e. one who comes to settle and establish political control over a place and its people. In school my peers and I were taught to associate Columbus with "God, Glory and Gold". The three things that, according to education, would equate to the birth of a nation with no prior human life. The three G's, along with Columbus, would be the start of America, as we knew it. Similarly, when it came to learning about the 4th of July, also known as Independence Day, my peers and I were taught that this was a national holiday because it marked the moment all people became free and independent. Little did we know, on this day, black and brown people were still entrenched in servitude. Erasure of native knowledge and ways of knowing (i.e. subjugating knowledge), via colonialism, has long distorted history and in many cases, rewrote it with every new school cycle.

Education has long claimed to be a "great equalizer"⁴ in society, a balance wheel that holds equality in one hand, and colonialism in another. Colonialism, defined by the Stanford Encyclopedia of Philosophy, "is a practice of domination, which involves the subjugation of one people to another."⁵ An example of colonialism in history includes the Dutch, German, and French settling in South Africa, as well as British settlements in America. This practice of domination has shaped the way human beings interact with one another; playing a role in developments of racism, sexism, xenophobia, misogyny etc. Participating in everyday activities like receiving an education, voting, and even shopping means we are engaging with various aspects of colonialism. In each of these things we see a level of power that must be harnessed or tapped into in order to participate comfortably in that space. The power that comes from colonialism offers a unique privilege to white folks. This creates disenfranchisement that determines the

³ Morales, A. L. (n.d.). *The Historian as Curandera*.

⁴ Horace Mann (1848, as cited in Education and Social Inequity, n.d.)

⁵ Kohn, Margaret, and Kavita Reddy. "Colonialism." Stanford Encyclopedia of Philosophy. Stanford University, August 29, 2017. <https://plato.stanford.edu/entries/colonialism/>.

winner and loser in society, providing subtle messaging to minority groups that they ought to “know their place.” Today, this subtle messaging and act of subjugation starts in the classroom; in the education that children all around the country are receiving. Subjugating knowledge results in policymakers and world leaders alike, receiving a lack of education that makes them ignorant, creating harmful policy. When we subjugate knowledge we worsen the experiences of everyone in the classroom.

Curriculums do not subjugate and become violent by accident. It starts with society. Since the United States is a nation founded in colonialism, it relies on people of color to be both invisible and subjugated. Colonialism requires inequality but racism enshrines it. This is how our society becomes violent; not on its own but as a result of maintaining power dynamics. Subjugation starts with the establishment of an “official”⁶ history or narrative, this could also be seen as a “rewriting” of history. This is the same official history that has educated me, and students of color alike, on white values and racial hierarchies.

The problem is students of color are experiencing a subjugation of their communities' knowledge and in turn are experiencing violence in their education. To understand this violence, the research will uncover if it exists and if Ethnic Studies could be an intervention to this violence. Ethnic studies intervenes in colonialist teachings in classrooms. As students began to notice the violence and subjugation they were experiencing in the classroom, they fought for an education that represented their communities. Ethnic Studies is an interdisciplinary field that focuses on historically racialized groups in the United States. It promotes understanding among races, teaches students critical thinking skills⁷ and encourages students to uphold their own cultural identities⁸.

This research examines the following questions: To what extent do teachers understand the current K-12 Curricula as violent and/or harmful? If perceived as violent/harmful, do they view Ethnic Studies as a potential intervention? How can secondary English and U.S. History teachers understand Ethnic Studies as a way to combat curricular violence towards students of color? These questions are being asked because, what happens in education and how the classroom is structured, starts with teachers and the crucial role they play in shaping students into human beings. Seeing as much of colonization history starts with the classroom, the research will leverage interviews from secondary English and U.S. History teachers to gain first-hand experiences, and comments on the topics of violence and Ethnic Studies. The research questions are explored through the lens of my own lived experiences of being erased by education. The following stages will detail the steps that will be used to answer and

⁶ I am using quotations around official to note that I do not agree with the nation's history to be official, true, or the most authentic to the American people.

⁷ Sleeter, Christine E. *The Academic and Social Value of Ethnic Studies: A Research Review*, n.d.

⁸ “Culturally Relevant Pedagogy.” Culturally Relevant Pedagogy - Educator Excellence (CA Dept of Education). Accessed May 7, 2022. <https://www.cde.ca.gov/pd/ee/culturalrelevantpedagogy.asp>.

explore these questions: Literature Review, Methods, Discussion & Findings, and Conclusion.

Literature Review

The Legacy of Ethnic Studies

Starting in the 1960s, with the Civil Rights Movement and the desire of students of color to be seen and acknowledged in their education, Ethnic Studies was forged through academic programs and courses. The growing self-awareness kicked off with a push to teach Black Studies in universities. In 1968, the advocacy for Ethnic Studies catapulted the longest student strike in US history. The strike took place at San Francisco State University, led by the Black Student Union and a coalition of students, known as the Third World Liberation Front. It lasted five months. Students were fighting for demands that would create a new curriculum recognizing the history and culture of all Ethnic minorities. In 1998, Ethnic Studies was advanced in the Tucson Unified School District (TUSD) with the creation of The Mexican American Studies (MAS) program. MAS was offered to elementary, middle, and high school students.

In 2011 the state of Arizona banned the MAS program in the TUSD district and students took over the school board meeting, calling for the program to be reinstated. In 2014, El Rancho Unified School District became the first school system in California to require students to take an Ethnic Studies course in order to graduate. In 2014, Ethnic Studies continued to get established in the Los Angeles Unified School District (LAUSD) as they voted to make Ethnic Studies a graduation requirement here as well. Come 2016, Ethnic Studies gained legitimacy and California Governor Jerry Brown, required California's Instructional Quality Commission (IQC) to create a guide to teach classes on Ethnic Studies. By 2019, every high school student in the state of California had to take a class in Ethnic Studies in order to graduate.

More recently, in 2018, a success for Ethnic Studies came with the recent victory by the Committee on MAS PreK-12 that sits under the Texas State Board of Education. This committee fought to get Ethnic Studies, the first MAS course in Texas, approved by the Texas State Board of Education on April 13th, 2018. Dr. Angela Valenzuela's "Equity and Excellence in Education"⁹ article provides a recount of how the Committee on MAS PreK-12 gained the victory to get Ethnic Studies in Texas classrooms.

⁹ Valenzuela, Angela. "The Struggle to Decolonize Official Knowledge in Texas' State Curriculum: Side-Stepping the Colonial Matrix of Power." *Equity & Excellence in Education* 52, no. 2-3 (2019): 197-215. <https://doi.org/10.1080/10665684.2019.1649609>.

Now, in 2022, activists and those in opposition to Ethnic Studies are going head-to-head as states like Texas engage in conversations around the banning of Critical Race Theory and Ethnic Studies alike. However, the groundbreaking work that organizers, scholars, and students alike have engaged in, have still led to states adopting new legislation that integrates Ethnic Studies programs across the country. The State of Texas just addressed legislation, making Ethnic Studies a part of graduation requirements. Overall, the fight for Ethnic Studies is a long and lengthy battle that continues to prove to be one worth the fight. With every new development around this issue, students are one step closer to learning about themselves and their cultures in the classroom.

Ethnic Studies as an Intervention

Considering previous historic context, this research suggests that Ethnic Studies is a necessary intervention to address the harm of subjugated knowledge and colonialism in the classroom. Ethnic Studies challenges subjugated knowledge by allowing students to share their stories and in turn do what Fernandez describes as “raising the individual’s consciousness of common experiences and open up the possibility for social action.”¹⁰ Curriculum today silences non-white narratives and Ethnic Studies liberates it. The intervention is then important because it allows for cultural storytelling, a type of storytelling that Fernandez finds as both liberating and necessary for survival. For in those pockets of storytelling exist “sites of oppression and sites of resistance”¹¹ where students of color reimagine their futures outside of the context of oppression and colonialism. Allowing themselves to dream.

Ethnic Studies history provides evidence that combatting curricular violence, is not only possible but actively happening. This is something found by Tintiangco-Cubales, Kohli et al in “Toward an Ethnic Studies Pedagogy: Implications for K-12 Schools from the Research”, when they examined effective Ethnic Studies pedagogy. In their research they found that students engaging in Ethnic Studies courses “recognized the importance of building relationships with their students and students’ parents and community.”¹² Regardless of race or identity, students had established a new investment in the cultures and people around them.

Additional scholars like Christine Sleeter have shown how “research finds that the overwhelming dominance of Euro-American perspectives leads many students to

¹⁰ Fernández, Lilia. “Telling Stories about School: Using Critical Race and Latino Critical Theories to Document Latina/Latino Education and Resistance.” *Qualitative Inquiry* 8, no. 1 (2002): 45–65. <https://doi.org/10.1177/1077800402008001004>.

¹¹ Ibid

¹² Tintiangco-Cubales, Allyson, Rita Kohli, Jocyl Sacramento, Nick Henning, Ruchi Agarwal-Rangnath, and Christine Sleeter. “Toward an Ethnic Studies Pedagogy: Implications for K-12 Schools from the Research.” *The Urban Review* 47, no. 1 (2014): 104–25. <https://doi.org/10.1007/s11256-014-0280-y>.

disengage from academic learning.”¹³As mentioned previously, when students fail to see themselves in their education they become uninterested, checking-out of their education altogether. Through tools like Ethnic Studies we find what Orozco calls, a “mechanism through which non-Whites can claim some form of property and inclusion in schools.”¹⁴ This alone points to Ethnic Studies as a successful tool of student liberation. Thomas Dee and Emily Penner further prove this through their own research where they found that Ethnic Studies had the capacity “to unlock the educational potential of historically marginalized students.”¹⁵ In many ways Ethnic Studies is the launchpad for educational success and attainment for students of color acting as a necessary prerequisite to student success.

Scholars like Julio Cammarota have found that the “contention is that young people of color in particular have a second sight deriving from marginality based on both racial difference and youthfulness.”¹⁶ Similar to the idea of code-switching, marginalized students/students of color are finding themselves in roles where they position their identity in both the role of the oppressed and that of an autonomous individual who can act outside of the limitations of their oppression. This “second sight stems from marginalization and presents the possibility of recognizing how oppression operates in society.”¹⁷ Students are learning just how powerful knowledge is. “Once knowledge is gained, the student feels [they have] the consciousness to recognize injustice.”¹⁸ Ethnic Studies then acts as a catalyst for students to challenge educational norms that perpetuate racial hierarchies allowing them to become more aware of the opportunity gap that exists because of the “white-centered” curriculum. We are seeing students from all backgrounds coming to understand how their education does not reflect their own lived experience and realities.¹⁹

In understanding Ethnic Studies as an intervention to the harm students of color are experiencing in the classroom, this research focuses on subjugated knowledge because of the way classrooms and education alike, are a source of knowledge

¹³ Sleeter, Christine E. *The Academic and Social Value of Ethnic Studies: A Research Review*, n.d.

¹⁴ Orozco, Richard A. “‘It Is Certainly Strange...’: Attacks on Ethnic Studies and Whiteness as Property.” *Journal of Education Policy* 26, no. 6 (2011): 819–38. <https://doi.org/10.1080/02680939.2011.587540>.

¹⁵ Dee, Thomas, and Emily Penner. “The Causal Effects of Cultural Relevance: Evidence from an Ethnic Studies Curriculum,” 2016. <https://doi.org/10.3386/w21865>.

¹⁶ Cammarota, Julio. “The Praxis of Ethnic Studies: Transforming Second Sight into Critical Consciousness.” *Race Ethnicity and Education* 19, no. 2 (2015): 233–51. <https://doi.org/10.1080/13613324.2015.1041486>.

¹⁷ Cammarota, Julio. “The Praxis of Ethnic Studies: Transforming Second Sight into Critical Consciousness.” *Race Ethnicity and Education* 19, no. 2 (2015): 233–51. <https://doi.org/10.1080/13613324.2015.1041486>.

¹⁸ Ibid

¹⁹ Tintiangco-Cubales, Allyson, Rita Kohli, Jocyl Sacramento, Nick Henning, Ruchi Agarwal-Rangnath, and Christine Sleeter. “Toward an Ethnic Studies Pedagogy: Implications for K-12 Schools from the Research.” *The Urban Review* 47, no. 1 (2014): 104–25. <https://doi.org/10.1007/s11256-014-0280-y>.

production. While most concepts of coloniality, a concept interrelated to the legacies of colonialism,²⁰ or harm, are all connected to colonialism. Before the research proves that the curriculum in secondary English and U.S. History classrooms subjugate knowledge, we must begin with talking about colonialism. Colonialism is a system of power that relies on the bolstering of white people and the subjugation of people of color. A relationship between colonialism and violence is established as the act of colonizing or the domination/controlling of someone or something can be seen as violent and/or harmful. This relationship brings us to curricular violence. Curricular violence, defined in this research, is the harm of learning non-white peoples are unworthy, or less than. In the context of the English and U.S. History classroom, curricular violence is the act of claiming Indigenous/marginalized identities as inferior through the curriculum; resulting in direct harm to those communities.

Curricular Violence

Though this research is the first to define curricular violence, scholars have already determined that in fact the structure of many state curriculums in the United States does focus on a “colonial imaginary [that] assumes that a nation’s people share the same history and identity”,²¹ leaving out any knowledge and Indigenous ways of knowing that do not fit. Focus on the colonial imaginary is commonly known as what Angela Valenzuela refers to as a colonial matrix, resulting in education systems and teachings being grounded in settler colonialism. Settler colonialism is “a type of colonialism shaped by the fact that European colonizers came to stay.”²² We ought not look at colonialism as a past historic event but something continuously happening today, in and with social structures. The concept of colonial matrix is also a reflection of curricular violence as it explains exactly how students learn about the power dynamics between people of color and white identities. The knowledge students are learning “acts in the interior of [the] imagination of the dominated (i.e. non-white students)... and of the dominant group (white students), equating to a consciousness that presumes dominance.”²³ This is an example of curricular violence as it positions certain ethnic groups as less than when compared to white groups, sending subliminal messaging of which groups do and do not hold power in society. Colonialism then causes harm and

²⁰ Colonialism is a practice of control by people or power over other people often by establishing economic dominance. In the process of colonization, colonizers may impose their religion, language, economics, and other cultural practices.

²¹ Hernández-Avila Inés, and Cantú Norma E. *Entre Guadalupe y Malinche: Tejanas in Literature and Art*. Austin: University of Texas Press, 2016.

²² Calderon, Dolores. “Uncovering Settler Grammars in Curriculum.” *Educational Studies* 50, no. 4 (2014): 313–38. <https://doi.org/10.1080/00131946.2014.926904>.

²³ Valenzuela, Angela. “The Struggle to Decolonize Official Knowledge in Texas’ State Curriculum: Side-Stepping the Colonial Matrix of Power.” *Equity & Excellence in Education* 52, no. 2-3 (2019): 197–215. <https://doi.org/10.1080/10665684.2019.1649609>.

violence by the way it shapes learning into an “empire-type of imagined community,”²⁴ one that focuses on power, deeming anything non-white invisible or inferior. Knowing that the colonial matrix functions as a result of, and is linked to colonialism, takes us one step closer to understanding the full picture of how colonialism leads to curricular violence.

With scholars and researchers like Calderon, the concept that colonialism leads to a violent curriculum is able to be further explored by her own definitions of settler colonialism. Calderon describes settler colonialism as something that promotes a European state of mind and has painted a specific type of “rich” history, in classroom textbooks. The idea that settler colonialism begins in classroom textbooks, provides a new lens to analyze curricular violence with. Calderon found that “US social studies textbooks...promote a particular type of American nationalism identity,”²⁵ an identity that casts a negative light on Indigenous and non-white communities in education. Calderon’s analysis further explains why it is that when we learn of historic events of colonialism, we read narratives describing how those who dominated Latinx, and Black, Indigenous, People of Color (BIPOC) are “justified and found a way to see their dominance as not only legitimate but as the only acceptable option.”²⁶ Textbook recollection of history doesn’t just fluff the narrative of colonialism (as an historic event) but it treats those who were colonized and their experiences as “other.” It’s inferred that the “othering” of non-white experiences in education and through textbooks is purposeful. “The radical absence of the ‘other’ not only postulates an atomistic image of social existence; it denies the idea of the social totality”²⁷ completely omitting non-western thought as true and/or a part of the whole nation’s history. “Othering”, then regulates minority groups as simple ‘subjects’ “unequal... inferior, by nature.”²⁸

A curriculum is violent because it subjugates knowledge via acts of erasure, whether through the histories taught or stories read to students. When a non-white experience is erased, it is subjugated knowledge. Defined by Susan Mann, subjugated knowledge is the knowledge of marginalized groups that have been “buried, silenced, or deemed less credible by dominant groups and their narratives.”²⁹ Foucault in *The History of Sexuality* (1980), refers to this subjugated knowledge as “naive knowledge.”³⁰

²⁴ Calderon, Dolores. “Uncovering Settler Grammars in Curriculum.” *Educational Studies* 50, no. 4 (2014): 313–38. <https://doi.org/10.1080/00131946.2014.926904>.

²⁵ Ibid

²⁶ Morales, A. L. (n.d.). *The Historian as Curandera*.

²⁷ Quijano, Aníbal. “Coloniality and Modernity/Rationality.” *Cultural Studies* 21, no. 2-3 (2007): 168–78. <https://doi.org/10.1080/09502380601164353>.

²⁸ Ibid

²⁹ Mann, Susan A. “Pioneers of U.S. Ecofeminism and Environmental Justice.” *Feminist Formations* 23, no. 2 (2011): 1–25. <https://doi.org/10.1353/ff.2011.0028>.

³⁰ “Foucault’s the History of Sexuality.” *Understanding Foucault, Understanding Modernism*, n.d. <https://doi.org/10.5040/9781501323621.ch-006>.

Thus it should be noted that all knowledge is socially situated and is birthed from locations of power. Defining subjugated knowledge is important to understanding how colonial knowledge and narratives get deemed as true, acceptable, and proof of “American values” in the classroom. Linked back to Calderon’s analysis of the U.S. History textbooks, subjugated knowledge is purposefully crafted in order to create a national identity that’s white, Anglo, and protestant; not representative of all identities of that nation. Furthermore, the understanding of subjugated knowledge sheds light on why institutional structures like the Texas State Board of Education describes knowledge outside of colonialism, and courses like Mexican American Studies, as “divisive” and “unamerican.”

Imagine being a student of color in public school. You are told your whole life, starting in grade school, that you, your community, and culture are less than. You aren’t told this outright but you are conditioned by the books you read, the histories you learn, and the overall goal of the classroom when only white experiences are shared. Whether you realize it or not, your experience as a non-white student is being left out and, as we now know, purposefully erased. But why does this matter? If history has proven anything, the reason white identities make up the majority of CEO positions, Presidents of the United States, non-incarcerated peoples, actors/actresses on tv and in movies, etc. is because they have been conditioned since pre-K for success. They are first-hand examples of what happens when students learn about their experiences in education... the sky’s the limit. When education doesn’t include you, the opposite happens. Instead of students learning about people that look like them in successful spaces, they see their non-white identity overpopulated in jails, houseless, oppressed, or simply seen as “less than.” A lack of representation is crucial to making sense of how knowledge of the self is informed and developed by the power dynamics of the classroom. Students of color never get to imagine or even dream of what they could become. They are constantly being told that the success/excellence of their community has not, and will never exist. While the current education system may not teach it, non-white excellence does in fact exist, and it’s weaved into the stories that are taught and told through Ethnic Studies.

In the paragraphs to come, as this research transitions to analyzing the data collected, there will be a focus on public school education, specifically the curriculum in secondary English and U.S. History classrooms. It has begun with the analysis of scholarly work that you’ve just read, all of which provides context to curricular violence. Next, interviews with secondary English and U.S. History teachers will be used to analyze to what extent teachers understand what scholars have found, that being the current K-12 Curricula as violent and/or harmful. In this interview analysis stage, the research hopes to uncover if these teachers view the curriculum as violent, and if so, that they recommend Ethnic Studies as a solution and/or intervention to this violence.

Methods

The following section will detail the stages that will be used to answer and explore the research questions.

Define & Apply:

As referenced in the literature review, this project seeks to first define curricular violence. Next this research will provide definitions based on academic scholarship for the following words: subjugated knowledge, colonial matrix, and Ethnic Studies. For the contexts of colonialism and how it functions in the curriculum, we can expect that a basic understanding of colonialism can be applied to analyzing how the classroom erases marginalized communities. Through the application portion of the research, I'm interested in unraveling how teachers find Ethnic Studies intervenes within the context of subjugated knowledge, and the colonial matrix in the classroom.

Interviews:

For this study, I conducted interviews with teachers that taught secondary English and U.S. History at a public school in the North East Independent School District (NEISD) in San Antonio, Texas. This area was selected as it's the area I grew up in and experienced my own memories of erasure from education. To better understand the demographics of the district I'll reference a 2018 Texas Tribune article that stated NEISD had 64,215 students. "45.1% of students were considered at risk of dropping out of school. 16.8% of students were enrolled in bilingual and English language learning programs."³¹ This information allows us to infer the demographics of the schools these teachers teach at and the identity make up of the students being taught by the teachers interviewed.

I conducted semi-structured virtual interviews with five teachers I previously met, knew, or were taught by. Three identified as women, two identified as male. Four White, one Hispanic. This is a convenience sample because these are teachers who know who I am and whom I could easily reach out to. Conversely, this is a purposeful sample because these teachers taught me and/or my peers directly and played a role in our own identity development. In my experience, this identity development was crucial in crafting how I would navigate the possibility of college and any future careers that were dominantly white centered. My educational experience would go on to dictate what I deemed possible for myself and my community.

³¹ <https://schools.texastribune.org/districts/north-east-isd/>

Each interview lasted at least 30 minutes. In the interviews, I asked teachers questions about their teaching experience, their responsibilities in their community, the demographics of their students, and about the state curriculum and Ethnic Studies. As the participants answered the questions I transcribed.

Though it's one community of teachers, this is valuable as a single community can reflect a larger lived experience of hundreds of students who have similar experiences. These perspectives, however limited they may be, are necessary for explaining what's taking place in the classroom. Interviewing these participants was particularly important as they are teachers who are experts in these subjects. They're the ones who are reproducing, consciously or unconsciously, the curriculum. Essentially all teachers are doing the best they can, this research will just highlight this through varying perspectives.

The research analyzed how courses like Ethnic Studies could provide a positive impact and solution to students of color being left out. It is assumed that the teachers participating have heard of the terms such as colonialism and Ethnic Studies and understand it in some context. Through the interview process, these words are embedded in the questionnaire for participants to respond to or speak on. For example, I posed questions such as the following: What adjectives or descriptors come to mind as you think about the curriculum as exclusionary? Does the concept of colonialism or assimilation resonate in the context of your feelings about the curriculum? Do you see a benefit to Ethnic Studies being taught in the classroom?

Coding:

Once all interviews were complete, I began manually entering each transcription into a coding software. The initial set of codes were developed directly from the interviews. Any common themes that were being repeated or mentioned by participants were added to my list of codes. The codes were created based on things mentioned by participants. For instance, the curriculum representation code included mention of the terms, "non-inclusive", and "exclusionary." By allowing codes to form directly out of the interviews, I was able to remove any personal bias and work off of direct participant responses. Once it was clear which themes were being commonly stated, I moved to highlight excerpts that matched and responded to the codes. I continued this type of coding for all five interviews. By doing this, I was able to create an exhaustive set of codes and themes to pull from. I found approximately 16 codes and then broke those down into the following three buckets: Curriculum Representation, Effects of Subjugated Knowledge, and Overall Response to Ethnic Studies.

I focused on how teachers found their curriculum to be representative of their students and of the world today. I then followed up with how these teachers felt about Ethnic Studies as a response to making the curriculum more representative. By doing this, I was able to find the overall themes that matched the participants' descriptions. Generally the codes fall into three themes.

The following are examples of quotes from which I pulled each theme:

Curriculum Representation -

“I do think the K-12 system prefers Protestant White Americans. Just look at your required readings, how many come from people of color? When we look at U.S. History, we look at it through the experience of Anglos. As a Hispanic educator when I see terms as ‘WE’, I already know that that is not including me.” Rocky

Effects of Subjugated Knowledge -

“If we are excluding the [BIPOC] experience then all those students are unseen and feel neglected about whatever we are discussing. We are authorizing³² specific groups. If we aren't reading Black or Asian authors, it is detrimental to our kids... they're unable to identify or connect which means they would drop out of school because it's not relevant to them” Peewee Herman.

Overall Response to Ethnic Studies -

“If I had Ethnic Studies I don't think I would be wondering why black people are so angry. I don't ever remember learning about the Japanese Internment camps, of course, you learn about the Holocaust in Germany but I didn't even hear about [Native Americans] being displaced from their lands and I think those kinds of things are really important for us to understand.” Kitty

Discussion & Findings

Before analyzing interviews with participants, I'm going to provide demographics that offer context for participant quotes.

Demographics of the students of the participants include a makeup of 15-22% Black Students and 40% Hispanic Students. Majority of the participants taught at a high school that they referred to as “extremely diverse...mostly White/Hispanic kids and Black kids. Not a huge Asian or Indigenous population” Hannah. This information is crucial to the research's understanding of why participants are saying certain things and sharing specific experiences on behalf of their students.

In examining interviews with Secondary English and U.S. History Teachers, I have broken down the transcripts into the following three main themes: Curriculum Representation, Effects of Subjugated Knowledge, and Overall Response to Ethnic Studies. These will be the themes in which I analyze further.

³² In this context, authorizing can be understood as legitimizing one group over another.

Curriculum Representation

Nearly all interviewees described the curriculum as unrepresentative of their students. In English, participants shared that “For on level³³, we are looking at anything written by an old White man... for AP³⁴, they are actively trying to change that but historically it’s also old White men as well” Peewee Herman. This participant is explaining that regardless of how advanced a course was, all content being consumed was White centered. Another participant mentioned that while Black authors were being read in their classroom, they, along with their students, still noticed a disconnect. “In English 2, we don’t even address Black History Month. We do read a diverse amount of literature but we don’t address it as *that’s* what we’re reading about” Kitty. By “*that’s*” the participant is referring to the mention of historic context and identity, race, ethnicity or the like, of the authors being read. This lack of identity recognition resulted in the following experience: “I had a student get angry at me because he was Black and I didn’t recognize that he was Black and treat him as such. It was a real eye opening experience for me. That I didn’t make a big deal about Black History Month, was what started it all. I said ‘we read Black authors all year long, why would I just do in February’ and I guess what he wanted me to do was make a big deal about it in February pinpointing ‘hey this is a Black author’” Kitty. As the interviewee recalled this experience to me, I couldn’t help but picture a young boy shouting to be seen and acknowledged. Through his anger, he was fighting for what students like myself had long hoped for ourselves. He wanted to be seen in his education. More importantly, this student wanted his community to be seen by his peers. During the interview, as this experience was shared, I noticed a shift in the participants’ recollection, almost as if they too felt the pain their students expressed to them. This vulnerable and gut-wrenching experience is the reason this research began. This was an experience of one student, but every new school year, there are more and more students getting left behind, drowning in the tide of whiteness and erasure. Not all are brave enough to stand up for what they need.

In the U.S History classroom, one participant found that “materials developed to support instruction of curriculum, excludes groups” Morgan Freeman. The participant was a part of a group that chose textbooks for their school. During this experience, they noticed that the state of Texas didn’t have a lot of time to vet sources or look over books. This resulted in the teaching of materials that exclude stories of communities of color.

Amongst the combined 60.5 years of teaching, participants found that the curriculum didn’t just exclude their students of color, it bolstered and reinforced the power dynamics of their White students. Relating back to Dr. Angela Valenzuela’s

³³Students not in advanced placement but rather on track for their grade.

³⁴AP stands for Advanced Placement. A program that allows students to earn college credit prior to graduation.

theory of colonial matrix³⁵ and Dr. Dolores Calderon's definition of settler colonialism,³⁶ these are real world examples of ways BIPOC communities have been left out and isolated from their education. According to one interview, "I do think the K-12 system prefers Protestant White Americans. Just look at your required readings, how many come from people of color? When we look at U.S. History, we look at it through the experience of Anglos. As a Hispanic educator when I see terms as 'WE', I already know that that is not including me" Rocky. This highlights a response to whether participants felt the curriculum was exclusionary or representative of their students. Through personal and/or the experiences of their students, each participant answered the question while providing insight on the critical effects of an exclusionary curriculum. Each quote further emphasizes why curriculum representation is necessary and affirms that students are being failed by their education.

Effects of Subjugated Knowledge:

Subjugated knowledge is the knowledge of marginalized groups that have been "buried, silenced, or deemed less credible by dominant groups and their narratives." An example of this is seen through the following quote: "Hispanic families don't make it to summa night.³⁷ Our black students aren't going to be hand in hand with their parents" Rocky. In this excerpt, a participant is recalling a memory from a ceremony honoring students achievements, where they noticed the harm their students experienced when they saw themselves and their communities as less than, compared to their white peers in these spaces. It's dangerous when "the only time a Hispanic seems themselves is when we're crossing a river or in cages ... every time I saw Black and Brown Americans it's in an area of stress (i.e. slavery) these narratives make students feel helpless." Students of color never see themselves in successful positions and instead are consumed with narratives of being helpless against white power. Ceremonies are especially important as they make students feel a sense of belonging. Not attending ceremonies and events like these are indicative of the lack of belonging students may experience in education. It is no wonder that once students of color find themselves in successful situations, in this case at a ceremony celebrating their achievement of graduating with honors, that they hold shame for their communities. Whether consciously or not, they are distancing themselves from people that look like them in order to stay in what they've been taught, are positions of success and power. Positions that they have only ever seen as white. It can be inferred then that due to the subjugated knowledge that tells students their BIPOC communities are less than their white peers, students of color are leaving their identities at the classroom door, working

³⁵ According to Dr. Angela Valenzuela, a Colonial Matrix is when education systems and teachings focus on a colonial imaginary and are grounded in settler colonialism.

³⁶ According to Dr. Dolores Calderon, Settler Colonialism is something that promotes a European state of mind and has painted a specific type of "rich" history, in classroom textbooks.

³⁷ Also known as a "summa ceremony". This is when students are recognized for graduating with honors.

toward Americanizing and whitening how they show up. “I’ve noticed ... students feel that for them to be successful they must distance themselves from their families because their families are never depicted as a symbol of strength in our systems. Every time we talk about Black and Brown people we have to help them and in fact makes you feel like you’re helpless without the Whiteman or White saviors who come to the ghettos” Rocky. These interviews demonstrate how self-hate is both learned and taught to students in the curriculum.

Through the recalling of these observations, participants related the effects of subjugated knowledge to curricular violence. Curricular violence, defined by this research, is the harm of learning non-white peoples are unworthy, or less than. According to one interview, “if we are excluding the [BIPOC] experience then all those students are unseen and feel neglected about whatever we are discussing. We are authorizing³⁸ specific groups. If we aren't reading Black or Asian authors, it is detrimental to our kids... they're unable to identify or connect which means they would drop out of school because it's not relevant to them” Peewee Herman. Students are being excluded from their education, and as a result are being encouraged to check out of school altogether. It is inferred that the previously mentioned 45.1% of students who were considered at risk of dropping out of school, was as a result of the education they received in the classroom. Here, Peewee Herman is calling attention to something many teachers experience, that being, when students feel left out of their education and what they’re learning, they become uninterested and look for narratives outside of the classroom that may better reflect their experience. In this case, that search results in high school dropouts. More importantly, it sets the scene for what other scholars have explained as the school-to-prison pipeline system³⁹.

No matter the case, with every interview came new examples of harm students were experiencing because of the curriculum in the classroom. Participants were mentally coming to terms with what the body of literature has already argued, that students are being harmed by the erasure of their communities in their education. Participants even shared cases of assimilation. “Because of the nature of [programs like] AG⁴⁰, students drop their identity to get along with that community that is 80-90% White” Rocky. When students of color found non-white narratives invisible or inferior in spaces they entered, they showed up as close to White as possible, in order to gain acceptance. This is reflective of a common experience students of color face in education. As soon as students get to school, as young as age 4, they are told to assimilate and try their best to erase their marginalization. As students, whether we consciously know it or not, our goal from Pre-K on is to move as far away from the margins as possible. What exists in the middle is a whole lot of Whiteness, something most of us are not. The battle then is, do we, as students of color, continue to put up a

³⁸ In this context, authorizing can be understood as legitimizing one group over another.

³⁹ The tendency of minors and communities of color to become incarcerated because of educational inequality in the United States.

⁴⁰ Agricultural Education that teaches about agriculture, animal science, horticulture, and land & wildlife management.

fight to be a part of our own education, or do we seek experiences that, though systemically are deemed “bad” and “lesser” choices, have groups of people that look like us.

All of the quotes shared show the real-life effects of Subjugated knowledge. Each one shares a new intimacy of the way marginalized students are being buried, silenced, or deemed less credible by their education. The question is, do students fight to be seen or give into the silence?

Overall Response to Ethnic Studies

Overall, these conversations with teachers confirmed the need and want for Ethnic Studies. Where the curriculum failed to include students, Ethnic Studies offered a safe oasis. “Ethnic Studies would allow a lot of students to actively know and learn about different races, cultures, and groups... we become better people when we understand and know about each other” Peewee Herman. While Ethnic Studies is beneficial to students of color, it is also a great way to educate and inform our White students. Ethnic Studies allows all students in the classroom to become better scholars and global citizens. Learning about various groups, races, and identities at an early age will equip students with the skills to better navigate adulthood.

When all participants were asked if they thought Ethnic Studies could offer an intervention to the exclusionary curriculum they all agreed that Ethnic Studies was an intervention and should be taught in the classroom. When asked if Ethnic Studies should be incorporated and taught in the classroom the participants shared the following:

“I’m all for it. I love it... and I hope as they become more established we will have more resources to pull into required courses” Hannah.

“I think Ethnic Studies should be taught especially now as our communities become more diverse. If we aren't learning about where everyone else comes from, we aren't doing anyone a favor because we are staying in a safe space” Peewee Herman.

”I think it's awesome. I think our population is a lot more diverse than we're led to believe... From my experience, if we include that as a part of the narrative, it helps students understand the history of the world” Morgan Freeman.

“Definitely there should be Ethnic Studies... so we can understand where people are coming from and what their families have gone through... it opens a dialog for kids who may not feel comfortable just speaking about things” Kitty.

“It is long overdue to have Mexican American Studies, African American Studies, and Asian American Studies... everyone else took 12 yrs. of American Studies, they can take one semester of MAS”⁴¹ Rocky.

When it came to the role Ethnic Studies could play in the classroom relating to student achievement teachers found that Ethnic Studies courses offered more diversity in the curriculum and options to students. “The more diversity you have and opportunities in education would help alleviate some of those feelings that this isn't for me...seeing those options is something that gets students excited. That's kind of your hope as a teacher, to see students excited about learning, and that's how you get students involved” Morgan Freeman. The participant believes that Ethnic Studies is an avenue for students to see themselves and become encouraged to take an active role in their education. Additionally, they shared something they realized in their own classroom. “Students familiar with those stories who identify will have a much easier time synthesizing that material into a product teachers look for and that could affect their grade and opportunities they might have in the future” Morgan Freeman. Ethnic Studies is beneficial for students because it offers them a personal lens through which to understand course content. It allows students to connect with the material they're learning. The historical context put into perspective in the Ethnic Studies classroom can be applied to all other courses resulting in better student learning and engagement. While participants clearly show support for Ethnic Studies, it remains unclear how and if they use Ethnic Studies in their own classroom.

Teachers argued that Ethnic Studies was especially important because you're “getting something where students feel like it matters to them” Peewee Herman. When students see themselves they're more eager to engage, ask questions, show up to class, and get involved. All of a sudden their education matters to them. This spark of interest changes the way students view their education and even possible career choices. “Having a student relate to a topic or material is probably the best way for them to learn something” Morgan Freeman. This quote reflects how participants continuously affirmed the benefit of Ethnic Studies and situated it as purposeful in the context of learning.

During these interviews participants reflected on their own misrepresentation in education, filling in where Ethnic Studies would've been helpful. “If I had Ethnic Studies I don't think I would be wondering why Black people are so angry. I don't ever remember learning about the Japanese Internment camps, of course, you learn about the holocaust in Germany ... I didn't even hear about the [Native Americans] being displaced from their lands and I think those kinds of things are really important for us to understand” Kitty. Reflecting on their own lack of awareness, the participant also shared how with the rise of the Black Lives Matter Movement, the Trump Presidency, and everything else 2020 brought, they were made aware of their own white privilege. In the context of Ethnic Studies, the participant might have navigated the world differently had they had the knowledge of the ways their peers navigated life. As they mentioned, these

⁴¹ Mexican American Studies.

are important for all of us to understand, in order to be kind, empathic human beings that show up for one another.

Across the board participants believed that Ethnic Studies has long been a necessary intervention; all even suggested that Ethnic Studies be incorporated in all K-12 grades. “I think you start at the beginning, we shouldn't wait ‘til 18 to tell them about the world and things they can do to impact it. I'm not saying tell the gruesome things at four or five years old but tell the general story and build on it. Kids are resilient and they understand a lot more than people give them credit for” Hannah. Taking it a step further, participants called for the requirement of an Ethnic Studies course. “A required course because in general, it would make people better if they had that knowledge base of Ethnic Studies” Kitty. Overall participants agreed that Ethnic Studies was a necessary intervention to the curricular violence occurring in the classroom and to the social injustices occurring in the world.

Whether participants were overtly aware or just learning of the harm being caused by the curriculum, all agreed that our education system is clearly flawed and broken. As we previously discovered, this is not an accident. Nevertheless, teachers continue to teach and work to educate a new generation. For these teachers, Ethnic Studies is the hope of public education, that it can act like “a magic school bus⁴² on its best days and the good teachers are Ms. Frizzle.⁴³ They're going to take you somewhere you otherwise wouldn't go and they're going to make you better because of that” Rocky. Ethnic Studies, like Ms. Frizzle, offers students an adventure in their education. It's a magical journey that allows all students to learn something new and see the world differently. It's the joy and purpose of education that enables students to achieve their potential and fully participate now and in the future.⁴⁴

Conclusion

As this research has shown, our education systems need to change curricular development by providing a solution to the violent curriculum and instead offer support for an Ethnic Studies centered curriculum in the classroom. The implications of my research look to give credence to the incorporation of Ethnic Studies into K-12 curricula so that education may have the ability to reform and mediate the violent acts of erasure that currently exist in the classroom. This research also legitimizes the act of curricular

⁴² The Magic School Bus is an American animated children's television series.

⁴³ The teacher of the Magic School Bus teacher.

⁴⁴ “CHAPTER 4. PUBLIC EDUCATION MISSION, OBJECTIVES, AND GOALS.” Education code Chapter 4. Public Education Mission, objectives, and goals, n.d.
[https://statutes.capitol.texas.gov/Docs/ED/htm/ED.4.htm#:~:text=\(a\)%20The%20mission%20of%20the,of%20our%20state%20and%20nation.](https://statutes.capitol.texas.gov/Docs/ED/htm/ED.4.htm#:~:text=(a)%20The%20mission%20of%20the,of%20our%20state%20and%20nation.)

violence, defining it as the harm of learning non-white peoples are unworthy, or less than.

Limitations to this research can first be found through the findings being based on interviews conducted in one school district, in one city from the current moment. Another possible limitation could come from the inaccessible language used in the research. While my goal is for everyone, regardless of background, to be able to digest and understand the research being conducted, certain terms could still be limiting and therefore hinder the use of this research in education and/or community reform. This might result in the research remaining within the confines of the world of academia.

Something that could mitigate this limit is making sure the abstract and conclusion are straightforward and easier to understand. Even if the bulk of the research is not read or hard to read through, at least these parts could be acknowledged and provide new knowledge to the reader.

Moving forward, we have a duty to change the consciousness and knowledge of the nation because “healing from the trauma of history is a process that is ongoing, complex, and felt physically, intellectually, and spiritually,”⁴⁵ but it is healing that is possible through Ethnic Studies.

Lastly, I would like to recognize that what you just read might’ve been disheartening, brought up your own memories of erasure, or hurt you in some way. I want to be clear that this is purposeful. Every day across the nation, especially in the State of Texas, there is a war against Education. Though daunting, I remain hopeful, for I believe that it’s not a coincidence that the old Mexican Proverb says “They tried to bury us. They didn’t know we were seeds/ Quisieron enterrarnos. Sin saber que éramos semillas.” This research and the fight for education is far from over. We are just growing.

Acknowledgements

Thank you to the Departments of Women & Gender Studies and Mexican American & Latina/o/x Studies at the University of Texas at Austin. You changed my life by allowing me the chance to learn about my identity and see myself in my education. You helped me uncover what I innately knew, that I had a claim to my Mexican American and Chicana identity. Thank you for giving me professors and mentors alike that look and live like me. You have made my life all the more colorful.

I also want to thank the native teachings and practices, the familiar and kind curanderas, my grandmother and my mother, and all those in my community that have

⁴⁵ Leyva, Yolanda Chavez. “There Is Great Good in Returning’: A Testimonio from the Borderlands.” *Frontiers: A Journal of Women Studies* 24, no. 2 (2004): 1–9. <https://doi.org/10.1353/fro.2004.0006>.

helped raise and guide me. Your healing and collective care has grounded me through this process, more than you will ever know.

To Dr. Angela Valenzuela who started this journey with me; thank you for welcoming me into the world of Ethnic Studies and education. It has been an honor to be on the receiving end of your investment in the future of Ethnic Studies. To Dr. Karma Chavez, thank you for helping with the completion of this thesis and my post-grad journey. Your continued mentorship and inspiration during my procrastination cycles made this thesis what it is. This process has not always been easy and so I deeply appreciate you always meeting me where I was. To Dr. Sally Nuamah who was always honest and helpful in the rough parts of this paper, thank you. Thank you for believing in me, pushing me to grow, and always giving me the opportunity to learn through my research. To my family, the people who have seen the other side of this adventure; who dealt with my silence when I couldn't talk because I was writing or was in a rut after working on my research, muchisimas gracias. The patience and love you offered me in this life is something I will hold with me forever.

To my grandmother, for whom the possibility of even dreaming of attending college on a full-ride and finding ways to fund my research wouldn't even be possible. This thesis is a testament to your faith.

And to all the teachers who took time out of their lives to chat with me, relive their own trauma, and be willing to answer my questions, thank you. You have made this thesis what it is, you have made students like me who we are and have changed the world with every life you've touched.

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Themes in High School Math Teachers Racial Attitudes and the Impacts of Socio-demographic Factors

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Current research shows evidence of lower achievement among Black students in math and cites the importance of school environment and teaching practices both informed by teachers' racial attitudes. This study uses nationally representative data from a pilot study of high school math teachers to explore the impact of teachers' racial attitudes by asking: 1) how do racial attitude measures come together to capture various aspects of teachers' racial beliefs, and how well do these constructs hold?, and 2) do teachers' racial beliefs (as captured by these constructs) vary by gender, race, and political ideology? Four main constructs emerge for teachers' racial attitudes: minimization of race, racial consciousness, race evasiveness, and pro-CRT. There were statistically significant variations across these constructs by political ideology and by race for the racial consciousness construct. Overall, this study suggests a need for more education for teachers, regardless of their background, so that they are able to utilize culturally relevant pedagogy and create more meaningful connections with students to improve their engagement in learning and success.

There are a plethora of studies detailing lower levels of math performance among non-white students, particularly for Black students (Diemer et al. 2016; Farkas 2004; Holloway 2004; Minor 2016). While some argue that this is due to differences in the emphasis placed on school by Black students, others argue that these differences are more likely due to norms within schools that tend to benefit white students (Lewis 2015). Many studies also detail the impact of teachers' perceptions on their treatment of minoritized students (Quinn 2017; Bahr 1991; Tettegah 1996). However, little is known about teachers' more general racial attitudes outside of their perceptions of specific students.

In this study, I use nationally representative data from a pilot study of high school math teachers to bridge this gap by asking: 1) how do racial attitude measures come together to capture various aspects of teachers' racial beliefs, and how well do these constructs hold?, and 2) do teachers' racial beliefs (as captured by these constructs) vary by gender, race, and political ideology? The main goal of this study is to better understand the underlying racial beliefs that might shape math teachers' racial attitudes and impact their ability to effectively teach, support, and nurture the development of minoritized students. This study will also allow

for future exploration of the relationship between teachers' racial attitudes and their utilization of culturally relevant pedagogy, which promotes engagement among minoritized students (Ladson-Billings 1995).

Theoretical Framework

This study draws upon Eduardo Bonilla-Silva's framing of colorblind ideology. Bonilla-Silva characterizes colorblindness as a new racial ideology that continues to uphold white supremacy through a method of indirect, subtle racism that often does not mention race at all (2017). Bonilla-Silva outlines four central frames of colorblind racism: abstract liberalism, naturalization, cultural racism, and minimization of racism (2017). This study focuses on abstract liberalism and the minimization of racism. Abstract liberalism draws on political and economic liberalism, usually equal opportunity and choice, to explain racial matters (Bonilla-Silva 2017). This framework operates from an individual level and fails to acknowledge how structural factors influence individual choice (Bonilla-Silva 2017). And when people state that discrimination is not a main factor impacting minoritized individuals' life chances, they are engaging in the minimization of racism framework (Bonilla-Silva 2017). These frames allow individuals to frame race and structural factors as less critical to the detriment of non-white people who are undoubtedly affected.

Bonilla-Silva (2017) also describes the typical characteristics of racially progressive white people as: usually female, working or lower-middle class, college-educated, and liberal or radical in their political ideology (2017). Although there are white people who fit into this progressive characterization, there are usually limitations to their thinking in terms of racial progressiveness (Bonilla-Silva 2017). Using this framing, I will be exploring racial attitude constructs measured within this study across gender, political ideology, and race to see if there are any significant differences in how these subgroups construct their racial attitudes.

This study also draws on Gloria Ladson-Billings' conceptualization of culturally relevant pedagogy and its benefits to minoritized students (1995). Additionally, I draw on Tiffany Cook Hunter's framing of the relationship between teachers' racial beliefs on how they incorporate culturally relevant pedagogy (2015). It aims to measure teachers' racial attitudes and how they vary by demographics and political ideologies with the hopes of further research from the data exploring how these attitudes impact the use of culturally relevant pedagogy and thus minoritized students' engagement and success (Tucker 2002).

Literature Review

Lower math achievement among non-white students, specifically Black students, has been studied extensively (Diemer et al. 2016; Farkas 2004; Holloway 2004; Minor 2016). One main reason for these achievement gaps is teachers' lower expectations for Black students, which often translates into less rigorous coursework (Holloway 2004). Another reason is Black students' lack of math identity, which comes from the value students place on a task and their

self-concept in relation to it (Holloway 2004; Diemer et al. 2016). Teaching practices, including explaining the purpose of academic work, offering opportunities for students to take ownership of their learning, and encouraging students to think positively about their academic abilities, have a strong, direct impact on student self-concept (Urda and Schoenfelder 2006). Overall, teachers' racial attitudes are likely to shape their treatment of students and the practices teachers use to engage them, directly impacting students' success.

Teacher's Racial Attitudes

In general, teachers' racial attitudes mirror racial attitudes in America (Hinojosa and Moras 2009). One study found three key themes on how teachers discuss race within their classroom, which align well with Bonilla-Silva's framing of discussions of race. These themes were: rejecting discussions of racial inequalities altogether, color-blindness and confusion, and racial consciousness (Davis et al. 2022). Rejecting discussions of race was paired with the idea that structural inequalities are not real and instead political propaganda (Davis et al. 2022). Confusion and acknowledgment of structural racism, a desire for race not to be seen or matter, and the idea that white people also experience bias are all related to colorblindness (Davis et al. 2022). Lastly, actively acknowledging structural racism and desiring to reduce racial biases within education was characterized as racial consciousness (Davis et al. 2022).

When teachers fail to consider their racial background and how race impacts learning opportunities, their students' learning opportunities are hindered (Milner IV 2010). Teachers are at the forefront of the race socialization of non-white and white students and their consciousness around the subject. Teachers who ignore race in general also tend to ignore the harmful narratives surrounding students of color and their achievement. Furthermore, they are likely to end up engaging in the reproduction of these narratives due to their inaction. Teachers' racial attitudes impact the value students feel towards their race within academic settings, and within the larger racialized society. This impact comes either through their direct treatment of their students or their use of culturally relevant pedagogy.

Attitudes and treatment. Teachers' racial attitudes impact how they interact with minoritized students in multiple ways, from direct discrimination to various microaggressions (Quinn 2017). Teachers' racial attitudes can impact the amount of effort they put into educating minority students and how they perceive their students (Quinn 2017). For example, teachers may be more likely to misidentify minoritized students as needing special education intervention (Quinn 2017) or refer them more often to mental health professionals (Bahr 1991). Teachers may also expect less from minoritized students, which can lead even students who are excelling to experience anxiety through stereotype threat (Quinn 2017). This anxiety is exacerbated for minoritized students as they are more likely to have their behavior judged using subjective measures and guided by their teacher's racial attitudes (Quinn 2017; Tettegah 1996). Lastly, teachers' racial attitudes impact the level of relationships they are comfortable forming with students, specifically, their level of warmth towards students (Quinn 2017).

Attitudes and teaching outcomes. Teachers' racial beliefs also impact the way they choose to engage their students in the classroom and the teaching practices they employ (Gay 2010; Pajares 1992). One study in Germany found that teachers who engaged in color-blind

beliefs were less likely to adapt their teaching to diverse student populations (Hachfeld et al. 2015). Multicultural beliefs, on the other hand, were found to impact minoritized students positively because teachers were more likely to engage in culturally responsive pedagogy (Hachfeld et al. 2015). For example, they were more likely to use a motivational orientation and promote positive values towards minoritized students (Hachfeld et al. 2015; Gay 2002). Engaging in culturally relevant pedagogy allows students to feel more positive about their abilities in mathematics (Yu 2018; Ladson-Billings 1995) and increases their engagement and achievement in the subject (Abacioglu, Volman, and Fischer 2019).

Demographics, Political Ideology and Racial Attitudes

There have been a few studies on general racial attitudes in America. Cultural racism has persisted as one of the most popular ways for white people to explain inequalities (Moberg, Krysan, and Christianson 2019). Cultural racism, one of the four main frames of colorblind racism, is based on the idea that cultural values across racial groups explain the different outcomes people encounter in life (Bonilla-Silva 2017). For example, it is not uncommon for people to reference the false belief that Mexican or Black people do not emphasize education to explain the achievement gap instead of looking at larger structural issues that impact education (Bonilla-Silva 2017). However, there has been a noticeable decline in this explanation and previous genetic explanations, and instead increased white endorsement of discrimination as a factor for racial inequalities since 2016 (Moberg et al. 2019). Curiously, there has also been a significant decrease in the percentage of Black people citing discrimination as a cause for racial inequalities than the increase among white people; regardless, they are still most likely to employ this explanation (Moberg et al. 2019; Bobo et al. 2012).

Gender. Many studies agree with Bonilla-Silva's framing of the "white racial progressive" as predominantly female (2017; Johnson and Mariani 1998; Hughes and Tuch 2003). While this is true overall, there are still many instances when white women and men are virtually identical in their support, or lack thereof, for racial progress. For example, Hughes and Tuch found no difference between how white men and women characterized racial stereotypes or their support for integrated neighborhoods or interracial marriage (2003). Supporting Bonilla-Silva's (2017) framing, white women are more likely to support integration in communities, support policies towards equality (except in employment), and feel sympathy and empathy towards Black people (Hughes and Tuch 2003). Additionally, they found that white women are less likely than white men to support symbolic racism. Symbolic racism is an anti-Black affect mixed with traditional conservative values (Sears and Henry 2003). It is the idea that Black people are violating important American cultural values, especially by demanding changes in what is currently the (white) norm (McConahay and Hough Jr. 1976).

Political ideology. There are many discussions around party identity and racial attitudes. One study found that during the 1990s, racial attitudes were more likely to influence partisanship, or political bias (Engelhardt 2019). After the 2000s, a shift occurred, leading partisanship to shape white people's racial attitudes (Engelhardt 2019). This reversed effect is crucial to note as it shows the vital role of politics on racial attitudes and, thus, behavior. The Pew Research Center also illustrates the stark differences in racial attitudes among political parties (2017). There is a substantial gap in the percentage of individuals who support ideas of

structural racism, with Democrats supporting the idea more than Republicans. The Pew Research Center also explores racial attitudes by race and significant differences in their support for structural explanations for inequalities in America (2017).

While Engelhardt's (2019) study focuses on party affiliation, the current research focuses on political ideology, using the conceptualization of "the racial progressive" laid out by Bonilla-Silva. However, Engelhardt's argument that partisanship influences racial attitudes will guide the data analysis. Ideology will be the independent variable, and racial attitudes will be the dependent variable.

Methods and Analysis

This study uses nationally representative pilot data from the National Survey of High School Math Teachers, collected from June to August of 2021. The survey used for this study was designed using qualitative data based on teachers' perspectives, which was collected through focus groups with math teachers and teacher educators. Survey questions center on themes related to culturally relevant pedagogy, anti-deficit thinking, engaging with race in the classroom, and color-blindness. Teachers were recruited to participate in the study via both random and non-random sampling. Random sampling for the survey was completed in two stages. The first stage includes a stratified random sample of public high schools identified using the National Center for Education Statistics' Common Core of Data. For the second stage, a list of names and emails for all math teachers at each school was compiled using publicly available information. These teachers were invited to participate in the survey via email, where they were offered compensation for their time and participation. Math teachers were also recruited to participate in the survey via open invitations distributed on listservs of state and national organizations for math teachers. Invitations were also posted to online forums for math teachers, as well as on social media (e.g., Facebook, Twitter). Overall, the survey yielded 283 responses, half of which were from teachers recruited via the random sample. The analytical sample for this study includes the 201 teachers who fully completed the questions used in the analysis.

Variables

This study includes three demographic variables: gender, race, and political ideology. All respondents in the study identified as either male or female; however, non-binary was an option listed. Approximately 35% of teachers are male, and about 65% are female. The race question allowed participants to choose all options that applied to them. The options were: Asian, white, Black or African American, American Indian or Alaska Native, and Native Hawaiian and Pacific Islander. There was also a question asking respondents to identify if they were of Hispanic or Latino origin. Respondents were divided into two categories: white and non-white. White includes respondents who identified as white but not as Hispanic or Latino. Teachers who identified as Black, American Indian, Asian, or Hispanic/Latino (regardless of race) were categorized as non-white. This differentiation is significant because it emphasizes the current

color line within American society.⁴⁶ Respondents identified their political ideology on a seven-point Likert scale ranging from extremely liberal (1) to extremely conservative (7). Approximately 55% of respondents identified as liberal, 43% identified as conservative, and 23% identified as being in the middle. Distributions for demographic variables are presented in Table 1.

Table 1. Demographics of Respondents

	Percent
Gender	
Male	35.32
Female	64.68
Race	
Non-white	31.34
White	68.66
Political Ideology	
Extremely liberal	12.94
Somewhat liberal	23.88
Lean liberal	17.91
In the middle	22.89
Lean conservative	9.45
Somewhat conservative	10.45
Extremely conservative	2.49

⁴⁶ The non-white category encompasses racial groups that fall at different levels within the racial hierarchy. Due to this, there are likely differences in their racial beliefs and socialization. Differences are expected even within a single racial group because no group is monolithic. However, due to the number of respondents within each racial group, it is more beneficial to view results with this division.

Racial Beliefs

Two different types of racial beliefs, within education and in general, are being analyzed in the context of gender, race, and political ideology. Questions on teachers' racial beliefs in education analyze their perspectives on race within their classroom and how important they think race consciousness is to math education. General racial beliefs questions allowed us to explore the racial beliefs of teachers concerning the general society.

Analysis

First, I used exploratory factor analysis to examine each set of racial belief variables. If the factor loadings were greater than .55, they were included within the scales and constructs I created. James Stevens states that, regardless of sample size, if four variables have a factor loading of 0.6, the factor can be considered reliable (2001). Within this study, the target number of variables reaching 0.55 was four to five. I also computed the Cronbach's alpha values of each scale to see how strongly the factors held together. All the scales produced values over 0.7 which means they held together strongly and can be labeled a construct.

Next, I estimated the means for each construct, by gender and race. Two-tailed t-tests were estimated to identify significant differences between men and women, and between white and non-white teachers. Lastly, I used crosstabs to examine the relationship between racial beliefs and political ideology. Before doing so, constructs for racial beliefs were divided into tertiles. The three categories (low, mid, and high) each represent approximately a third of the sample. The low category consists of teachers with the lowest values within each construct. The mid category includes teachers whose responses placed them in the middle third. Those who scored in the top third are in the high category. I estimated Chi-square tests for statistical significance.

Key Findings

Question 1 - How do racial attitude measures come together to capture various aspects of teachers' racial beliefs, and how well do these constructs hold?

Questions measuring racial beliefs are presented in Table 2.1 and Table 2.2. The response options for these questions, utilizing a 6-point Likert scale, ranged from strongly disagree (1) to strongly agree (6). While the statements are divided by race beliefs in the classroom and in general, the constructs show a pattern of colorblindness

(factors 1a and 1b) and racial consciousness (factors 2a and 2b), which will be discussed more with research question 2.

Table 2.1 Reliability and Factor Structure of Racial Attitudes in the Classroom Subscales from Exploratory Factor Analysis

Racial Beliefs in the Classroom Items	Factor 1a	Factor 2a
1. I don't think of my students in terms of their race or ethnicity.	0.2848	-0.5851
2. There is too much emphasis placed on multicultural awareness and training for teachers.	0.5445*	-0.6026
3. Only teachers who work with students from different racial/ethnic backgrounds should have specific training on cultural diversity.	0.7686	-0.1507
4. Adapting course content to students' cultural backgrounds is unnecessary because math is a universal language.	0.7533	-0.3501
5. Taking time to find and include examples of the cultural, historic, and everyday lived experiences of my students distracts from teaching what matters most.	0.7727	-0.1201
6. I feel prepared to have conversations about race in my classroom.	0.2733	0.5097*
7. Teachers should adapt their teaching to the distinctive cultures of African American, Latina/o/x, Asian, and Native American students.	-0.2209	0.8038
8. Schools should implement specific strategies to ensure that the racial composition of advanced math courses is reflective of their general student body.	-0.2004	0.7445
9. Disparities in the racial composition of advanced math courses are about poverty, not race.	0.3683	0.1628
10. Students should always be encouraged to resolve conflicts with each other by finding common ground.	-0.0067	-0.0724
Cronbach's Alpha	0.7535	0.7223

Factor loadings of $|\geq .55|$ and above are bolded. Factor loadings above $|\geq .5|$ are noted with an asterisk.

Factor 1a reflects a mindset leaning towards minimization of race

Factor 2a reflects a mindset leaning toward racial consciousness

Factor 1a, minimization of race, is composed of three items (items 3, 4, and 5). These items were all related to the idea that math education does not need to include race because math inherently is unrelated to race. Item 2 also measures the minimization of race by teachers; however, it did not reach the 0.55 threshold for inclusion in the final scale.

Factor 2a, which reflects a mindset of racial consciousness, is composed of four items (items 1, 2, 7, and 8). Items 1 and 2 were negatively related to the scale. In other words, when teachers answered these items, they usually answered oppositely to these in relation to the other items within the construct. This pattern occurs because the idea represented within the statement contradicts the general idea represented within the construct. For example, if a teacher answered on the agree side of the scale for item 8, they likely answered on the disagree side for items 1 and 2. Item 6 also slightly mirrors the idea of racial consciousness, however, it did not meet factor loading criteria for inclusion in the final scale.

Table 2.2 Reliability and Factor Structure of General Racial Attitudes Subscales from Exploratory Factor Analysis

General Racial Belief Items	Factor 1b	Factor 2b
1. People are more likely to come together when we focus on our similarities rather than our differences.	0.7026	0.1707
2. It is a problem if people think of themselves mostly as members of groups rather than as individuals.	0.8129	-0.1057
3. Racial/ethnic diversity improves experiences and interactions within schools and classrooms.	-0.1018	0.7663
4. Focusing too much on people's different backgrounds is divisive.	0.7877	-0.3437
5. Talking about racism could open a can of worms, and little good is likely to come of it.	0.6621	-0.3949
6. Racial and ethnic minorities in the U.S. have certain advantages because of the color of their skin.	0.5153*	-0.3276
7. It is important that people begin to think of themselves as American, not as African American or Mexican American.	0.7062	-0.3160
8. It is important for public schools to teach about the history and contributions of racial and ethnic minorities.	-0.1630	0.7660
9. Students in the U.S. should be required to take at least one ethnic studies course to graduate high school.	-0.2193	0.7589
10. Everyone who works hard, no matter what race they are, has an equal chance to succeed.	0.7225	-0.1485
	Cronbach's Alpha	0.7535
		0.7223

Factor loadings of $|\geq .55|$ and above are bolded. Factor loadings above $|\geq .5|$ are noted with an asterisk.

Factor 1b reflects a race evasive mindset

Factor 2b reflects a pro-CRT mindset

Factor 1b reflects a mindset leaning towards race evasiveness; it is composed of six items (items 1, 2, 4, 5, 7, and 10). These items focused on colorblindness and the idea that race is not a necessary point of discussion in society today but instead a point of tension.

Within this factor, there are contradicting ideas on the importance of the group and the individual. For example, item 2 highlights the importance of individuals, while item 7 pushes the idea of a group mindset (as long as it's centered around national pride). It highlights the importance of being an individual while pushing us to ignore the nuances that make people different. Item 6, while not meeting the factor loading requirements to be included in the construct, echoes similar sentiments to the questions within this scale.

The second factor, which reflects a pro-CRT (Critical Race Theory) mindset, is composed of three items (items 3, 8, and 9). These items emphasize the importance of racial diversity, specifically in education. They center on seeing multiculturalism's benefits for students and pushing for educational requirements to highlight this.

Question 2 - Do teachers' racial beliefs (as captured by these constructs) vary by gender, race, and political ideology?

Gender

Table 3 Means and Difference of Means for Each Scale by Gender

		Min. of Race	Racial Consciousness	Race Evasiveness	Pro-CRT
	Obs	Mean	Mean	Mean	Mean
Male	63	2.31	3.94	3.52	4.78
Female	138	2.26	4.09	3.32	4.94
Total	201	2.27	4.04	3.39	4.88
Difference		0.05	1.5	0.21	0.16
P-value		0.76	0.39	0.24	0.23

Table 3 presents means for each construct by teachers' gender. There were still slight differences between males and females across each construct. Male teachers answered higher on the minimization of race and race evasiveness scales, on average than females, meaning they agree more with the statements within these constructs. The racial consciousness and pro-CRT constructs both showed the opposite; women answered higher than men. In other words, women were more likely to agree with the statements in these constructs or disagree with the statements directly contradicting the other items within the scale (see discussion on factor 2a above). However, results did not reveal any significant differences by gender. While not significant, patterns suggest that women were more likely to agree with ideas surrounding race consciousness, and men were more likely to agree with ideas relating to colorblindness.

Race

Table 4 Means and Difference of Means for Each Scale by White vs. Non-White

		Min. of Race	Racial Consciousness	Race Evasiveness	Pro-CRT
	Obs	Mean	Mean	Mean	Mean
Non-white	63	2.41	4.28	3.60	5.02
White	138	2.21	3.93	3.29	4.82
Total	201	2.27	4.04	3.39	4.88
Difference		0.20	0.35	0.31	0.2
P-value		0.24	0.05	0.08	0.15

** values are statistically significant at $p \leq .05$, * values are marginally significant at $p \leq .10$

Means for each construct by race are presented in Table 4. Results show that non-white teachers answered higher, on average, across all constructs. For example, Only the racial consciousness construct returned values with a significant difference by race at the .05 level. Non-white teachers answered higher on the questions within this scale than white teachers, meaning they were more likely to agree with the ideas measured by this scale.

The difference in means for race evasiveness was marginally significant, with a p-value of 0.08. Non-white teachers answered higher on this scale than white teachers, meaning they were more likely to agree with ideas measured by this scale. This was not expected based on current research around race consciousness and minoritized individuals.

Political Ideology

Table 5.1 Political Ideology and Minimization of Race Scale Categories Chi-Squared Test, Percentages

	Low	Mid	High	Total
(1) Extremely Liberal	57.69	23.08	19.23	100.00
(2) Somewhat Liberal	45.83	39.58	14.58	100.00
(3) Lean Liberal	25.00	38.89	36.11	100.00
(4) In the Middle	19.57	32.61	47.83	100.00
(5) Lean Conservative	10.53	15.79	73.68	100.00
(6) Somewhat Conservative	14.29	19.05	66.67	100.00
(7) Extremely Conservative	20.00	40.00	40.00	100.00
Total	30.35	31.34	38.31	100.00

$\chi^2 (12) = 42.88, p \leq 0.001$

Tables 5.1 through 5.4 present values from crosstabs of racial belief constructs by political ideology. Results from Table 5.1 show that ideology and the minimization of race scale have a positive relationship. Teachers who answered higher (more conservative) on the ideology scale answered higher on the minimization of race scale, meaning they agreed more often with the scale items. Extremely conservative teachers are divided between the mid and high categories for answering questions. However, moving from extremely to leaning conservative, the percentage of individuals in the high category increases from 40 percent to about 74 percent.

Liberal respondents, on the other hand, were more likely to answer questions on this scale with low responses, meaning they disagreed with the items more often. The tipping point for liberal respondents comes at those who lean liberal, with 75 percent of respondents spread across the mid and high categories. This is similar to respondents in the middle of the political ideology scale with approximately 80 percent of respondents spread across the mid and high categories.

Table 5.2 Political Ideology and Racial Consciousness Scale Categories Chi-Squared Test, Percentages

	Low	Mid	High	Total
(1) Extremely Liberal	7.69	23.08	69.23	100.00
(2) Somewhat Liberal	12.50	22.92	64.58	100.00
(3) Lean Liberal	16.67	44.44	38.89	100.00
(4) In the Middle	26.09	39.13	34.78	100.00
(5) Lean Conservative	52.63	42.11	5.26	100.00
(6) Somewhat Conservative	66.67	28.57	4.76	100.00
(7) Extremely Conservative	80.00	20.00	0.00	100.00
Total	26.87	32.84	40.30	100.00

$\chi^2 (12) = 63.24, p \leq 0.001$

Results from table 5.2 show that ideology and the racial consciousness scale have a negative relationship. Teachers who answered lower (more liberal) on the ideology scale answered higher on the racial consciousness scale, meaning they were more likely to agree with the statements in this construct or disagree with statements that directly contradicted its overall idea. Extreme and somewhat liberal respondents had a majority of their respondents answer high on the scale, both above 60 percent. However, again, the tipping point for the liberal side occurs among respondents who lean liberal. Approximately 65 percent of these respondents' answers were in the mid category, similar to those with political ideology in the middle who had around 40 percent of respondents in this category.

On the other hand, conservative respondents did not have a tipping point. All three levels of conservatism answered low on the scale, meaning they disagreed more with the statements in this construct. The more extreme respondents identified their conservatism, the less room for compromise there seems to be. This is illustrated by the numbers within the high category reaching zero respondents when looking at the extremely conservative group while also having 80 percent of their respondents within the low category.

Table 5.3 Political Ideology and Race Evasiveness Scale Categories Chi-Squared Test, Percentages

	Low	Mid	High	Total
(1) Extremely Liberal	73.08	15.38	11.54	100.00
(2) Somewhat Liberal	47.92	37.5	14.58	100.00
(3) Lean Liberal	25.00	41.67	33.33	100.00
(4) In the Middle	17.39	50.00	32.61	100.00
(5) Lean Conservative	0.00	31.58	68.42	100.00
(6) Somewhat Conservative	0.00	13.29	85.71	100.00
(7) Extremely Conservative	0.00	20.00	80.00	100.00
Total	29.35	34.83	35.82	100.00

$\chi^2 (12) = 81.09, p \leq 0.001$

In Table 5.3, ideology and the race evasiveness scale have a positive relationship. Teachers who answered lower (more liberal) on the ideology scale answered low on the scale, meaning they mostly disagreed with the statements within this construct. Around 73 percent of respondents who identify as extremely liberal were within the low category. Additionally, those who identify as somewhat liberal are mostly in the low category but also have a significant amount of respondents within the mid category. The tipping point is, again, with those who identify as leaning liberal with almost 42 percent of respondents in the middle and a more even distribution across the categories in general. Those who identify as in the middle were mostly in the mid and high categories.

Conservative respondents, once again, did not have a tipping point. Across all levels of conservatism, the respondents mostly answered the statements on the high side of the scale meaning they mostly agreed with the statements in this construct. The more extreme respondents identified their political ideology on the conservative side the more likely those respondents' answers clustered together towards agreement with the statements. For example, 80 percent of respondents who identify as extremely conservative are within the high category, 20 percent are within the mid category, and 0 respondents were within the high category.

Table 5.4 Political Ideology and Pro-CRT Scale Categories Chi-Squared Test, Percentages

	Low	Mid	High	Total
(1) Extremely Liberal	7.69	19.23	73.08	100.00
(2) Somewhat Liberal	16.67	22.92	60.42	100.00
(3) Lean Liberal	22.22	25.00	52.78	100.00
(4) In the Middle	28.26	39.13	32.61	100.00
(5) Lean Conservative	57.89	26.32	15.79	100.00
(6) Somewhat Conservative	61.90	33.33	4.76	100.00
(7) Extremely Conservative	80.00	20.00	0.00	100.00
Total	29.35	27.86	42.79	100.00

$\chi^2 (12) = 51.81, p \leq 0.001$

In Table 5.4, ideology and the pro-CRT scale have a negative relationship. Teachers who answered higher (more conservative) on the ideology scale answered low on the scale, meaning they mostly disagreed with the statements in this construct. For this construct, both liberals and conservatives across all levels had a majority of their respondents, over 50 percent, in either the high or low categories, respectively.

In other words, neither group had a tipping point like the other constructs. This is expected as issues surrounding CRT are highly politicized currently. While neither side had a tipping point, those who identify as extremely conservative have a tighter cluster of respondents centered within the low category. For example, about 17 percent of somewhat liberal respondents were grouped within the low category, and only around 5 percent were grouped in the high category for somewhat conservative respondents. Both extreme liberals and extreme conservatives had over 70 percent of respondents grouped together within the high and low categories, respectively. However, extremely conservative respondents did not have any respondents within the high category in comparison to the extremely liberal group of respondents which had about 8 percent.

Discussion and Conclusion

Gender

Women were more likely to agree with the racially conscious statements and constructs, while men were more likely to agree with the colorblind statements and constructs. This pattern follows what previous literature has shown. However, while this pattern holds true, it would be interesting to see if this same pattern exists when looking deeper at teachers' use of deficit thinking and racial stereotypes.

Race

Non-white participants scored higher across all constructs, including those measuring colorblindness. This is a curious discovery when looking at the literature on racial consciousness, which posits that minoritized individuals are more likely to be racially aware.

What led to these results? For one, the way that race was split within this study, while an important distinction, may have skewed the results. While non-white people have historically been seen as less than socially when compared to white people, their socialization within society is fluid across time. Race is an ever-changing social construct. Therefore, the way people who fall into these categories are socialized varies, giving them different world views. No racial group is entirely uniform. Some individuals may desire to assimilate and find pride in traditionalism and conservatism. In contrast, others may feel their efforts are best utilized by improving race consciousness and emphasizing the importance of diversity. In other words, across the race line, there may be even more differences present in racial beliefs than across the color line.

Political Ideology

Political ideology seems to relate to racial attitudes in general and within education strongly. The larger idea of race consciousness (not the construct) has a negative relationship with the political ideology scale, and color-blindness has a positive relationship with the political ideology scale. In other words, liberal teachers were likely to agree with constructs relating to the idea of racial consciousness and conservative teachers were likely to agree with constructs surrounding ideas related to colorblindness. Additionally, conservative respondents were less likely to be spread across the categories (low, mid, high) on their attitudes towards race.

These results illustrate a significant issue of the current polarized political climate's impact on racial attitudes. Further, it raises concerns about how this political polarization will impact students in the classroom. Teachers may feel they are simply

siding with the party whose views align most with their own and that these viewpoints are separated from their impact on students. However, these viewpoints can have deleterious effects on how future generations of students engage with race, view their math ability, and, even more, their overall academic success.

Limitations

Overall, while the constructs hold strongly, they each have only a few items. As the study develops further, additional questions that capture the ideas within each construct will be necessary. Within the racial beliefs related to the classroom, more questions that explore teachers' fears around discussing racial issues or their discomfort with diversity could be included. For the general racial beliefs, it would be interesting to see more questions on teachers' views surrounding political/racial activism and how this translates to their teaching outcomes. With additional statements added within the scales, the chance of a higher number of variables having a significant factor loading increases allowing for a better chance for factor reliability.

Implications

From the study, it is clear that there are differences in racial attitudes across gender, race, and political ideology. While many of these differences may come from differences in socialization and experience, these beliefs impact students in many ways. The role teachers play extends beyond their duty of imbuing students with academic knowledge. Schools are a pivotal place where students become socialized and secure their identity in relation to their education. These two things are fostered through the teaching practices teachers use and the direct treatment of their students. The way teachers engage students, whether through culturally relevant means or traditional methods, is shaped by their racial attitudes and largely impacts their students' success and engagement (Hachfeld et al. 2015; Gay 2010; Pajares 1992; Yu 2018; Ladson-Billings 1995). The way teachers interact with minoritized students is also impacted by their racial attitudes. It shapes the effort they give students, the way they discipline students, and the relationships they form with them (Quinn 2017; Tettegah 1996). These things are fundamental in shaping students' relationship with education and the self-concept because it dictates the way they relate to the space and the comfort they have in engaging with material.

The biggest takeaway from this study is that mandatory education for teachers on racial issues and how to utilize culturally relevant pedagogy and create more meaningful connections with students are needed to ensure that teachers from all

backgrounds have the tools needed to educate and empower their students. With this additional training, teachers will be able to reflect on their own racial attitudes and more consciously lean into the ultimate goals of engaging students, supporting their formation of a strong academic identity, and striving for their holistic development and success.

Future Research

Research on the effectiveness of race education for teachers and its impact on their racial attitudes and/or their teaching outcomes would allow for expansion of the argument presented within this study and for more policy work on these issues. Additionally, research on the relationship between racial beliefs and teaching outcomes would allow us to see how teachers' beliefs impact how they teach students and, in turn, their students' success.

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A Literature Review about Foster Care Involved Youth Post-Independence

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Foster youth are more vulnerable to negative life outcomes, especially when exiting the system at 18 years old. They often lack the resources, support, or guidance in life before and after aging out of the system. This literature review examines the role of education, housing, incarceration, in the lives of the foster care youth and the programs established to support them.

When the state determines that a family is “unfit” to provide the basic needs of a child, or inflicts harm on a child, the child is typically taken into foster care until the parent is deemed fit or the child turns eighteen. Children of color are over-represented in the child welfare system although there are no differences in the abuse and neglect rates for African American and white families.¹ This is because of the ethnic and racial biases in the reporting of maltreatment and the child welfare decisions in who to investigate, substantiation, and placement.¹ Foster care is defined as formal, welfare supervised placement in a family or group home setting or, probation supervised placement. According to the Adoption and Foster Care Analysis Reporting System, there were 442,995 children and adolescents in foster care in 2017.² That same year, 247,631 children exited foster care: 121,203 (49%) were reunited with parents or primary caretakers, 58,104 (24%) were adopted, and 19,945 (8%) were discharged because they were emancipated or “aged out”.²

The transition from adolescence to adulthood is a defining moment in everyone’s lives, but also a very vulnerable moment for foster youth that are aging out of the system. Youth aging out of the system transition to adulthood with less material resources and social support than the average young person transitioning out of their family’s home. Youth who’ve been placed in foster care have often experienced poverty, parental substance abuse, violence in their homes and communities, and incarceration of a parent which oftentimes makes them more likely to engage in riskier behavior such as drug use or unprotected sex.³ One-third to one-half of youth formerly

in foster care have been arrested, 25% reported substance use while 15% have substance abuse dependence disorders.³ Furthermore, around half of the youth aging out of foster care have not obtained their a high school diploma, employment, financial stability, or housing security.³ For those who have obtained employment, their income is often below the poverty threshold and up to 40% experience homelessness.³

In this review I will cover some of the literature and key areas of study related to youth involved in foster care, such as education, housing, incarceration. I will also discuss current programs and possible solutions that can be implemented to assist foster youth in the areas mentioned.

Review of Literature

Education

A college education is life changing for any individual, especially for youth previously in the foster system. Individuals with college degrees have lower rates of unemployment, higher income, and are more likely to have health insurance and pension benefits than those who do not.⁴ However, compared to the national average, youth that were formerly in foster care are less likely to attend college. Even though 80% of youth in foster care have dreams of obtaining a post-secondary degree, only 3-5% obtain a bachelor's degree compared to 29% of the general population.⁴ Geiger's study shows that this is due to pre-existing educational barriers and the lack of social and familial support. For example, children in foster care with unstable families frequently move homes which hurts their performance at school.⁴ Furthermore, children who have experienced maltreatment are more likely to struggle with their academic performance and cognitive functioning throughout elementary and middle school and show more behavioral issues⁴. They also have less opportunities for tutoring, advanced placement classes, field trips, counseling and therefore are more likely to be pushed out of high school. Geiger shows that those that make it to college face further barriers that cause them to drop out.⁴ For example, they struggle to find stable housing, income, university resources, or have not been adequately prepared for the rigorous course work.⁴

In the study conducted by Angelique Day and colleagues (2012), they received testimonies from over 40 former foster youth ranging in age from 15-23 years. Their testimonies support Geiger's study on what are their barriers for educational success.⁵

The eight major themes were the following:

1. Need for support from an adult outside of school
2. Need for connection with teachers who understand the unique circumstances of foster youth
3. Need for teachers to be sensitive to individual student learning needs
4. Lack of resources to address basic school-related needs
5. Lack of access to extracurricular activities, unsafe schools, untreated mental health issues, and lack of preparation and support for independent living.⁵

Learning about the needs of foster-youth in terms of educational attainment can allow policymakers, social workers, and teachers to know which areas they need to improve on to better support youth in foster care. Improving support can increase the number of youths in foster care that have educational success which improves life outcomes. Geiger found that postsecondary education is linked with having a higher income level, better health, and lower levels of unemployment.⁴ Relatedly, individuals with bachelor's degrees were shown to make more than twice the annual income than individuals with a high school diploma.⁴ Both studies speak to the barriers that foster youth face in obtaining and accessing educational opportunities and the effects that the lack of higher education can have on their life outcomes.

Housing

Youth who age out of the system are one of the most vulnerable populations at risk for being unhoused.⁶ This is due to the termination of services and their chaotic family environments. Financial, educational, and social support provided through the child welfare system ends at the age of 18, but some states have extended services for foster youth until the age of 21.⁶ In Fowler's study, the youth who were interviewed were 16 years old and subjects of abuse and neglect investigations. As part of the study, they did two-year follow-ups to assess housing instability. Youth were separated into three groups: 1) youth who aged out of foster care, 2) foster youth who were reunified with family, and 3) youth who were never removed from their home.⁶ They found that youth who aged out of foster care had the same probability of being unhoused as youth who were never placed out-of-home. Youth who were reunified with their family were less

likely to be unhoused. This study shows the importance of foster youth having familial contact and support is beneficial for foster youth.

Another study (2013, Dworsky, et.al) similarly found that when a young person is returned to their family the probability of them experiencing housing insecurity is significantly reduced.⁷ The study found that 36% of the 624 youth surveyed had experienced housing insecurity at least once by the age of 26.⁷ Both Fowler et.al's and Dworsky et.al's studies concluded that youth who become unhoused are more likely to experience mental health disorders, have a high risk of physical and sexual victimization and lack access to health care services.

However, it is important to note that the risk for housing instability for youth involved with the child welfare system is high regardless of aging out status.⁷ The risk further increases when the youth are Black, Brown, or part of the LGBTQIA+ population. Children of Color in the system are more likely to receive out-of-home placement, experience placement disruptions, and remain in foster care for longer and are less likely to receive services such as foster parent support services and caseworker visits.⁷ Moreover, due to systemic racism communities of colors face hyper-segregation which greater affects poverty levels and unemployment.⁷

Furthermore, youth who identify as lesbian, gay, bisexual, transgender, or queer or questioning (LGBTQ+) often lack family support which is a leading factor related to experiencing homelessness.⁸ Their sexuality and gender identity are both a factor for them entering the child welfare system, the instability of placements while in the system, and the lack of resources when exiting the system.⁸

Incarceration

Youth in the foster system are far more likely than the general population to be involved with the criminal legal system both as children and adults. Crawford found that youth preparing to age out of foster care are the most at higher risk of being criminalized and arrested thus ending up in the criminal legal system. By the age of 19, 57% of male foster youth and 4% of female foster youth were arrested compared to 20% and 3% of males and females in the national sample.⁹ The traumatic experiences youth in foster care face increase the likelihood of them living in low-income, under resourced communities that are more highly policed and surveilled thus making them more vulnerable to arrest and subsequent detention.⁹

In Yi and Wilderman's study, they were also concerned about the racial/ethnic disparities that further put youth in foster care at greater risk for incarceration.¹⁰ A great disparity being the number of ethnic minorities or Black families being investigated by CPS compared to white families. They found that 53.2% of African American and 32%

of Hispanic children have been exposed to a CPS investigation compared to 23.2% of white children.¹⁰ Further disparities can be seen in the distribution of foster care placements. The overall risk of being placed in foster care is 5.9% for all children, but for Black children it is 11% and for Native American children it is 15.4%.¹⁰ Yi and Wilderman not only mention how the disparity of children of color in the foster system affect the rate of incarceration, but also how successful interventions can change incarceration rates.¹⁰ They suggest improving placement experiences, especially with children of color, where their culture plays a major role. This can be done by considering diverse family forms when looking at options for foster placements, better training of foster parents, and by ensuring foster youth have access to substance use/abuse and mental health services.¹⁰

Programs/Possible Solutions

Previous studies have shown how the lack of housing affects youth in foster care in many aspects of life such as educational attainment and incarceration rates. Gabrielle Richard's article covers the U.S. Department of Housing and Urban Development (HUD) report on the housing needs of youth exiting foster care and the housing options available to them.¹¹ While there are some federal and state funded programs for foster youth including the Chafee Foster Care Independence Program, Section 8 (Housing Choice Vouchers), Family Unification Programs (FUP) and Continuum of Care services there is still a need for more accessible, affordable, and sustainable housing for foster youth. The HUD found limitations to these programs that result in very few foster care youth being enrolled in these programs. For example, the Chafee Foster Care Independence Program receives \$140 million annually, but only 30% of funds are used for sustainable housing.¹¹ Furthermore, only 14% of FUP vouchers have been awarded due to Public Child Welfare Agencies who do not refer foster youth to keep the vouchers.¹¹ The lack of accessibility and knowledge of these programs cause further unstable housing within foster youth populations. The instability of housing affects their environment as they also try to find a job and get an education. The knowledge and accessibility of these programs could be life changing for foster youth population

Chun Liu further explores how Independent Living Programs (ILPs) affect youth aging out of foster care and how effective they are.¹² Chun Liu uses the National Youth in Transition Database (NYTD) which collects information on the effectiveness of the programs all over the country. His study found that ILP services are associated with positive outcomes in terms of education, employment, and housing outcomes.¹² The most effective service that results in better outcomes all around is the post-secondary educational support service. Post-secondary educational support includes classes for

test preparation such as the Scholastic Aptitude Test (SAT), counseling about college, information about financial aid and scholarships, help completing college or loan applications, or tutoring while in college.¹² The limitation to this study is that it did not provide the scope and quality of these services and it also lacks the implementation fidelity and program design across states which can result negatively or positively in youths' outcomes.¹²

In Geiger's study, we can learn more about college campus programs for foster youth that have been successful and could be done at other campuses.¹³ For example, Michigan State has the FAME (Fostering Academics Mentoring Excellence) program for foster care alumni with the goal to increase the academic success of youth from foster care by providing support.¹³ Their services include campus champions which are individuals who students can talk to and ask questions, a summer camp prior to the first semester, student involvement, peer mentorship, and academic and social services for students in the program.¹³ Similar programs are beginning to emerge and can be found at Western Michigan University, the state of California, The University of Washington, and Texas State University.¹³ These programs can reduce the college pushout rate within the foster youth population which will then foster better results in all areas of life.

Conclusion

The child welfare system still has much work to do in creating a safe and equitable experience for foster youth. Although there are many initiatives in public and private institutions to alleviate the effects of the child welfare system, we need to get to the root cause of the inequalities in the foster care system. We are unsure of how the child welfare system will address the effects of their practice, but we know change needs to happen. Finally, research needs to be done on how the child welfare system affects indigenous and other ethnic populations. Change is not possible without the acknowledgment of these issues

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