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Foreword

Every institution of higher learning, from the loftiest Ivy League school to a regional community college, is eager to establish itself with an identity. Efforts are made to develop a slogan, a mission statement, a visible symbol—anything, it is hoped, that will put that institution 'on the map.' UW-Stout has a history of establishing its own unique identity and focused mission, one that hasn't really changed so much as it has grown and adapted; starting as the Stout Manual Training School, and continuing now as "Wisconsin's Polytechnic," our focus has always been the application of applied research and learning with the goal of preparing students to enter society and the workforce prepared to face the challenges of the day in changing times.

In a way, this sense of identity is highlighted by the cover art on this volume of the Journal Student Research. We are quite literally 'on the map,' as shown by the vintage map of Dunn County. UW-Stout has been a part of this community for well over a century, and is deeply rooted in the ecological, business and social heritage of the region. Some of the student research featured in this edition reflects this regionalism, such as a business analysis of a group of local furniture stores; a stereotype-challenging 'horror' film plotted on location in Menomonie, and a critical examination of the influence of female STEM teachers, using Stout's own faculty and students as a research sample.

At the same time, every map is part of a larger atlas, and the cultural ground occupied by UW-Stout goes well beyond a myopic interest in this region and its interests; thanks to a large segment of international students, non-regional faculty and staff, Global Perspectives-qualified courses, and study abroad programs, there has never been a greater awareness of the university's role on the larger world stage. This broader awareness is also represented by student research work in this issue touching on Japan (two articles!), West Africa, and Malawi.

As always, I'd like to thank all those who have supported the JSR and helped bring it to fruition. In particular, thanks are due to Elizabeth Buchanan, Stephen Eibes and Ashley Ramaker, all from Office of Research and Sponsored Programs; Ted Bensen of Graphic Communications Management; Charles Lume of the School of Art and Design. Thanks to the advisors who mentored these student submissions through the process, and to the reviewers who helped in deepening the critical quality of the students' work. Emily Wettergren provided the cover design (putting the map on us!); we encourage you to read her concept notes, on page 6.

Maps are wonderful tools for showing where one is, how far one has come, and the possibilities of where one could go. My hope is that Volume XVIII of the *Journal of Student Research* will be a nice representation of all three.

On the Cover Design

"While looking for common ground behind the various subjects covered in the
Journal of Student Research, what they all have in common is the place of origin -
Menomonie, WI.
The final cover design includes a vintage topographic map of Menomonie. The
vintage map gives a nod to the historical aspect of research and how much of today's
research needs to build off of previous accomplishments in order to be successful.
Furthermore, the curves of the topographic map are also reminiscent of folds in the
brain – an essential research component."

Emily Wettergren

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The Curious Link Between Free Will & Time Travel

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Abstract

Philosophers have debated the meaning of free will and if people have free will at all. Despite the years of discussion, no one can be sure if free will exists. When time travel is added to the equation, the discussion becomes even more complicated. While it is currently impossible to willfully travel through time in the real world, the relationship between free will and time travel can be explored in fictional stories. By analyzing time travel stories, it is possible to conduct thought experiments about the relationship between time travel and free will. While there are many stories to choose from, Michael Crichton's *Timeline*, Charles Dickens's *A Christmas Carol,* and *The X-Files* episode "Monday" will be discussed. In addition, the movies *Back to the Future: Part II* and *The Terminator* will be included to provide insight on how time travel paradoxes (specifically, the Grandfather Paradox and causal loops) can impact the free will question. Each story can be related to philosophical concepts, such as determinism, compatibilism, and libertarianism.

Keywords: Free will, time travel, paradox

The Curious Link Between Free Will & Time Travel

It is nice to think that individuals have control over their decisions. The idea of free will is deeply rooted in Western Culture, and therefore, many people easily accept this idea. Unfortunately, popular belief in free will does not prove that it is real. In fact, it is difficult to prove the existence of free will at all. At least, this is difficult in the physical world, where the laws that govern life cannot be changed. In stories, however, authors have the freedom to create their own rules, and the mechanics of free will can be more easily explored. This allows the readers to examine different fictional worlds and relate these fictitious realities to real life. However, most readers never consider how free will can be interpreted in the stories. Free will plays an especially notable role in time travel stories. Even when it seems that these stories demonstrate free will, there may be qualities of the story that limit free will. In some

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stories, such as *A Christmas Carol* by Charles Dickens, *Timeline* by Michael Crichton, and *Back to the Future Part II* there are few storytelling elements that restrict free will. Still, not every author uses the same method of time travel. For instance, some authors may choose to incorporate many different possible timelines, whereas others choose to have only one. With these differing methods of time travel, as in stories like *Harry Potter and the Prisoner of Azkaban*, *The X-Files* episode, "Monday," and *The Terminator*, there are various obstacles that prevent total free will from existing.

Literature Review

An examination of some philosophical theories of free will can help illuminate how free will and time travel intersect with each other. Many of these theories consider what it means to have free will. In some cases, free will is associated with the ability to freely make decisions. For instance, the study, "Free Will is About Choosing: The Link Between Choice and the Belief in Free Will" by Gilad Feldman, Roy F. Baumeister, and Kin Fai Ellick Wong, reveals findings about how everyday people view free will. The researchers claim that most people associate free will with freedom of choice. Without free will, many believe they would not be free to make their own decisions. Overall, this study provides insight about how real people view free will.

In contrast, another source presents a less popular viewpoint: people may not have free will, though it may seem like it. This article written by Stephen Cave is titled, "There's No Such Thing as Free Will: But We're Better Off Believing in it Anyway." Instead of analyzing how people interpret free will, like Feldman's study, Cave discusses philosophical views of free will. Specifically, Cave focuses on theories that suggest free will is an illusion. Not only does Cave describe the various reasons why some do not believe in free will, but he also argues that there is a potentially negative impact from widespread disbelief in free will.

Cave is not the only person to consider the possibility of free will being an illusion. In the article "Is Free Will an Illusion?" Shaun Nichols also examines a few reasons why some people do not believe in free will. Instead of analyzing philosophical theories, Nichols looks at the neurological processes that create consciousness and influence the experience of free will. Additionally, Nichols examines how the unconscious mind can influence decisions, suggesting that decisions may not be as freely made as they seem to be (as some people believe that unconscious decisions are not freely made because they are not consciously made). In contrast to Feldman's study, Nichols describes biological processes that go against the typical outlook people have of free will. Feldman concludes that many believe the ability to make free decisions is an essential part of free will, while Nichols argues that decisions are not freely made.

In ordinary circumstances, there are already complex discussions about free will. However, fictional stories add complexity by including elements such as time travel. Time travel allows paradoxes to be created within the fictional universe which further complicates the analysis of free will. In "Tim, Tom, Time and Fate: Lewis on Time Travel," Brian Garnett outlines the well-known Grandfather Paradox. This paradox occurs when a time traveler does something in the past that threatens his or her own existence. However, this is not the only noteworthy paradox. The causal loop (which is an event that causes itself), as discussed in "Time Travel: A Writer's Guide to the Real Science of Plausible Time Travel" by Paul Nahin, also brings up interesting considerations when discussing free will. When paradoxes can be created, the free will of characters may be limited because the characters may be unable to perform actions that would cause a paradox.

Philosophical Perspectives

Unfortunately, people cannot travel freely through time, so it is impossible to study the connection of free will and time travel in the real world. Even if it is not possible to study time travel in the real world, time travel stories can be studied. Examining these views of time travel and relating them to theories of free will can help open discussions of time travel and its relationship to free will. To fully understand the connection between time travel and free will, it is helpful to look at stories that support (e.g. *Timeline*) and challenge (e.g. the episode "Monday") the typical idea of free will. By examining views from each source and connecting these theories of free will to time travel stories, it is possible to see the potential limitations that time travel places on concepts of free will.

Before discussing the stories, it is important to understand the philosophical concepts relating to free will. People commonly associate free will with the ability of individuals to freely make decisions (Feldman 239). This seems like a simple idea, but it is difficult to define what it means for individuals to make decisions freely. Do people only have free will when they are entirely responsible for their decisions? Or do people still have free will when the decisions they make are influenced by their environment? Philosophical beliefs (such as determinism, indeterminism, compatibilism, incompatibilism, and libertarianism) can help make sense of these questions. Determinism is the view that every event is determined by the events preceding it (Beebee 13). If it were possible to know all the important variables about an event, determinism suggests that it would be possible to predict this event exactly. This is true for seemingly "unpredictable" events, like weather, too. On the other hand, indeterminism suggests that there is not a set of universal laws that determine events and events, such as which specific particles will decay during radioactive decay, are random (Beebee 14-15). The theory of indeterminism does not necessarily mean free will exists. Many believe free will requires choices to be freely made (Feldman 239). If events occur completely randomly, people may not be freely

making decisions.

There debate over whether determinism would allow free will to exist or if free will can only exist in an indeterministic universe. Compatibilism suggests that determinism can exist alongside free will. Incompatibilism, then, suggests that free will and determinism cannot co-exist. Both compatibilists and incompatibilists believe that the freedom for individuals to make their own decisions is a necessity for free will. However, both schools of thought have different ways of defining what is required for individuals to have control over their actions. For a compatibilist, individuals still have control their actions even when those actions are influenced by "universal laws," like genetics. The decisions a person makes may be influenced by universal laws defining a person's character. A compatibilist believes that even with these universal laws, a person can still have free will. Meanwhile, an incompatibilist would disagree and claim that actions influenced by the universal laws were not freely made because the decisions were shaped by external factors (Beebee 24-26).

Lastly, the theory of libertarianism draws some specific conclusions about the existence of free will, and its relationship to philosophical ideas. Specifically, libertarians believe in incompatibilism and believe that individuals can freely make at least some decisions (Beebee 124).

Connection to Time Travel

While the average person may be unfamiliar with these philosophical concepts, many people already have similar ideas about what it means to have free will. According to the study led by Feldman, ordinary people associate free will with the freedom to make their own decisions, even without knowledge of philosophical theories (239). As a result, there is a clear connection between decision making and free will. Both experts and ordinary people see a link between these two concepts. It is no surprise that this idea creeps into time travel stories as well. In *A Christmas Carol*, the ability of Scrooge to freely make his own decisions is essential to the plot. After seeing the bleak future in store for him, Scrooge actively decides to change. Scrooge's decisions are entirely his own, suggesting that he can determine his future. The same is true in *Timeline*. When the characters travel back to medieval Europe, they appear to have control over their decisions. Safely returning to the future is never a guarantee, as the story suggests that the decisions the characters make will lead to success or failure. Both stories follow a more libertarian view. The characters in both stories can choose to do anything, and there is an infinite amount of possibilities for the future. This future is determined purely by the decisions the characters make. In these cases, the factor of time travel does not limit free will.

However, this is due to the unique styles of time travel the authors use. Crichton chose to use a multi-verse in *Timeline*. Essentially, his characters never traveled into the past of their universe. Rather, they traveled into the present of a

different universe (where the present year was 1357), which was consistent with the past of their universe. Because of this, the characters could not truly change the past. They could only act in the present, which gave them freedom to make their own decisions and create the future. Their actions were not limited by things that had already happened in the past, because these events had not happened yet in the alternate universe. As John Abbruzzese explains in the article, "On Using the Multiverse to Avoid the Paradoxes of Time Travel," using the multi-verse as a method of time travel is a convenient way to avoid some paradoxes (such as the Grandfather Paradox or causal loops) created by other methods of time travel (36). However, Abbruzzese also suggests that traveling into a different universe may not be true time travel (37). After all, the traveler seems to be moving through space rather than time.

A similar situation occurs in *A Christmas Carol*: Scrooge never travels directly into his past. Instead, Scrooge sees his past as a vision. He could only watch the events as they had happened, and there were no opportunities for him to change events. Because of this, Scrooge could only directly interact with the present. Without the ability to change the past, Scrooge was able to freely make his decisions. In the novel, Scrooge's freedom to make his own decisions allows him to change his future. The bleak future shown to him is suggested to be one of many possible futures. Based on Scrooge's change of heart, it seems reasonable that Scrooge's future would be much brighter than the one the ghost showed him. At no point in *A Christmas Carol* or *Timeline* were the actions of the characters limited. In accordance with the libertarian perspective, the characters in these stories had free will.

While the characters in *A Christmas Carol* and *Timeline* had free will, this is not true for every time travel story. When the characters actively travel into their own past, it is likely that free will is going to be compromised. Otherwise, paradoxes could arise. One way to avoid paradoxes is to eliminate the alternative choices the characters have in the past. By eliminating alternative choices, the characters only have one option. This is at odds with the defining quality of free will: the power to freely make decisions. However, in many of these stories, the characters still believe they have free will. *Prisoner of Azkaban* provides an excellent example of this situation. At the end of the book, Harry must travel into his past to save Sirius and Buckbeak from execution. There is the illusion of a possibility that Harry could fail, but there is no real threat of failure. The events leading to the need for Harry to time travel were only possible because his mission back in time had already succeeded. In the end, there was only one possible outcome—success. Harry did not have any choices. The narrative of the story suggests that there was only one set of choices that would lead to success. Since the mission had to succeed (because it had already been a success), the alternative choices Harry could have potentially made were eliminated. Essentially, this seems to create a "loop" in the *Prisoner of Azkaban* timeline.

Despite his lack of free will, Harry acts as though he has complete freedom.

There are advantages to this. As explained in "There's No Such Thing as Free Will," the belief in free will allows people to see themselves as responsible for their actions and drives individuals to work hard (Cave). These are certainly traits that the hero should have. If Harry was lazy and irresponsible because of a belief that his decisions would not make a difference, the *Prisoner of Azkaban* would lose its charm. The mission to save Sirius would no longer be a harrowing adventure, but another dull day for Harry, the boy just following his destiny. Overall, the *Prisoner of Azkaban* follows the incompatibilist view. The actions of the characters are determined, and they have no freedom to choose other decisions. Even in this universe, there is still benefit to the characters believing in free will.

The *Prisoner of Azkaban* is not the only story that implies time travel into the past limits free will. Even when it appears that the characters have free will, the underlying rules of the story's time travel method may work against free will. This situation arises in *The X-Files* episode "Monday," where one day is repeated until the characters get it "right." The underlying idea is that there was a predetermined set of events. At one point, this chain of events was thrown off, causing the day to end wrong (unfortunately, an explanation for how this could happen is never given). At the end of each day, a would-be bank robber would realize that his efforts were fruitless. Instead of facing the police, he chose to blow up the bank, killing everyone inside. Throughout the repetitions of the day, the actions of the characters vary, but all lead to the same ending. Eventually, the right sequence of events occurs, and the bank remains standing at the end of the day. Only at this point could time move forward. Like with the *Prisoner of Azkaban*, the actions of the characters are limited to events that can only lead to one outcome. When this outcome is not what it is "supposed" to be, the day restarts. For time to move forward, all the choices the characters make must be ones that are part of the "right" sequence of events. The characters exercise some free will since the details of their daily interactions change, suggesting there is some freedom to make decisions. However, the actions of each character are still limited because there is only one way the day can end. In the end, only one character (the would-be bank robber) can determine if the day will repeat, and his decision is entirely determined by the actions of the other characters. Time could only advance once the right set of actions was accidently stumbled upon. As a result, the episode introduces a simple concept of time travel that becomes increasingly complicated when considering the free will of the characters.

Mulder and Scully add to the complexity when they discuss free will in one of the repetitions of the day. While Mulder firmly believes in free will, Scully suggests that fate has a role to play. Scully voices her opinion that, "We're free to be the people that we are—good, bad or indifferent. I think that it's our character that determines our fate" ("Monday"). Mulder, however, stubbornly sticks to his view of free will, and argues that, "And all the rest is just preordained? I don't buy that. There's too

many variables. Too many forks in the road" ("Monday"). Later, Scully again insists that fate is important, and Mulder confidently replies, "Free will. With every choice, you change your fate" ("Monday"). In this case, Mulder's confidence seems to be misplaced. Since there is a "right" way for the day to end, Scully's belief in fate has some ground. The article by Shaun Nichols supports Scully's view. Nichols suggests that the belief in free will is nothing more than an illusion with the subconscious exercising more control over decision-making than people realize. Considering Nichols's argument and the idea that time cannot go forward without the correct sequence of events, Mulder's belief in free will seems incorrect, while Scully's view is closer to the truth. After all, freely making decisions is key to free will, and the characters do not have this ability in this deterministic story.

Paradoxes

There is already a complicated relationship between free will and time travel. However, the author of a story can add even more complexity to this relationship. Since authors do not have to follow the rules of the physical world in their stories, the rules that authors create for their method of time travel and their view of free will may be at odds with each other. As a result, a paradox can be created. For example, in *Back to the Future Part II* (hereafter *BTTF*), it would be conceivable for the classic "Grandfather Paradox" to be created. In *BTTF*, the time travelers' actions have the potential to change the future. When Biff gives his younger self a sports almanac, a new (and unfavorable) future is created. However, this new reality is not permanently set, giving Marty and Doc the opportunity to fix the timeline. As a result, time travelers in *BTTF* seem to have unlimited free will: they can do anything, and their actions are not limited by the events that happen in the future. The future is not set, and actions in the past change the course of future events. At first, the rules of free will in *BTTF* seem straightforward. The writers gloss over the potential issues to create a fun movie.

However, a deeper analysis of the movie reveals that the complete free will of the characters leads to the potential for paradoxes to occur. In the *Back to the Future* universe, the Grandfather Paradox could be easily created. As explained in "Tim, Tom, Time and Fate: Lewis on Time Travel," the Grandfather Paradox arises if a time traveler goes back in time to kill their grandfather (Garnett 247-248). In this circumstance, the time traveler would both be able and unable to kill their grandfather (Garnett 248). The time traveler would have the same physical and decision-making abilities as normal, allowing him to be able to perform any reasonable action (Garnett 248). However, if the time traveler killed his grandfather in the past, this would change the course of the future. This new future would include a reality where the time traveler was never born. If the time traveler was never born, who killed the grandfather? Garnett argues that this paradox can be avoided. There

may always be some event that prevents the time traveler from killing the grandfather in the past, making the attempt unsuccessful every time (Garnett 248). While this argument makes logical sense, it does not follow the style of time travel presented in *BTTF*. Admittedly, no characters try to kill their grandfather in the movie, but a paradox of similar nature could be created. After all, the characters in this movie exhibit complete free will regardless of their location in time.

In the first *Back to the Future* movie, there is one scene that creates a circumstance related to this paradox. Marty is performing at the Enchantment Under the Sea dance, and he begins to disappear since his efforts to set up his parents have been unsuccessful. The movie does not adequately account for this paradox. Marty's parents did not meet as they should have because of Marty's meddling, so Marty begins to disappear. However, Marty is the one responsible for causing his parents not to meet. If he were to disappear as a result of his blunder, he could not have interfered with his parents meeting because he would have never existed at all. Fortunately, Marty's parents fall in love at the end of the movie and the paradox is avoided.

Perhaps the complete free will of the characters in *BTTF* is only an illusion. Maybe, if it was possible to explore the *Back to the Future* universe in greater depth, it would be impossible for the characters to perform any action that would result in the creation of a Grandfather Paradox, as Garnett theorized in his discussion of the paradox. This would cause the seemingly indeterministic world of *BTTF* to be deterministic. After all, if the characters could not perform certain actions, this would mean that preceding events (such as the existence of the protagonist) would be limiting the actions of the character. As a result, *BTTF* presents an interesting dilemma. It seems that either the characters have complete free will and the ability to create a paradox, or the characters do not truly have free will which eliminates the possibility of creating a paradox. However, Garnett suggests that free will could exist without creating a paradox. Multiple decisions can be made, but external factors will always prevent a paradox from developing (Garnett 248).

The Grandfather Paradox may be one of the best-known paradoxes, but it is not the only paradox to impact the free will of fictional characters. Another paradox, known as a "casual loop," plays a large role in the storyline in *The Terminator*. While *BTTF* leads the viewer to believe that anything can happen, *The Terminator* takes a different approach. Logic used in *The Terminator* suggests that events in the past cannot be changed. The past events have already occurred, and a future has been created based on those events. Even though the time-traveling-protagonist, Kyle, claims throughout the movie that the future is not set, *The Terminator* offers no evidence to support this claim. Every event that occurs is necessary for creating the dystopian future Kyle comes from. In fact, the non-time-traveling-heroine, Sarah, accepts that the future cannot be changed, and the desolate future is inevitable.

Regardless of what Kyle and Sarah believe, the future is predetermined in *The Terminator*, and the actions of the characters are limited to actions that will bring the creation of that future. Unlike *Timeline* and *BTTF*, there is only one timeline in *The Terminator*, and no additional timelines can be created. Any time travel in *The Terminator* involves traveling to a past that already happened. As a result, the past cannot be changed, and the characters can only make decisions that lead to a specific future. For example, John (the son of Kyle and Sarah) always sends Kyle back to Sarah, and Sarah always gives birth to John. These events will always occur, otherwise humankind would cease to exist in the future (which is impossible since Kyle already exists). In this version of time travel a causal loop can be created. In "Time Travel: A Writer's Guide to the Real Science of Plausible Time Travel," Paul Nahin provides examples of time travel stories incorporating causal loops. From these examples, it is possible to derive a definition for this paradox. A causal loop develops when time travel creates a never-ending loop where the original cause of an event is tied to the effect of the event (Nahin 122-124). As a result, there appears to be no starting point for the event. An example of a causal loop exists in *The Terminator*. Before the credits roll, Sarah is shown recording a tape for John, explaining the role he must play in the future. On this tape, she explains to John that he must send Kyle into the past, otherwise he (John) can never be born. However, the reason that Sarah knew that Kyle must be sent to the past is because the future version of John already sent Kyle into the past. Yet, John only knew to send Kyle into the past because Sarah informed him that he must. The pattern continues, looping back on itself endlessly.

As seen from *The Terminator*, any story that creates casual loops prevents the characters from having free will. The existence of a casual loop ensures that the universe is a deterministic one. All actions of the characters are solely determined by a predetermined future. After all, for any time traveling characters, the future of the other characters is their past. Since the time traveler's past cannot be changed, the events leading to the time traveling must occur. Otherwise, the time traveler could not exist in the present time of the other characters. Just like Kutach discusses in "Time Travel and Consistency Constraints," time travel into the past would create a limit on what actions the time traveler could perform in the past (1098). The time traveler's own existence depends on the occurrence of certain events and undoing these events would create a paradox.

Conclusion

The connection between time travel and free will suggests that traveling through time can limit one's freedom to make decisions. When the characters can change their past, there is a need to place limits on the actions they can perform. Impossible scenarios would arise otherwise. Out of all the stories discussed, only in *A Christmas Carol* and *Timeline* did the characters' travel through time fail to impact their ability to freely make decisions. In *Prisoner of Azkaban* and *The Terminator*, there

were narrow paths for the characters to follow. They had one set of decisions they could make and no alternative choices. Even in "Monday" (*The X-Files* episode) and *BTTF*, where the characters arguably had more freedom, they were still limited in the choices they could make. *The X-Files* characters could only make decisions that would lead to a specific outcome, and *BTTF* characters had to make decisions that would avoid paradoxes. One could argue that free will and time travel are incompatible since the stories without "true" time travel (*A Christmas Carol* and *Timeline*) place the fewest limits on free will. Meanwhile, stories like *The Terminator* and *Prisoner of Azkaban* eliminate free decision making. However, one could also argue that free will and time travel complement each other since stories like "Monday" and *BTTF* support the libertarian view of free will. After all, the characters are still free to make some decisions. However, these stories are only fiction. They cannot provide a concrete answer about the link between free will and time travel. Nonetheless, each story offers a unique perspective on the free will question. Which story has the most valid view of time travel? There is no definite answer to that question, which leaves ample room for readers to ponder the answer and decide for themselves.

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School-to-Prison Pipeline; Its Creation, Effects, and How It Can Be Diminished

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Abstract

The school-to-prison pipeline is a term that refers to a system of policies and practices that pushes students out of the classroom and into the criminal justice system and mainly affects children of color, children with disabilities, and children who identify in the LGBTQIA+ community. There are three main reasons for this system of oppression and its continuation: zero-tolerance disciplinary policies, discrimination practices, and policing in schools (nea.org). Instead of providing mediation and counseling to figure out why students act out, schools increasingly resort to punishment pushing more children towards incarceration. This system has been proven to have a greater impact and prevalence in southern schools because of the large population of African American students and the harsh racial history of this region. After looking at existing research about the school-to-prison pipeline, how it operates, and its effects, this paper examines four potential policy changes that could be made to decrease the prevalence of the system. I conclude that instead of increasing the use of school resource officers, schools should look to increasing the use of restorative justice and hiring more professionals to help children rather than punish them. Restorative justice could help diminish the school-to-prison pipeline.

Keywords: Criminal justice system, restorative justice, race

Introduction

The school-to-prison pipeline is a set of practices and policies that contributes to pushing children out of the classroom and towards the criminal justice system. Currently, 82% of prison inmates are high school drop-outs, which could be an outcome of the pipeline (Rodriguez, 2017). Rodriguez explains how this system works: when a student is taken out of the classroom due to misbehavior or absences and is given detentions and suspensions, they are more likely to become a drop-out

(2017). They will resort to dropping out because when they are taken out of the classroom, they easily get behind in school work, and without guidance they feel like they cannot get back on track. The fact that around 1 in 14 students are suspended each year is a huge problem (González, 2012). That number does not seem like a lot, but it is one that could be avoided. In order to address this issue, two very important topics that are extremely relevant today must be combined: criminal justice reform and a school system reform.

The purpose of this research is to examine how the school-to-prison pipeline impacts schools throughout the country and to investigate policies that might mitigate negative effects. Helping diminish the pipeline could be a start to making schools a better and safer environment for everyone. Since this influences the high numbers of people that are in the prison systems, this could also help address the problem of mass incarceration in the United States. Restorative justice could not only be a good solution to implement in the criminal justice system but in schools too.

After looking at four different policy alternatives, I conclude that instead of increasing the use of school resource officers, schools should use restorative justice tools and hire more professionals to help children rather than punish them. The paper will first look at the history of the school-to-prison pipeline and how it affects certain groups of people. Next, I compare policy alternatives to help alleviate the school-to-prison pipeline. Finally, the recommended policy alternative of replacing school resource officers with counselors will be discussed.

History

The school-to-prison pipeline (also called the jail-to-rail or the schoolhouse to jailhouse track) is a problem with various causes. A mixture of unconscious biases and the mentality of being tough on crime play a large role in the pipeline's existence. Unconscious biases, also known as implicit biases, are usually snap judgments that individuals make about certain people or groups of people (McNeal, 2016). These typically happen quickly enough that people do not even realize it. Implicit biases play a role in creating the pipeline because when people have stereotypes about young people of color being dangerous, they tend to link those to other people of color and unconsciously think that they too should be punished (McNeal, 2016). Another reason for the pipeline is that we are in a time where mass shootings have become more prevalent and normalized. Looking to police officers and strict security measures like metal detectors have become common methods used to help keep children safe. Unfortunately, this is where unconscious biases play a role in disproportionately punishing minority students (McNeal, 2016). If police officers see youth, especially young black boys, as potentially dangerous, punishment becomes a way to deal with any behavior problems they might exhibit (McNeal, 2016).

Mass incarceration describes the huge number of people in the prison systems in the United States, and this phenomenon is related to practices in schools (ACLU, 2014). The mentality of being tough on crime has made its way into the school system disguised as zero tolerance disciplinary policies. Just like being tough on crime led to an increase in the prison population starting in the 1970s, zero tolerance disciplinary policies have increased the number of students being pushed into the criminal justice system (ACLU, 2014). These policies have also been shown to disproportionally affect people of color and other minority groups. The prison industrial complex is a term used to describe the quick creation of more prisons to keep up with mass incarceration (ACLU, 2014). The pipeline is an easy way to funnel people unwanted by society and the political systems into a subclass of humanity. The people affected by over-policing are, again, are often people who have disabilities, are people of color, or are of low socio-economic status (ACLU, 2014).

Disproportionality by Race and Gender

Data compiled by the American Bar Association, collected by the U.S. Department of Education Civil Rights division during the 2011-12 school year, is displayed in the next three figures (Redfield & Nance, 2016).

Image 1, above, shows what percentages of the youth in some form of juvenile corrections (detained, convicted in criminal court, diverted, and adjudicated and placed) are from each racial or ethnic group. If removals from school were actually
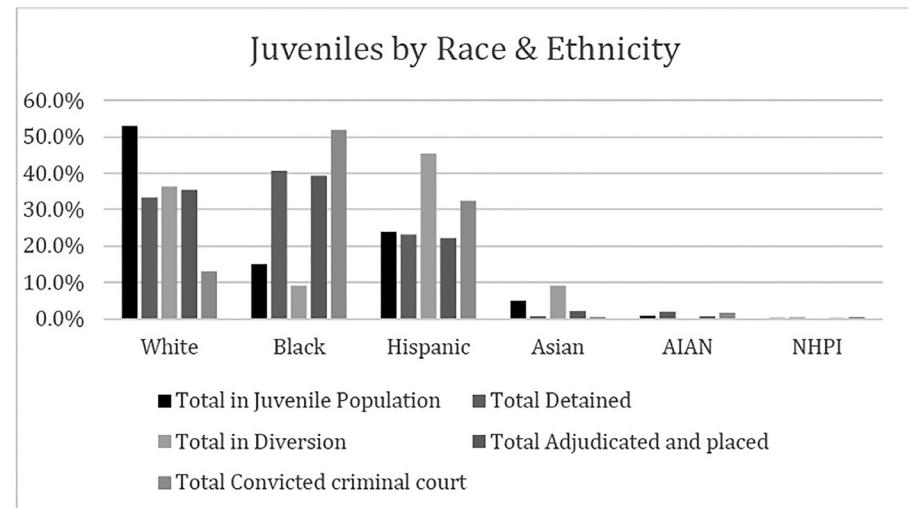

Image 1: Juveniles Detained & Placed by Race & Ethnicity (Redfield & Nance, 2016)

making the schools safer or improved, the outcomes of the students could perhaps be justified, but that is not the case here (Redfield & Nance, 2016). Redfield and Nance show that most removals are for behaviors that do not threaten the safety of

other students (2016). This is further explained by the fact that out of the 3.3 million students being suspended, 95% of them are for nonviolent misbehaviors (Redfield & Nance, 2016).

The most dramatic section of the graph is the black population of students. These students make up only fifteen percent of the school population but are detained, adjudicated and placed at around forty-five percent, while their white counterparts are detained at a rate of around thirty-five percent shows the racial disparity. The white student population in schools is over fifty percent, but they only makeup thirty-five percent that are being handled by police officers, and then only around ten percent that are being convicted is mind boggling. In other words, black children make up a smaller percentage of the student population, but the largest percentages facing the harshest punishments that interrupt their schooling. There is no justification for this racial disproportionality, with studies showing that children misbehave at similar rates across racial categories (Redfield & Nance, 2016).

Image 2 zooms in on how African American children are disproportionately affected by the system compared to other races. This chart compares the percentage of the African American student population as a whole to their percentages among
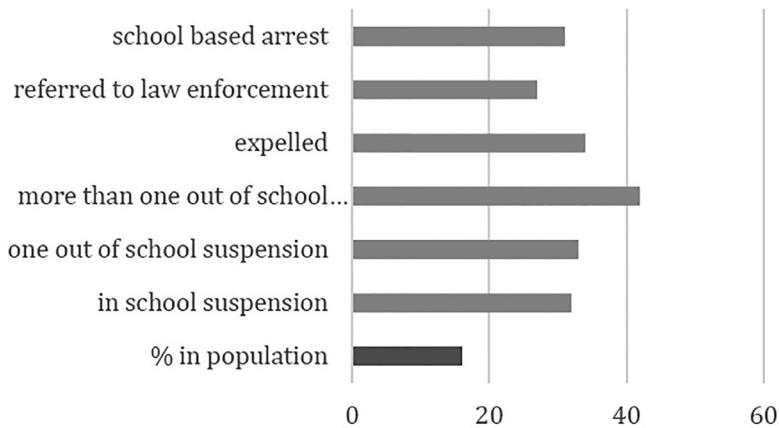
Image 2: Disproportionality Illustrated, African American (Redfield & Nance, 2016)

those with disciplinary actions to prove that there is an uneven representation of black students being disciplined. In the 2011-2012 school year, shown by the graph above, African American students were only sixteen percent of the student population, but they made up thirty-three percent of students who were given out of school suspensions. They also made up forty-two percent of children who received

more than one out of school suspension and thirty four percent of students who were expelled (Redfield & Nance 2016). This bar graph supports that African American students make up a small amount of the school population but are punished at higher rates even though studies prove that all races misbehave at similar rates (Redfield & Nance, 2016).

Image 3 shows that disciplinary actions are taken disproportionately against girls based on their race. Hispanic girls are disciplined at about the same percentage of their makeup of the school population. Again, even though black students are only
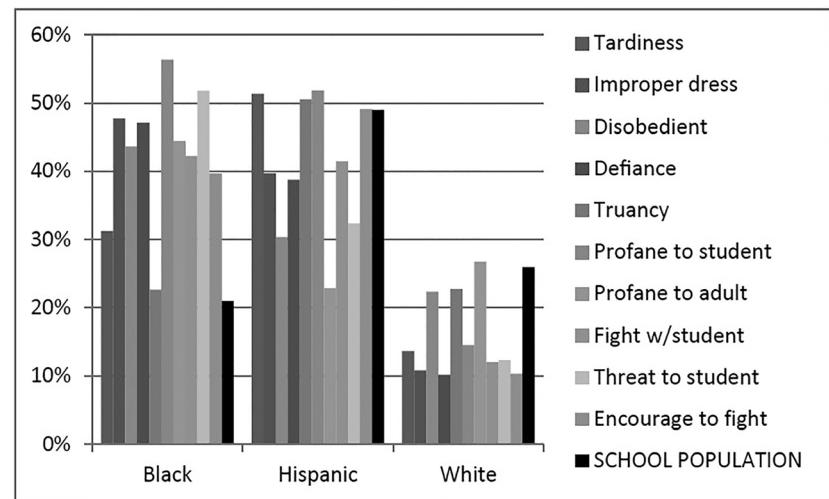
Image 3: Discipline Disproportionately Girls (Redfield & Nance, 2016)

around twenty percent of the school population they are disciplined at around double the rate (40%) of white females, which is around ten to twenty percent (Redfield & Nance, 2016). This emphasizes the role of the different relationships and expectations that teachers have for white female students compared to black female students. Researchers have been able to demonstrate that when minority students have a teacher who holds less discriminatory views, they will do better in the classroom than they would having a teacher that holds prejudicial views towards them (Redfield & Nance, 2016). The self-fulfilling prophecy is where teachers expect certain students to have better performance than the rest, and therefore they get that behavior from those students (Redfield & Nance, 2016). When teachers have implicit biases towards certain types of students, those students are more apt to be labeled negatively. These expectations can be a huge factor and a cause for racial and gender disparities when associating it with their academics and pipeline events (Redfield & Nance, 2016).

Analysis of Policy Options to Diminish the Pipeline

After doing research on policy options to help get rid of the pipeline, I found four especially promising options. The four options include bringing restorative justice techniques to schools, removing zero-tolerance policies, replacing SROs with counselors, and scaling back on strict security. The goal here is to help decrease the prevalence of the practices that make up the school-to-prison pipeline, while acknowledging it might not be possible to get rid of it because there will always be implicit biases that people have. I chose techniques that are action-based, and I did this because these have the best chance to work. One can never get rid of people's personal biases but getting rid of the system that makes it easier for people to act on those biases is a start.

Restorative Justice Techniques.

Restorative justice is about getting at the root cause and providing children with intervention and support to understand why they misbehave (Redfield & Nance, 2016). It is an attempt to stop the harsh cycle of oppression and recidivism that people face when they enter the criminal justice system. Instead of discipline, restorative justice works to rehabilitate people through reconciliation and counseling to help solve the issue, rather than putting a Band-Aid on it. In a Ted Talk, Debra Postil says something that really captures what restorative justice is all about, "asking children not 'what is wrong with you'? but instead asking 'what happened to you?'" (2016). Finding the root cause to the issue, not disciplining the student, and finding ways to help them avoid misbehavior again are the main steps of restorative justice techniques.

Image 4, above, shows two different scenarios or settings that could occur while walking into a school. The first is the current system that schools use to
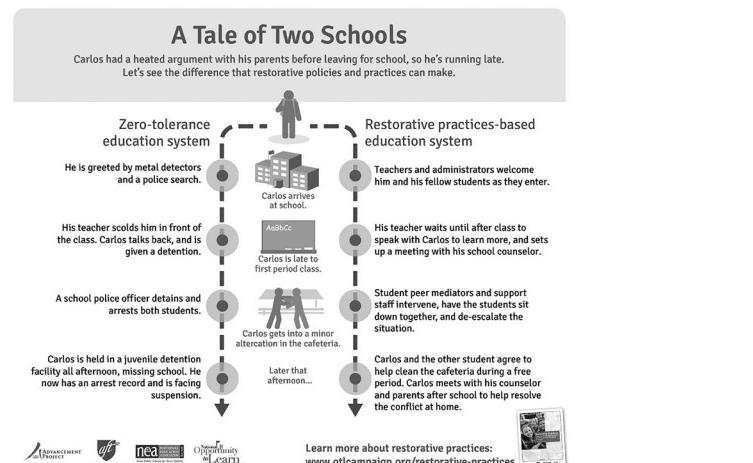
Image 4: A Tale of Two Schools (NEA, 2014)

help people visualize why the pipeline exists. Utilizing zero-tolerance policies and disciplinary actions show negative results. When a student walks into school and is greeted by metal detectors, sets them off because of something that was not a safety hazard, they are then forced to be even more late to class. This then makes the bad start to the student's day even worse and has a domino effect which leads to other events like the student getting into more disciplinary trouble. In the first scenario there is no mediation or any effort to figure out why the student is behaving as they are. The second scenario is an example of how restorative justice techniques can be used in that situation. The student was late to class and instead of the teacher embarrassing the student in front of everyone, they get pulled aside afterwards to get to the root cause of the problem. Students are counseled during a free period of the day, and not pulled out of school to be punished which starts a cycle because they miss more schooling because of this. These two very different scenarios have a huge effect on students, their school work, and the outcome for the rest of their life.

The American Bar Association hosted a Houston Town Hall Meeting on February 6, 2015 where they brought together speakers who talked about the pipeline. Doctor Marilyn Armour talked about the Restorative Justice Project that was piloted in several schools in Texas. She found that this technique dropped tardiness by thirty-nine percent as well as reduced out of school discipline by eighty-four percent (Redfield & Nance, 2016). Using restorative justice techniques that are shown in image 4 changes the whole school climate because of the shift from punishment to building relationships which then changes the attitudes of the students (Redfield & Nance, 2016). Lowering tardiness, decreasing out of school discipline, and creating a healthier atmosphere are all positives that come out of using restorative justice techniques in schools to help reduce the school-to-prison pipeline. The negatives of using restorative justice techniques include that it does not work for all student misbehaviors, there is a long transition period, and it does not work on all types of children. An example of when restorative justice may not work is that not all kids respond to mediation and counseling. Some students may respond better to being punished and having the reality check that there are consequences to their actions.

Having an environment like the second image could make students feel safer and would not create a prison-type atmosphere. Having a school where students are greeted with police officers and metal detectors already makes them feel guilty (Redfield & Nance, 2016). Children can understand how people perceive them and people who are like them, and they can end up taking on these labels (Redfield & Nance, 2016). This can be further explained with labeling theory, which is where when certain groups of people are defined as deviant which leads them to then act in deviant ways (Knutsson, 1977). In this situation of the school to prison pipeline, the metal detectors and other strict security measures are making the children feel like they are guilty/deviant, and they might then act in deviant ways because of this. Using

restorative justice techniques removes easy ways to target certain groups of students who are most commonly affected by the pipeline and eliminates the prison-type atmosphere. Having a school where children are greeted with happy faces and people who want to genuinely help them can make a world of a difference in the attitude of the students and how they act. Changing the school climate and focusing on positive relationships brings positive results.

Removing zero-tolerance policies from schools.

Zero-tolerance policies have been proven to take children away from the classroom and the learning environment, and it is clear this disproportionately happens to minority children. This then produces a plethora of other problems, as discussed earlier. When students are taken out of the classroom and are subjected to suspensions and detentions, they are going to miss crucial class time and then are going to feel behind, which is going to result in additional misconduct (Rodríguez, 2017). Many agencies like the American Bar Association have studied the school-to-prison pipeline and have concluded that zero-tolerance policies are counterproductive and do not create a healthier school climate (Nance, 2016). Instead of having zero-tolerance policies, schools can switch to mediation techniques and other reformative programs. Having these types of programs in place could get at the root cause of why children are acting up and help them avoid future altercations. Removing zero-tolerance policies could, however, be dangerous to teachers and other students because they include getting rid of security measures that can help keep children safe in the case of severe violence.

Replace officers with counselors.

Counselors are needed to provide more social support and mediation to all students, but especially the ones who need the extra help. These students need better trained teachers and administrators to help them cope with their issues rather than disciplinary actions that do not get at the root cause of their misbehavior (Nance, 2016). Even if schools are not able to replace the officers, then they could use better training, especially when dealing with children with disabilities (Nance, 2016). Establishing ground rules and job requirements of School Resource Officers (SROs) can help them know that their job is to make the students feel safe. Training them to not get involved in routine disciplinary matters could help them fulfill their initial purpose (Nance, 2016). One potential negative outcome from removing officers might be a reduction in safety for everyone in the school because most teachers are not trained in the same way officers are. This is where training in de-escalation techniques and other situations for teachers and other staff would be effective. The option of replacing officers with counselors is further explained in the recommended alternative.

Scale back strict security measures.

In a time where school shootings are increasingly common, people look to metal detectors, random searches, drug-sniffing dogs, and police searches to help diminish crime. It has been proven that these measures do the opposite (Nance, 2016). Matthew Mayer and Peter Leone conducted research on around 7,000 students and concluded that schools' use of metal detectors, security guards, and other strict security measured were actually associated with higher levels of school disorder, crime, and violence (Nance 2016). This also takes us back to Figure 4, which shows that having a more positive school atmosphere can make a whole world of a difference. Getting rid of strict security measures can give schools a healthier learning environment for children. Yet again removing strict security measures will put the children and staff of the school at risk for potential harm. In situations where a student brings in a knife, gun, or any other sort of weapon, the schools may not be equipped to handle these situations without metal detectors or school resource officers. This is where training and using a technique of talking with the student and calmly deescalating the situation will be more effective in the short and long run than turning a gun on the student. Limiting the use of law enforcement in regular day routine misbehaviors by students is what the goal is. Having school resource officers in the building is proven to do more harm than good, especially when they are put there to avoid situations that are very rare. In conclusion, preparing for a rare emergency has pushed countless students into the criminal justice system instead of helping them.

Recommended Alternative

For a problem that has a plethora of working parts, it is difficult to narrow it down to one alternative or solution. But, after research, the best option would be to replace school resource officers with counselors or social workers. Chongmin Na and Denise Gottfredon found that as schools increase their use of police or SRO's, they have higher rates of crimes involving weapons and drugs. They also report a higher percentage of less serious violent crimes to law enforcement (2011). SROs have been added to schools without the decision being researched enough. Adding school resource officers, most importantly, takes away funding for hiring more counselors and the ability to implement programs like after-school programs and other programs that build character (Nance, 2016).

Having SROs additionally familiarizes the students with the justice system and makes petty crimes normal. Even if replacing the SROs was not an option, if they were given the proper training to deal with students like children and not criminals, this could make an important impact. Like everyone else, police officers have their own hidden biases that do affect the types of students they arrest. The main problem

with SROs is that, compared to school administrators and educators, they do not have advanced training in discipline, pedagogy, and child psychology (Nance, 2016). As explained in a case study by Wendy Haight, even the special education teacher did not know how to correctly handle a student with disabilities. How can a school resource officer be expected to do the same (2016)?

Social workers or other licensed support specialists are trained to adequately help students. SROs are specially trained to handle altercations and to punish children for misbehaving, even when it is a minor altercation. Having people on staff to work towards helping children and find the root cause of their misbehaviors so they can avoid them is huge. Yes, there are instances where having school resource officers would be beneficial. Some positives of having the presence of school resource officers include, quicker police call response times in case of emergencies, increased perceptions of safety, and fewer distractions from teachers and allowing them to focus on other students (Raymond, 2010). They are not doing what they were put in schools to do and are creating biased results, that is why they need to be replaced with professionals who are there to help the students.

Implementation of what seems like a completely new method of setting up schools is going to get a lot of backlash, especially in this current political climate. This change in schools could be seen and portrayed as radical, even though schools used to not have officers present. That is why it would be more beneficial to make small incremental changes at this time. This will benefit not only the school systems and the children, but the attitudes towards the policy. Having incremental changes will also be the best option because it is going to make updating and revising the policy so much easier than one big change. Getting people on board to change the way schools have been for a while is not going to be easy. But this policy change is one that is needed to start the healing process of both the criminal justice system and the school systems.

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Friday the 13th: How Superstitions, Luck, and Mood Influence Decision Making

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Abstract

A superstitious belief has the power to affect how people go about their everyday lives and how they even will go out of their way to protect or enhance their future. The purpose of this research was to examine the connection between superstitions, luck, and mood on a risky decision task. Although Friday the 13th, did not directly impact decision making (Study 1), mood states were found to be significantly lower on Friday the 13th relative to mood on Friday the 20th. Additionally, negative mood states significantly predicted safer decision-making on a risky decision-making task (Study 1 and 2). This finding suggests that Friday the 13th may have had an indirect impact on decision making. Individual differences in the perception of luck and superstition was also examined.

Keywords: Superstition, luck, mood

Friday the 13th: How Superstitions, Luck and Mood Influence Decision Making

People tend to be influenced by perceptions of luck depending on if it is good luck or bad luck. Some may adopt well known rituals (e.g., knocking on wood) or beliefs (e.g., Friday the 13th is unlucky), while others may develop their own personal rituals (e.g., personally lucky item). These superstitions are often used as methods

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of coping or protecting oneself from sources of stress. For example, in its original form, knocking on wood was an expression intended to ward off the evil eye, an evil gaze which will inflict bad luck or harm someone (Berger, 2013). Often, the meaning may be lost or reinterpreted. For example, many people may be familiar with the concept of knocking on wood but may think it is to avoid "jinxing" something instead of warding off an evil look from another (Berger, 2013). The goal of the current study was to examine how differences between people's beliefs in superstition or luck influence decision making.

In order to understand how superstitions could influence performance, Paola, Gioia, and Scoppa (2014), examined how superstitions regarding numbers influenced confidence for exam performance. In this study, participants were randomly assigned to complete exams at desks numbered as lucky or unlucky numbers. Participants were then asked to rate how confident they felt about their exam performance after completing the exam. Interestingly, the presence of lucky numbers enhanced the perceptions of confidence for men; while the presence of unlucky numbers reduced confidence in women. Men's confidence was not influenced by unlucky numbers. Similarly, women's sense of confidence was not bolstered by the presence of lucky numbers (Paola et al., 2014).

This research by Paola and colleagues (2014) suggests that we can be influenced just by the awareness/presence of lucky/unlucky numbers. Schwarz, Zwick, and Xu (2012) examined how decision-making can also be influenced by thoughts of luck through the idea of cleanliness. In their study, participants were asked to recall a previous good or bad luck experience. In a seemingly unrelated task they were then asked to do a product review of some hand soap. Some of the participants, focused on the appearance of the soap bottle, while others had the opportunity to try the soap and wash their hands. In this study, the premise was that one may unconsciously feel as though they had "washed away" the bad or good luck experience previously recalled. Schwarz and colleagues (2012), found an interaction effect in which people were more likely to select the safer choice if they had recalled bad luck, but not had the opportunity to wash their hands, or if they had washed their hands after recalling good luck. In contrast, participants who could "wash away" the bad luck or retain their good luck recall (not washing their hands) were more likely to select the riskier option in the decision-making task.

The purpose of the current study was to examine a similar connection by examining how unlucky dates (Friday the 13th) influence decision making. Historically, it is unknown why this is such a spooky day and why some individuals are so afraid of it. Interestingly though, behavioral scientist, Jane Risen, has found that superstitions affect everyone, even those who are not superstitious (interview of Jane Risen, as cited in Handwerk, 2018). On Friday the 13th, some people have been found to refuse to travel, buy a house, or trust a stock tip, all of which could result in

a temporarily slowed economy (Handwerk, 2018). Knowing the impact that this date has had historically, the current researchers sought to learn if priming participants with the actual date, completing a task on Friday the 13th, would influence decision making on a risky decision task, differently than on other, more neutral, Fridays (dates other than the 13th). It was hypothesized that participants primed with an unlucky date (Friday the 13th) would make safer financial decisions relative to those primed with a neutral date, (Friday the 20th).

Study 1

Method

Participants. Participants were recruited through the social media site, Facebook, using a snowball sampling technique. Of the 302 participants recruited, 77.15% were female, 16.56% male, 0.66% of them identified as gender fluid, and 0.66% selected the "other" option. The age of the participants ranged from 18 to 75 years of age (M = 38.85, SD = 13.92). The ethnicity of the participants was predominantly white/Caucasian (89.07%).

Materials. Participants in this study were asked to respond to a hypothetical financial choice scenario that was previously used by Schwarz, Zwick, and Xu (2012). In this task participants were asked to make a choice regarding a financial risk, either a risky option (low probability but high reward) or a more conservative option (high probability with a small reward).

Participants completed two single-item questionnaires regarding their current mood state and personal beliefs about luck and superstition. Current mood was rated on a seven-point scale (1 = *very negative*, 2 = *somewhat negative*, 3 = *slightly negative*, 4 = *neutral*, 5 = *slightly positive*, 6 = *somewhat positive*, 7 = *very positive*). Perceptions of their own luck was rated on a seven-point scale (1 = *very unlucky*, 2 = *somewhat unlucky*, 3 = *slightly unlucky*, 4 = *I don't believe in luck*, 5 = *slightly lucky*, 6 = *somewhat lucky*, 7 = *very lucky*). Participants were also asked if they believed they were superstitious and were given the following three response options: *yes, no, only for some things*. At the end of the experiment participants were debriefed about the Friday the 13th manipulation, and then asked to identify the extent to which they felt Friday the 13th could influence their response to the risky decision question on a four-point scale (*not at all, maybe, somewhat, and definitely*).

Procedure. A recruitment ad was placed on Facebook it stated that the purpose of the study was to examine how the day of the week impacted decision making. The survey was made to appear as though the survey could be completed on any day of the week (options on the survey allowed participants to identify the current day as being any day of the week, Sunday-Saturday) over a four-week period, however, the recruitment ad and survey link were only released on two Fridays

(Friday the 13th and Friday the 20th) and was taken down the next day (Saturday the 14th and Saturday the 21st). To ensure a diverse sample, and not repeat participants, the Facebook recruiting post was posted on 8 personal pages across the country on Friday the 13th. Eight other personal pages were utilized on Friday the 20th, also from across the country. At the beginning of the Qualtrics survey, participants were asked to identify which day of the week it was (Sunday - Saturday), based on their response they were then asked to select the specific date for that month (Friday the 6th, Friday the 13th, Friday the 20th, or Friday the 27th). This was done to ensure that participants in the unlucky condition were aware that the current date was Friday the 13th and not just a generic Friday when they selected it.

Participants then read the hypothetical financial scenario and selected between a safer vs. a riskier response (Schwarz et al., 2012). Participants were then asked to rate their current mood state, their own perceptions of luckiness, and whether they were superstitious or not. Afterwards, participants were debriefed about the Friday the 13th manipulation and asked to think how much the day influenced their decision on the task (Friday the 13th condition), or how much they thought it might impact them if they had taken the survey on a Friday the 13th (Friday the 20th condition). Afterwards participants were thanked for their time and interest in the project. No additional form of compensation was provided.

Results

In this study, participants' decision-making preferences were examined in relation to the type of day that they completed the study, as well as participants' own self-reported superstitious beliefs and perceptions of luck. While the researchers viewed the idea of superstition and luck to be one and the same, the participant reports demonstrated something very different (see Table 1). Of note, 51.22% of the participants acknowledged either having personal good or bad luck but did not acknowledge being superstitious.

	Bad luck	Good luck	Total
Beliefs Match			
Luck/Superstitious	10.80 (8.02)	15.68 (22.84)	25.44 (30.86)
No Luck/Not Superstitious	-	-	18.82 (15.43)
Beliefs Mismatch			
Luck/Not superstitious	14.63 (13.58)	36.59 (32.10)	52.26 (45.68)
No Luck/Superstitious	-	-	3.48 (2.47)

Note. For Study 1 $N = 302$. For Study 2, $N = 170$. Study 2 Percentages are in ( ).

Table 1. Percentages of participants matched self-reported beliefs (Personal Luck: Good or Bad) and Superstitiousness (Study 1 and 2).

While it was hypothesized that participant would make safer choices on Friday the 13th, relative to Friday the 20th, the results of an independent samples t-test revealed that this hypothesis was not supported, $t(85) = 1.71$, $p = .090$. Although not part of the original analysis plan, it was found that moods were directly impacted by the date, $t(259) = -3.01$, $p = .003$, $R^2 = .03$. Specifically, participants reported significantly lower mood states on Friday the 13th ($M = 4.77$, $SD = 1.37$), relative to Friday the 20th ($M = 5.27$, $SD = 1.30$). When comparing the data separately for each date, it was revealed that participants who chose the risky option on Friday the 13th had significantly better moods ($M = 4.93$, $SD = 1.44$), relative to those who chose the safer option ($M = 4.40$, $SD = 1.31$), $t(112) = -2.07$, $p = .041$, $R^2 = .04$. On Friday the 20th, however decision making did not differ based on mood, $t(85) = 1.71$, $p = .090$.

In addition to identifying how the date could influence decision making, the researchers were also interested to learn if the participants believed that the date would have the power to influence their decision making (see Table 2). Of the participants who completed the survey on Friday the 13th, 24.44% stated that they believed the date did, or might have impacted their choice. Interestingly, almost half of this group also reported not being superstitious. On Friday the 20th, however, only 13.95% reported that completing the survey on Friday the 13th would or might have

	Possible	Not Possible
Friday the 13th		
Superstitious	12.59	20.28
Not Superstitious	11.88	55.24
Friday the 20th		
Superstitious	9.30	19.38
Not Superstitious	4.65	65.89

Note. Participants in the Friday the 13th condition were asked to reflect on whether the current date had an impact on them. Participants in the Friday the 20th condition were asked to reflect on whether the date *would have* impacted them, if they had completed the task on Friday the 13th. For both conditions, participant percentages in the "possible" category responded with either: maybe, somewhat, or definitely. Participant percentages in the "not possible" category responded with not at all.

Table 2. Participants reflections on whether they felt completing the study on an unlucky day (Friday the 13th) could influence their decision-making behavior on the task (percentage).

influenced their decision-making. Additionally, a chi-square test of independence was performed to examine the relation between the date (Friday the 13th and Friday the 20th) and whether participants believed that the date may have influenced their decision. This relationship between these variables was significant, $X^2(1, N = 273) = 4.17, p = .041$, participants were less likely to endorse the possibility of being influenced by the date on Friday the 20th relative to Friday the 13th.

Study 2

In Study 1, it was found that mood appeared to be impacted by the awareness of the unlucky date, and although not predicted, one's mood state was predictive of the type of decision that they made (worse moods resulting in safer decision making). One possible interpretation of this data is that the unlucky date did, in fact, influence decision making; however, there may not have been enough participants in the study to find the effect. One concern with Study 1 is that the mood rating occurred after both the date awareness manipulation and the decision-making task itself. The purpose of Study 2 was to create a more controlled examination of how mood states and luck/unlucky associations influenced choices on the decision-making task. Previous research has found that more neutral or negative mood states often result in safer decision making (Chou, Lee, & Ho, 2007). Additionally, Thaler and Johnson (1990) found that previous experience with losses or gains impacts future risky behaviors. Specifically, they found that when participants had losses in previous trials with financial luck, they were less likely to make the risky choice than those who had previous financial gain. Thus for Study 2, the researchers wanted to examine how recalling past financial luck (good and bad) influenced behavior. In Study 2, reporting of current mood states was counterbalanced with a good/bad luck recall activity to better understand how thinking about one's mood or one's experience with luck influenced decision-making performance. For Study 2 the researchers wanted to examine if mood states or luck would influence performance. Specifically, it was predicted that people in more negative mood states would make safer decisions relative to those in a good mood state. Additionally, consistent with the hypothesis from Study 1, it was predicted that people primed with bad luck recall would make safer decisions relative to those who had recalled a good luck experience.

Method

Participants. Participants for this study were recruited to complete the online survey in two ways. Of the 170 participants, 100 of them were recruited through a participant pool at a mid-size Midwestern university, while the other 70 were recruited through Facebook using a snowball sampling technique. Females comprised 64.71% of the participants, 27.65% were male, 1.18% were gender fluid, and 1.18% identified as being of a different gender. The age range for the participants was between 18 and 74 ($M = 25.99, SD = 12.08$). The ethnicity of the participants was

predominantly white/Caucasian (88.24%). Demographic characteristics between the two groups were relatively similar, the makeup of the Facebook group was slightly older, and had a slightly higher percentage of females.

Materials. The materials for Study 2 were similar to those used in Study 1. In both studies, participants were asked to rate their current mood state, complete the same hypothetical financial choice scenario, rate their own perceptions of luck, and identify if they were superstitious.

The major difference between the two studies was the order of the questions, and the prompt used to prime thoughts of luck/superstition. In Study 1, Friday the 13th was the prime. In Study 2, participants were asked to recall a time in which they experienced financially bad/good luck. Half of the participants were asked to recall a time of bad luck, while the other half were asked to recall a time of good luck.

Procedure. Participants were recruited through the university's participant pool or via a Facebook post shared on the research team's personal pages. Participants were informed they were being asked to complete a financial decision-making task. Participants were then randomly assigned to the experimental conditions. Half of the participants were asked to first report their current mood state and then recall a past experience in which they had good or bad luck financially. The other half of the participants were asked to recall an experience with either good luck or bad financial luck first, and then completed the mood measure. After participants were primed with the luck and mood manipulations they responded to a hypothetical financial question. After hypothetical questions participants were then asked to respond to perceptions on their own levels of luck, superstitious beliefs, and demographics. Afterwards participants were thanked for their time and interest in the project. For those who completed the study as part of the university participant pool, course credit was awarded. For those who completed the study via Facebook, no compensation was provided.

Results

As in Study 1, participants were asked to self-report their own superstitious tendencies and perceptions of personal luck, which resulted in similar discrepancy, with 45.68% of participants identifying as either having personal good or back luck, but not acknowledging being superstitious (see Table 1).

Using a between-subjects ANOVA, it was found that neither the luck prime, $F(1,159) = 1.68, p = .198$, mood position prime, $F(1,159) = 0.00, p = .952$, nor the interaction, $F(1,159) = 1.30, p = .256$, predicted decision making. However mood, in general, did predict decision making, $F(2,160) = 5.46, p = .005$ (see Figure 1). A Tukey HSD post hoc analysis revealed that positive moods resulted in significantly

more risky decision-making, relative to individuals in a neutral mood ($p = .015$), and a marginally significant increase in risky decision-making compared to those in a negative mood ($p = .057$).

General Discussion

In Study 1, it was predicted that participants would be more likely to make safer financial decisions on an unlucky day; the day itself, however, was not found to overly influence decision making. Interestingly, participants were more likely to
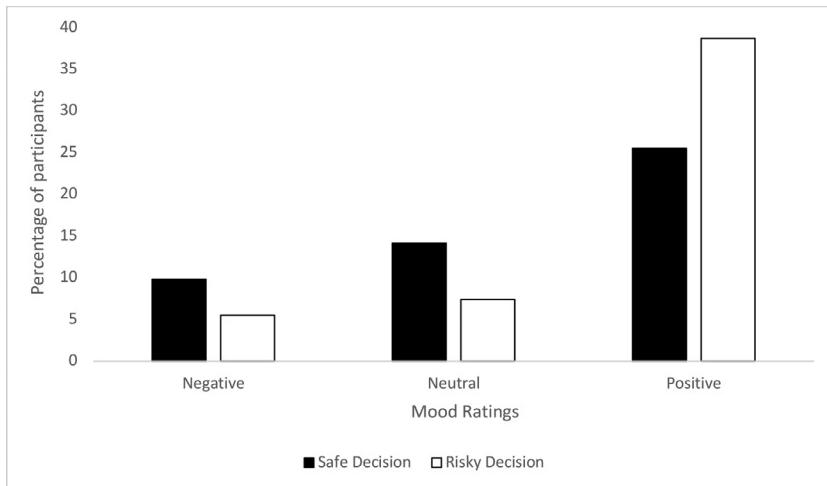

Figure 1. Percentage of decisions (risky and safe) made based on mood.

report being in a negative mood on Friday the 13th than they were on Friday the 20th. Along with this finding, a more negative mood state was predictive of safer decision making in both Study 1 and Study 2. This aligns with previous research where Schwarz, Zwick, and Xu (2012) found that when initially primed with good luck they were more likely to make risky choices rather than when they were primed with bad luck. In this case Friday the 13th was considered bad luck, when priming participants.

Considering participants' acknowledgement of their own superstitions and luck beliefs, an interesting mismatch was identified. It was found that many of the participants denied being superstitious, however, almost half of the participants, across both studies, identified as believing that they were personally lucky or unlucky. It was also found that those who said they were superstitious believed that good luck and bad luck affected them less than those who did not believe they were superstitious. In Study 1, it was also found that 16.5% of participants who identified as not being superstitious were open to the idea that Friday the 13th could have influenced the decision that they made on the task. One explanation considered by the researchers is that there may be different connotations associated with luck

relative to superstition. Future studies could examine the possibility that perceptions of personal luck may be perceived as more socially acceptable than acknowledging one's own superstitious tendencies.

In Study 2, mood did, overall, predict decision making. When looking at the combination of both mood and luck, when mood was primed first, decision making was not affected. Luck, however, was trending toward influencing decision making when bad luck was primed. This resulted in more risky decision making, while when good luck was primed participants tended to make less risky choices. It is possible that with a larger sample size this effect may have been significant. In previous research it was found that when people are in a better mood, they will make riskier choices (Chou et al., 2007). This finding was replicated in the current research when participants were primed with good luck. One thing that did not align with the Chou and colleagues (2007) study was that when participants were in a good mood, they were more likely to choose risky decisions while when mood was primed first for the current study decision making was not affected. The reason behind this could be because the research focused on priming good luck and bad luck. The researchers did not prime good mood or bad mood but simply asked the current mood of the participants.

Limitations

There were some limitations regarding sampling from Study 2. The participants were recruited from two different sources, with one of the sources being from the university's participant pool and the second was from Facebook. The reason that this could have been a confounding variable is participants from the participant pool were motivated to take the survey in order to receive course credit, whereas participants who were recruited through Facebook may have had other motives (no incentive was offered in the Facebook version), such as helping the researcher, boredom, or something else. Additionally, within study 2, there was no condition to examine the effect of mood along with a luck prime, thus making it more difficult to interpret the full extent that mood may have influenced decision making.

Conclusion and Future Directions

Future studies could incorporate some of these missing elements, such as a mood only condition, as well as more closely examining how priming good versus bad luck may influence the relationship. It may also be useful to examine how the possible connotations associated with superstition, luck, and other such terminology may differently serve to prime participant behaviors and decisions.

Overall, the perceptions of luck and superstition seem to have some effect either in the choices we make or at least in the perceptions of why we make choices. Especially when it comes to making important decision, such as financial decisions

for our future, it is important to understand what possible biases, such as luck or superstitions, might influence us. Creating more awareness about these unintentional influencers in one's day to day life, may be useful in helping others attempt to make more rational decisions, despite possibly unlucky elements perceived in their environment.

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Game of Sofas: Furniture Sales in Menomonie, WI

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Abstract

In December of 2016, Slumberland opened its doors in Menomonie, WI thereby increasing the level of competition in a relatively small market. In this paper, the furniture market of Menomonie, Wisconsin is analyzed. Local firm level data is used to measure the intensity of competition, parity of sales, and market power. Examining pricing techniques employed by the firms, an outlook on future furniture sales and contemporary issues are also discussed. This analysis provides insights about contemporary and future competition in Menomonie furniture market. The findings suggest that the newest entrant in the Menomonie furniture market has become the largest local provider of furniture sales and utilized advantageous price techniques. It is estimated that Slumberland is currently responsible for 60% of local furniture sales and is also able to maintain the largest mark-up on their products. These results indicate that Slumberland has obtained a dominant position with respect to market share and market power. However, online furniture sales continue to increase, which could impact physical retail stores due to their operating costs.

Keywords: Furniture sales, local competition, HHI, price anchoring

1. Introduction

Furniture is a key aspect of everyday life that builds and influences the spaces around us. Often it is used for decoration or to fill space, but most importantly it is to be physically interacted with. Most consumers will navigate the furniture market at least once, if not multiple times, in their lives. Furniture is often a major expenditure for consumers and as a result, furniture stores have a significant impact on consumers' budget and access to specific products. This paper analyzes the furniture market of Menomonie Wisconsin, as well as examines the outlook of the furniture industry and contemporary issues facing the industry.

As of 2018, the U.S. furniture store industry is comprised of 29,457 firms. The Midwest (states in the "Plains" and "Great Lakes" area in Figure 1) accounts for 15% of the of the national market. Wisconsin and Minnesota combined only make up

2.6% of the national market, containing close to 383 firms each (Palmer, 2017). The firms located in Menomonie make up about 0.01% of the National market and about 0.78% of the market in Wisconsin. Figure 1 provides: 1) the location of three firms that make up the Menomonie furniture market and 2) each state's share of national furniture sales. This analysis focuses on local stores that exclusively sell furniture, which excludes department stores like Walmart and Mills Fleet Farm. For this market analysis, department stores do not compete directly with furniture stores due to their quality and variety. Focusing on stores that locally sell and deliver assembled furniture, quality is indicative. Also, when comparing the quantity of furniture displayed in-store, variety is essential in comparing competing and non-competing firms.
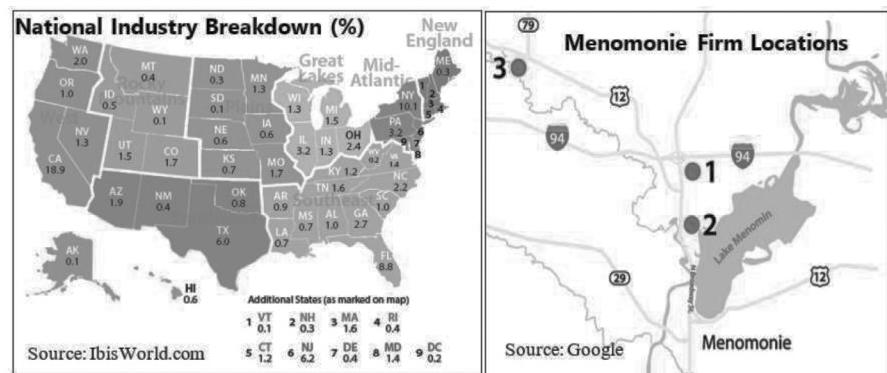

Figure 1. Furniture sales as proportion of National sales and Furniture firm locations in Menomonie, WI. Firm locations shown: 1 - Slumberland Furniture, 2 - Furnish123, and 3 - Rassbach's Furniture.
Source: Palmer (2017) Ibisworld.com and Google.

2. Local Firms and Products

To better understand the local furniture market, this section begins by examining each firm currently operating in Menomonie. Sales, clientele, product offerings, prices and discount offerings were collected directly from the company at individual branch locations in person. This data will be used to directly compare the competition in the market and calculate market power.

Rassbach's was the first to enter the Menomonie market in 1969. This store is family owned and located about five miles northwest of downtown Menomonie. This location is the second largest of the three firms that will be analyzed, housing 30,000 sq. ft. of space, and offers brands that include: Best Home Furnishings, Best Craft Furniture Inc., Wolfcraft Furniture, Lane Furniture, Flexsteel, Franklin Corporation, Marshfield Furniture, Spring Air, and Restonic. Based off manufacturers wholesale pricing and distribution in the furniture market, their estimated markup is to be

between 30% and 40%. Collecting floor discounts and tracking sale prices, the average discount calculated on sale items came out to be about 18.50%. Rassbach's also provides additional services including delivery and financing. Their delivery service starts at a base price of $40.00 and increases with distance. Their financing consists of a 90 day no interest loan.

Furnish123 opened in 2010, located on North Broadway Street in Menomonie, as one of three privately owned stores. This store has the smallest physical presence of the three stores examined, at only 13,000 sq. ft. Ashley Furniture is the main brand found at this location, other brands include: Signature Design by Ashley, Sierra Sleep, Serta, Mild America Bedding, Millennium, Howard Miller, Catnapper, International Furniture Direct LLC, Jofran Inc., Klaussner Home Furnishings, Marshfield Furniture, Jackson Furniture, and Benchcraft. The markup is estimated to be between 30% and 50%, with a calculated average discount of 23.91%. Furnish123 focuses on a specific clientele (college students and new residents), and also provides delivery services and a financing plan. Their delivery fees start at $49.00 and they offer a 12 month, no interest financing option.

In December of 2016, Slumberland opened its doors in Menomonie. Slumberland is different from the other stores due to its corporate ownership. Headquartered in Minneapolis, the company is comprised of over 125 locations in 12 states across the Midwest. Out of those 125 stores, Menomonie's ranks in the top five in size, having close to 35,234 sq. ft. The company is the largest seller of La-Z-Boy furniture in the nation. Other brands include: Broyhill, Reverie, Kodiak Furniture, Legends Furniture, Hughes Furniture, Modus Furniture, Dimensions, Overman International, Futura Leather, Franklin Corporation, Powell Home Fashions, Bauhaus Furniture, Sealy Mattresses, Beautyrest and BeautySleep Mattresses, Tempur-Pedic Mattresses, and Stearns & Foster Mattresses. The estimated markup is to be between 30% and 60%. The average calculated discount is 54.04%, suggesting that their markup may be to already discounted price, rather than the listed suggested retail price. Another word for this type of sales, is *price anchoring*[1] . Price anchoring makes it difficult to estimate actual markups and discounts, so for calculation purposes, all markup calculations will be to Slumberland's discounted price rather than to their suggested retail price. Slumberland also provides a delivery service and financing option. Shipping is $59.00, and if requested, there is $100.00 service fee to install the furniture. Slumberland also offers a 36 month, no interest financing option.

In general, the furniture industry is fairly mature and the products offered can be segmented in to four categories, dining room furniture, bedroom furniture, living room furniture, and other (Palmer 2017, p. 13). Figure 2 provides a break-down of furniture sales by product type. Dining room furniture makes up 13.8% of industry,

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[1]   Setting suggested retail price above consumers estimated price point, so when discounted, the product value increases, giving consumers "a deal".

and consists of dinner tables, chairs, sideboard cabinets, serving carts, bar stools and wine storage units.
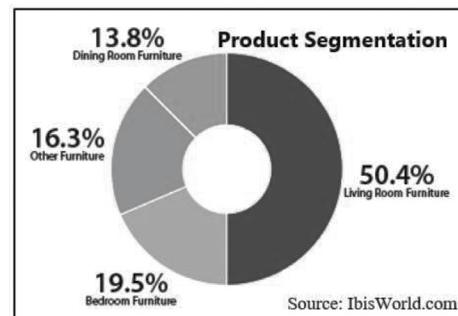
Figure 2. National furniture sales by product type.
Source: Palmer (2017) from Ibisworld.com

Bedroom furniture accounts for 19.5% of the market and includes beds, headboards, dressers, chests, armoires, bed benches, bookcases, chairs, vanities and nightstands. Mattresses, box springs, cots and waters make up the majority of revenue for this segment. Living room furniture, which is the largest segment at 50.4%, includes coffee tables, sofa tables, end tables, sofas, loveseats, chairs, bookshelves, ottomans, display cabinets, consoles, and TV stands. This segment also includes dual-purpose furniture, such as sleep sofas, daybeds and futons. The "Other" segment is comprised of office furniture, infant furniture, outdoor furniture, and decorative goods making up 16.3% of the industry (Palmer, 2017, p. 14).

3. Competition and Concentration Measurement

This section examines the level of competition concentrated between the furniture stores in Menomonie. Concentration is low due to the limited number of firms. Based off the characterization of each firm, and the assumption that each firm is selling comparable furniture, estimated sales is used as a proxy for output[2]. Estimated sales for each firm were collected in store, in person. The data collected shows Slumberland has the largest share of sales in the market at 60%, followed by

Firm (N)	Estimated Sales	% of Market	Cumulative %
1. Slumberland	3,000,000	60%	100%
2. Furnish123	1,100,000	22%	40%
3. Rassbach's	900,000	18%	18%
Total:	5,000,000	100%	

Table 1. Market share of sales for firm in Menomonie, WI.

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2   The level of vertical integration (which is discussed later) may affect the appropriateness of this proxy.

Furnish123 at 22% and Rassbach's 18%, respectively. Table 1 provides firms' estimated furniture sales and calculates their market share by dividing their individual sales by overall sales in Menomonie.

This provides evidence Slumberland is the dominant firm. However, industry parity can be measured by utilizing the Lorenz Curve and Gini Coefficient to examine market equality between firms. The Lorenz Curve requires first ranking firms from smallest to largest in terms of each share of sales, then plotting cumulative output as a share of cumulative population, starting with the smallest firm and adding the next largest. This approach has the benefit of showing the equality or inequality of market sales. Figure 3 provides the estimated Lorenz curve for furniture sales in 2018, which shows relative parity for furniture sales in Menomonie.
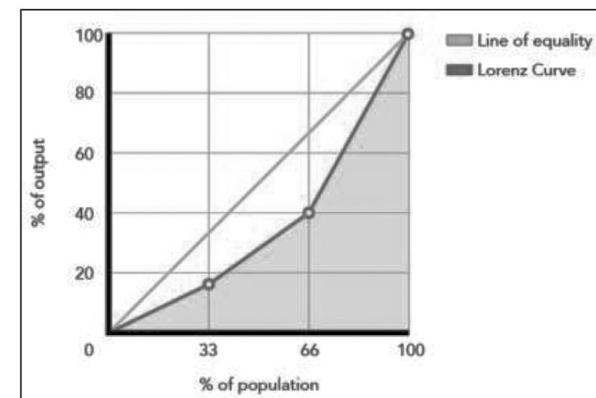
Figure 3. Lorenz curve for furniture sales in Menomonie, WI (2018 est.)

One additional benefit of finding the Lorenz curve is the ease of calculating the Gini Coefficient, which provides a numerical measure of the Lorenz curve. As mentioned by Gastwirth (1972, p. 306), the Gini Coefficient is the "single best measure of inequality." The Gini Coefficient calculates the area under the Lorenz curve, where each firm having the same amount of sales would yield the line of equality, illustrating complete parity and yielding a value of 5,000. If a single firm controlled all sales, then all other firms would have 0% of sales and the GINI coefficient yields a value of 0 (or close to it). An alternative method for calculating the Gini Coefficient from sales or output information is given by the following equation:

$$Gini = \frac{1}{N}\left(\sum_{i=1}^{N}\frac{q_i}{2Q} + \sum_{i=1}^{N-1}(N-i)q_i\right)$$

Q represents overall industry sales or output, and N represents the number of firms in the industry. Using the results from the Lorenz curve, the Gini coefficient yields a value of 3600. Relative to the extreme values of 0 and 5,000, the Gini Coefficient indicates that furniture sales in the Menomonie exhibits more parity.

Another competition measure commonly used in the industrial organization literature is the Herfindahl-Hirschman index (HHI). Relative to the Gini Coefficient, the HHI is more effective in measuring the size of firms, relative to the size of the industry, and is commonly used in anti-trust cases and competition law. The HHI scores an industry based on relative competition, thus identifying whether a market tends to operate more like a monopoly or a competitive market. The HHI provides a measured between $0 \leq HHI \leq 1$, with 0 representing pure competition and 1 representing a monopoly. As discussed by Michelini and Pickford (1985, p. 301), the Herfindahl-Hirschman index is computed as follows:

$$HHI = \sum_{i=1}^{N} \left(\frac{q_i}{Q} \right)^2$$

The HHI calculation for the Menomonie furniture market yields a value of .4408, and relative to the extreme values of 0 and 1 the HHI indicates that competition in the Menomonie furniture market is fairly imperfect. One reason that the HHI may differ from the Gini coefficient is that it accounts for market share as well as firm size.

As for competition, it is important to take into consideration average discount rates and the quality of furniture each firm provides. As prices and qualities range for all types and brands of furniture, product differentiation is important. Simon Todd (2014) describes the furniture market by comparing it to the automotive industry with its vertical product differentiation. With the qualities described in this article, none of the stores described in this analysis carry top-tier furniture. Available brands start showing up down the line, being described as "mid-range brands." Slumberland and Rassbach's have the highest number of these brands and products, putting them in more direct competition for higher-end furniture. Brands that are sold in this level are Broyhill, Catnapper, Flexsteel, and La-Z-Boy. These brands are dependable and popular in the mainstream consumer market (Todd, 2014). Although Furnish123 offers other brands, having Ashley Furniture as the main supplier of this firm puts them in the lower end for ranking in quality furniture. As described by Todd (2014), Ashley Furniture's furniture is very affordable, but not as long lasting or of great value. Furnish123 offers furniture that puts them in a niche market relative to other firms in Menomonie, with lower prices and advertising around town, they can easily target college students and newer residents.

4. Market Power

In this section, each firm's ability to influence prices is examined. Firms' abilities to influence prices better represents a firm's ability to impact a market and gauge their market power. Firms that can charge a premium for products, not only increase profit, but generally attract competition. Therefore, a firm's ability to maintain a higher premium on their products can signal market power. Having sales on specific items to undercut competition is a key way that firms compete and attract consumers away from rival's higher priced products. Therefore, the size of these discounts can also indicate a firm's market power, depending on the initial price. For example, Slumberland's average discount is 54.04%, providing a potential sign about its market power. However, even with these discounts, the prices are comparable to those of Rassbach's, making it reasonable to conclude that the markups on Slumberland's products are to the already discounted price, rather than the listed suggested retail price, recalling the earlier assumption that Slumberland uses a price anchoring strategy.

Product markup measures the premium over the costs of production and is a useful indicator of market power, as discussed by Lerner (1934). Each firm's estimated markup was obtained from wholesale manufacturers. From their information, Rassbach's estimated average markup of 40%, while Slumberland and Furnish123 have an estimated average markup of 50%. The Lerner Index (LI) measures a firm's ability to price over marginal cost and gives a sense of the firm's market power. The following formula is used to calculate the Lerner Index:

$$LI = \frac{(Price - Marginal\ Cost)}{Price}$$

The LI yields values between $0 \leq LI \leq 1$, and as values of the LI go to 1, it signifies an increase in a firm's market power. Using the average markup to calculate firms' marginal cost (MC), the Lerner Index can be easily calculated for different products. The average of the three product indexes is used to obtain a representative LI value for each of the firms. To account for product differentiation, markup calculations are considered from three separate products: sofas, recliners, and dining room sets. The marginal cost is calculated by subtracting the firm's markup from the suggested retail price.

$$LI = \frac{List\ Price - (Suggested\ Retail\ Price - Markup)}{List\ Price}$$

This estimate should be a robust measure of market power since it accounts for markup costs, product discounts, suggested retail prices, and actual list prices. While this form deviates from the form first discussed by Lerner (1934, p. 161), it mirrors those discussed by Liebowitz (1982, p. 233)[3]. For the calculations provided in table 2, price is derived from the actual listed price, while the marginal cost is derived from the suggested retail price and markup, except for Slumberland, whose markup is based on their already (discounted) list price, and not to their suggested retail price.

My calculations of the Lerner Index indicate that Slumberland matches their

Firm	Sofas	Recliners	Dining Room Sets	Average
Slumberland	.50	.50	.50	.50
Furnish123	.363	.370	.360	.364
Rassbach's	.271	.259	.40	.31

Table 2. Lerner index breakdown by product type.
Prices for Sofas – Slumberland (Kensington Collection) – Furnish123 (Breville) – Rassbach's (Flexsteel).
Prices for Recliners – Slumberland (La-Z-Boy Pinnacle Collection) – Furnish123 (Capehorn) – Rassbach's (Flexsteel)
Prices for Dining Room Sets – Slumberland (Enzo Collection) – Furnish123 (Larchmont) – Rassbach's (Unknown)

average markup at 0.50. This suggests that Slumberland has the largest amount of market power out of the three competing firms. Furnish123 has the second largest market power at a LI of 0.364, and Rassbach's with the least market power with a LI of 0.31.

The Lerner Index has additional uses. With market power quantified for each of the three firms, the responsiveness of their respective consumers can also be measured. As shown by Saving (1970, p. 140), the price elasticity of demand (eD) can be easily derived from each firm's LI value as follows:

The responsiveness of consumers to price changes is an important factor

$$e_{P,D} = \left| \frac{-1}{LI} \right|$$

in any market. Consumers with a greater desire for specific products allows firms to charge higher prices, unless sufficient competition is present to undercut any premiums. Price elasticity of demand measures consumer price sensitivity; values

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3   Mark-up usually refers to the additional amount added over cost, which is somewhat ambiguous. Lerner utilizes marginal cost in this analysis which often unknown to businesses. Leibowitz' use of average variable or average total cost is most appropriate for our uses.

less than one imply rigidness on behalf of consumers. This means an increase in price yields little change in the number of units sold. On the other hand, values above one imply more sensitivity on behalf of consumers. The higher price of demand elasticity, the more consumers respond to changes in price. Firms with lower price elasticity relative to other firms can effectively increase their prices without affecting the number of units they sell (Johnson, 1967).

Firm	Lerner Index	Price Elasticity of Demand ($e_{P,D}$)
Slumberland	0.5	2
Furnish123	0.364	2.747
Rassbach's	0.31	3.226

Table 3. Demand elasticity by firm

Firms with more inelastic demand can, consequently, more effectively raise prices to increase their profits. Therefore, price elasticity of demand is a useful tool to measure market power because it shows what firms can increase their prices with the least effect on the number of units they sell[4]. Table 3 provides the price elasticity of demand for each firm and the calculations show that out of the three firms, Rassbach's demand is the most elastic, indicating that their consumers are the most sensitive to price changes, while Slumberland's price elasticity of demand has the smallest value, indicating that their consumers are the least sensitive to price changes. This also reinforces our earlier findings that Slumberland has the most market power.

5. Industry Outlook and Volatility

Volatility in the furniture stores industry is rather low. The industry is sensitive to economic changes and housing market trends. As discussed by Mutikani and Ricci (2018), "More confident U.S. consumers point to stronger spending as the year begins." Unsurprisingly, the furniture market generally follows changes in the consumer opinion, housing markets, and U.S. economy, as well as disposable income, which play in important role in consumer spending. In order to gauge how furniture sales have changed in recent years, consumer sentiment, local unemployment, and local homeownership rates are examined to incorporate factors outside furniture market.

Consumer sentiment represents consumer perspective about the current

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4   Additional caveats exist when using the Lerner Index and price elasticity of demand to measure market power as discussed by Pepal et al. (2014), such as the role of scale, scope, and overhead costs. This analysis is between firms in similar markets which reduces some (but not all) of these concerns.

and future economic climate and plays an important role in consumer spending. National data along with local data will help gauge the forecast of this market. Figure 4 provides national consumer sentiment since 2000. As of April 2018, consumer confidence was at 128.7 (The Conference Board, 2018), indicating strong level of confidence which has continued to grow since the second half of 2015. Generally, a stronger consumer confidence leads to a stronger U.S. economy, and therefore a stronger furniture market.
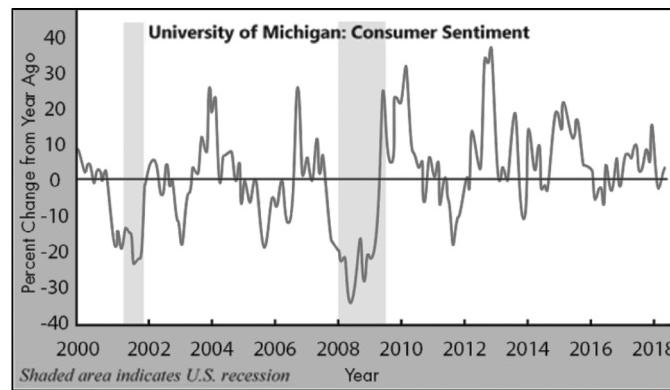
Figure 4. Consumer Sentiment
Source: University of Michigan

The industry's forecast is looking positive. As shown in Figure 4, consumer sentiment is increasing, showing consumers' confidence in the U.S. economy. Although this consumer sentiment takes in to consideration national data, it focuses on how citizens feel about the economy. A strong national consumer sentiment may signfy that consumer confidence in the local economy is also high. With the positive outlook on the economy, per capita disposable income is likely to increase (Palmer, 2017, p. 5). These national economic indicators can be useful up to a point, but local economic conditions are more informative for our purpose.

Unemployment is one of many economic indicators used to determine the health of an economy, and while unemployment doesn't perfectly represent income or consumer confidence, lower unemployment indicates a strong local economy. As shown in figure 5, Menomonie has recently had relatively low unemployment, with a spike during the financial crisis. Since 2010, unemployment in Menomonie has continued to decrease.

Looking at the unemployment as an economic indicator, it's not surprising that Furnish123 arrived in Menomonie in 2010. Generally, higher education enrollment increases during economic downturns. Given Furnish123's target demographic, college students, their consumer base increased following the financial
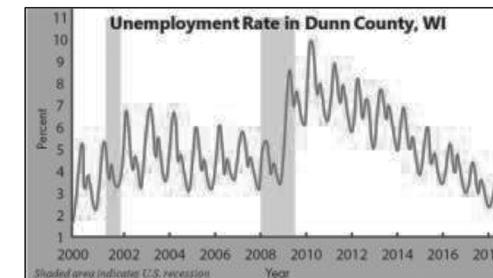
Figure 5. Recent unemployment rate in Dunn County, WI
Source: U.S. Bureau of Labor Statistics

crisis. In the fall of 2010, UW-Stout enrollment increased to a then record of 9,339 students. A year later, in the fall 2011, it broke that record high, with a student enrollment of 9,357 (UW-Stout, 2011). The continual decrease of unemployment and the eventual arrival of additional competition (Slumberland) may be due to the health of the local economy.
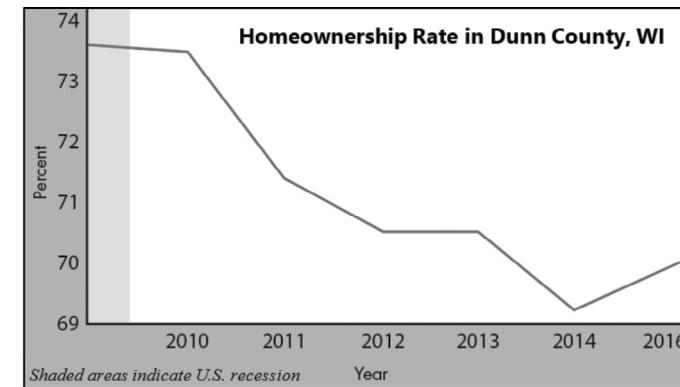
Figure 6. Home Ownership rate in Dunn County, WI

Home ownership is also an important economic indicator in the furniture market. Figure 6 shows the homeownership rate in Dunn County,[5] WI, and although homeownership is low right now, the percent of legal ownership is much higher. "The United States actually has more homeownership, in economic terms, than it did when the homeownership rate, a measure of mere legal ownership, was higher. Accordingly, the economy should also be less vulnerable to another real estate shock" (Lane, 2016). Examining local ownership rates provides additional insights about the local real estate market which will affect both current and future furniture sales. With this strengthening the U.S. economy, the graph is also showing a growth in homeownership since 2014. This growing homeownership should have positive

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5   The homeownership rate in Dunn County, WI is only available after 2009.

effects on furniture sales in years to come.

Other external drivers are the price of raw materials and demand from big box stores. The price of materials can affect the final price of a product and the price of sawmill lumber is projected to rise, which would increase the production costs of furniture. Recent tariff increases on wood, metal and textiles will also affect production costs. This means sellers will not be able to sell the same quantity at the same price. Big box stores have the ability to sell large amounts of furniture at greater discounts, highlighting the importance of scale in furniture manufacturing and distribution. According to the Furniture Stores in the US Industry Report, the supercenters and warehouse clubs industry is expecting to grow, possibly threatening the furniture stores industry. The relative closeness of Menomonie to Minneapolis and Eau Claire may affect this market as larger physical locations attract local consumers. Due to the proximity of stores in this area, consumers will have the opportunity to look elsewhere for furniture.

6. Contemporary Issues

Other issues surrounding the furniture stores industry involve technology, innovation, and the changing demographics of consumers. A main point of interest is online retail. According to Engel (2017), a Senior Retail Editor for *Furniture Today*, 13% of all furniture sales in 2014 were done online, double of what it was in 2012. This means that the need for a brick-and-mortar stores is declining. One large advantage of online retailers is their ability to save money by not having a physical inventory or lease (Palmer, 2017, p. 23). Not having these expenses makes it possible to sell furniture at cheaper prices. Also, with the rise of online stores, free shipping may be an option. This puts same priced products in direct competition with one another, having the buyer choose between delivery costs.

Another contemporary issue is the advancement of technology within furniture. As innovation continues, the need to plug in furniture will increase. Incorporating electricity to everyday items and creating smart-products may change the way houses are built. Adding to the number of outlets that are typically in one's living room may be something society starts to see in the future. With smart-products or "smart-furniture" we may see in the future, furniture may have to be programmed or may have to learn behavior patterns of the people using it. This advancement of technology is something that is happening in other sectors and one that is starting to make its way in to the furniture industry.

Consumer demographics also have a significant impact on the sale of furniture. As shown in Figure 7, 30% of consumers are 34 or younger (Palmer, 2017, p. 16). As this demographic starts to become homeowners, there will be a rise in share of these age groups. According to a report done by Stephanie Nickell (2014), 36% of those 35 and younger are choosing to remodel to increase resale value. "In

the next few years, 41% of homeowners have remodel plans, compared with 11% reporting they will purchase a new home, according to the latest survey from Palo Alto, Ca.-based Houzz" (Nickell, 2014). The growing sizes of homes means new furniture to fill these spaces. As Generation X and Millennials move into the market, trends are changing. "Generation X is buying from the regional chains, moving from independents which the Baby Boomers prefer" (George, 2017). In addition, buying online and from magazines is becoming more common with the younger generations.
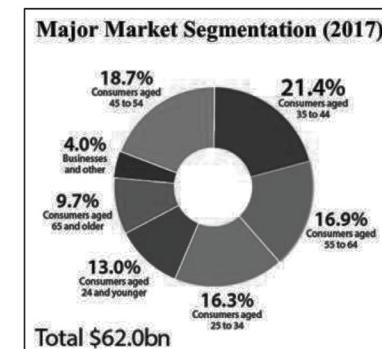
Figure 7. Furniture market consumer makeup by age
Source: Palmer (2017) from Ibisworld.com

7. Conclusion

At first look, the furniture market in Menomonie looks fairly competitive, with concentration looking fairly equal. Breaking down the competition, Slumberland and Rassbach's are more in direct competition with one another, selling similar quality products, at more similar prices. Taking a closer look at these firms' market power, it is found that even though Slumberland and Rassbach's have similar products and prices, Slumberland is very effective in utilizing pricing techniques to increase their markups. The integration of price anchoring into Slumberland's marketing techniques further illustrates its market power.

Furnish123 has found a niche in this market, with a target market more focused on college students and residents that are newer to the area. Their ability to sell lower quality products at a cheaper price keeps them separate from the larger competition. Using this strategy, Furnish123 is able to focus all of its sales and marketing on their consumers. Their market power comes from their ability to have an increased markup for the quality of products they sell.

Location and advertising are also interesting to note when looking at all of the data. Slumberland and Furnish123 are located right off of Broadway Street, the main street running through the city of Menomonie, while Rassbach's is about five miles out of town. Being a local store, Furnish123 uses billboards coming in to Menomonie

to advertise its business. This can catch the eyes of college students moving in to their dorms, apartments, or houses, as well as residents that are new to town. Slumberland, as the only corporately owned firm in this market, has corporate advertising and the recognition of being a familiar name to people in the Midwest region. Rassbach's is the familiar, quality furniture store of Menomonie, marketing to local residents for almost 50 years. Their focus on talking to their customers, getting to know exactly what they want, and having a relationship with them is how Rassbach's differentiates themselves.

As markets are always changing and adapting to those changes, understanding how firms operate can help other firms as well as consumers make educated and calculated decisions. As firms are always trying to differentiate themselves from competing firms, noticing where there are opportunities in the market, and what other firms are doing successfully, can increase competition. In these markets, firms that successfully differentiate themselves increase profits.

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Impacts and Factors of Women in STEM Education at UW-Stout

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Abstract

The purpose of this research was to gain an understanding of the factors that contribute to women choosing science, technology, engineering, or math (STEM) career paths. This research gathered information from other findings on the gender gap, the decline of interest of women pursuing STEM fields, and on ways to engage young women in STEM-related courses. Interviews from three female students seeking a STEM degree at the University of Wisconsin – Stout collected suggestions on how to increase young women joining STEM-related courses throughout their educational ladder, how those women persisted within their degree, and the hurdles they faced to get a STEM degree. Strategies suggested when conducting the interviews included implementing STEM curriculum such as simple coding programs in pre-kindergarten, providing mentorships with another female student or woman from a STEM profession and evaluating the STEM courses to adapt to the needs of everyone, not just males. Showcasing the story of women in a male-dominated occupation will present a better understanding of developing said occupation as an equal ground for all. The role of a female teacher holding a STEM education degree may have a significant impact on young female students' future.

Keywords: Women in STEM, technology education, women educator

Introduction

Classrooms of science, technology, engineering, or mathematics are prone to have more seats filled with male students' bodies rather than females. This research will help fill classrooms with female students. Spreading awareness of the gender gap, identifying a decline of interest in women pursuing a degree in a STEM field, and

exploring ways of engaging young women in STEM-related courses have shown there are changes that can be made in attracting women into STEM careers.

Literature Review

Gender in STEM fields

Based upon the outcome of standardized testing, women make up approximately half of the United States of America's workforce, but are underrepresented in STEM. Based upon the American College Testing's (ACT) fifth and latest test results, more than 2 million students participated in the college readiness test. Within the ACT, there is a portion that contains a STEM score to predict the students' ability to succeed in college courses such as calculus and biology which are typically required for a STEM-related university degree. Just 18 percent of females—compared to 24 percent of males—met the STEM benchmark. Moreover, among students who have an interest in STEM-related university degrees, the gap is even more significant, with 22 percent of female students meeting the STEM benchmark, compared to 31 percent of males. Overall, females interested in STEM were less likely than males to match or surpass the benchmark (ACT, 2018).

Before entering a university, there is already a gender gap between females and males interested in STEM-related education. According to Yonghog Xu (2015), individuals make education-related investments with the intention of future earnings, professional experiences, interventions to reduce gender-based pay inequality, and family-friendly workplaces that are open to and supportive of women's dual role as the primary family caregiver and successful professional. Furthermore, incentives are needed to support women's continuation of graduate education to increase their human capital and equalize their pay level (Xu, 2015). Statistics on those who have earned bachelor's degrees in 2012 show that females have: been awarded 59 percent of degrees in the biological/biomedical sciences; made up only 43 percent of degrees in mathematics and statistics; earned 18 percent of degrees in computer and information sciences; been awarded 19 percent of degrees in engineering, and received 38 percent of degrees in the physical and technological sciences (Wang & Degol, 2016). After receiving a STEM-related degree, women with STEM jobs earned 35 percent more than comparable women in non-STEM jobs — even higher than the 30 percent STEM premium for men. Women with STEM jobs also received 40 percent more than men with non-STEM jobs (Beede et al., 2011). As a result, the gender wage gap is smaller in STEM jobs than in non-STEM jobs.

Addressing the gender segregation rather than the gender gap in occupational expectations for STEM fields is seen across countries. Gender bias refers to the prejudicial differences in the treatment of women and men. Segregation is keeping one group of people apart from the other and treating them differently. The different treatment of people is based on gender, race, ethnicity, religion, and education. As Younghong Jade Xu (2008) mentions "faculty members of the opposite sex have no reason to feel threatened by the elimination of gender inequality given that the goal is not to force an equal number of women and men at all costs, but to provide equal access to career opportunities and similar resources and support for success to all talented scientists, be they men or women (p.14)." The gender gap is the difference in representation or expectations between women and men, in social, political, intellectual, cultural, or economic achievements or attitudes. For example, Seong Won Han (2017) indicated that computing and professional engineering expectations are higher for males than for females, although the magnitude of this gender gap varies across countries.

In contrast to computing and engineering occupational expectations, health service professional expectations are higher among females than males in almost all the countries. But just as for computing and engineering expectations, the magnitude of the gender gap varies across countries. This pattern of gender differences in STEM occupational expectations remains even when a student, school, or national characteristics are considered. After controlling for all individual, school, and country-level factors, females are 54 percent less likely than males to expect computing and engineering occupations (Han, 2016). A work environment free of gender bias is the best recruitment and retention policy for women.

Factors in the Decrease of Women's Interest in STEM Fields

Females' lack of participation has been attributed to curriculum content that is biased toward males' interests (Weber & Custer, 2005). Others attribute females' lack of interest in STEM to academic approaches rather than to the inherent nature of the subject (Weber & Custer, 2005). Even when interested in STEM fields, young women often lose confidence when they take courses with small numbers of female students. Women in introductory computer-science courses are often intimidated by male students who have significant programming experience (Coger, Cuny, Klawe, McGann, & Purcell, 2012). Computer-science programs at some universities and colleges, including Harvey Mudd, Carnegie Mellon, MIT, and the University of British Columbia have succeeded in recruiting and retaining more female students by creating a more encouraging and supportive learning environment (Coger et al., 2012).

Closing the gender gap in specific male-dominated science, technology, engineering, and mathematics occupation is essential for educators to establish a stable and inviting environment. The number of women in male-dominated professions has increased over the years, but that is only for specific fields such as biology, chemistry, and math. The gap has grown in computer science, engineering, and physics occupations. It has demonstrated that male-dominated fields such as

computer science may deter females due to females' lack of perceived similarity and belonging. Wang and Degol (2016) have found that removing stereotypically masculine objects, such as male characters, from computer science classrooms can increase female interest in these courses.

In the United States, women hold fewer than 25 percent of jobs in STEM fields, despite accounting for 47 percent of the workforce (DeNisco, 2019). A female student's environment will determine whether she is academically prepared to enter a specific field in college (Davis, 2016). The atmosphere has a significant impact on females' student lives and their overall motivation to succeed in an area.

Engaging Young Women in STEM Careers

The role of an educator in the classroom and practice is to foster learning and serve as a role model. Ashley Janis (2012) states that role modeling has often been referred to as the "hidden curriculum" of professional education as we often lack understanding regarding the influence role modeling has on learners. One of the founding theorists of critical pedagogy in the United States, Henry Giroux is best known for his work in pedagogy, cultural studies, youth studies, higher education, and critical theory. Fulya Kentli (2009) states that Giroux identifies hidden curriculum as what is being taught and how one learns in the school. Giroux also indicates that schools not only provide instruction but also more such as norms and principles experienced by students throughout their education life. A student's environment influences their plans to enter a STEM field. Motivation is a large part of entering a STEM field and making a career out of it. When a female is motivated, there will be nothing hindering her from making her goals (Davis, 2016). DeNisco (2019) offers advice for administrators who want to support female STEM students:

- Start as early as pre-K.
- Expand teaching methods. For example, students can learn about physics by building a structure with real materials, instead of just reading about it in a textbook.
- Challenge media portrayals of STEM professions. Men are depicted as STEM professionals over women 5 to 1 in family films. Men are portrayed as computer scientists 14 to 1 in family films, according to a February White House fact sheet. Make students aware of this stereotype.
- Build mentor programs with female STEM professionals. Female students need to see women who are in STEM jobs and understand their struggles to connect on a personal and professional level and set an example.
- Reach out to local STEM companies, organizations, and nonprofits and ask if female professionals can speak about their work and expose

students to what a STEM career entails.
- Examine your STEM programs to see if the enrollment in classes, clubs and after-school activities mirror the recruitment of females in your school. Ask female students why they are (or aren't) interested in STEM. Administrators should use this information to actively encourage women to pursue STEM and to make the programs more appealing.

Female students must know that entering these fields will not be easy. They must be prepared academically, mentally and emotionally for what will occur while navigating through the curriculum which will lead to their future career.

Methodological Approach

The purpose of this research was to gain an understanding of the factors that contribute to women choosing a STEM education career path, primarily in Technology Education, at the University of Wisconsin-Stout. The research question was, "What is the experience of women choosing a STEM education career path?" Six probes guided the study:

1. What are the types of STEM courses you have taken in high school?
2. What influenced you to take STEM-related courses during high school?
3. How did the instructors of the STEM courses create a classroom environment ensuring the female student return rate?
4. What are the hurdles you have faced while achieving a STEM education degree?
5. Why did you persist to achieve the STEM education degree?
6. What are your suggestions to increase the female population in STEM fields?

A phenomenological methodology used interviews with three women pursuing an undergraduate degree in a STEM Education at the University of Wisconsin – Stout. Upon being interviewed, the participants were presented a consent form to sign before the guided questions were recorded. The interviewed women were in a closed room with no distractions, and the session took less than 10 minutes of their time. Participants' identity was concealed; although the published responses from the interview questions are made public, the participant's identity is altered to protect participants.

Procedure

The following steps were used in the phenomenological approach to the research question. Creswell (1998) stated that phenomenological data analysis

proceeds through the methodology of reduction, the analysis of specific statements and themes, and a search for all possible meanings. The researcher needs to set aside all prejudgments, bracketing their experiences. Bracketing is when researchers put aside their own experiences, biases, and preconceived notions to understand how the phenomenon appears to participants instead of how it is recognized by the researcher (Flipp, 2014). The first step in storing away unconscious bias and personal experience is becoming aware of what it is and how it can affect others. By storing away beliefs and values received from family, culture, and experiences that strongly influence how we view and evaluate others. It allows the researcher to explore the views, perspectives, understandings, and feelings of participants who have experienced being a woman in STEM education.

Phenomenological research is naturally conducted with detailed interviews of small samples of participants. Recruited participants were women seeking out a STEM education degree at the institution and have experienced the phenomenon of interest. The researcher personally contacted the participants to solicit their participation. Once the participants agreed to answer the interview questions, they were sent an email asking when they would be available to be interviewed. Information collected from the interviews was recorded, while written notes were taken during the interview. Participants' identifying information was anonymized. These interviews gave a better understanding of the factors that contribute to women choosing a STEM education career path and provided a broad perspective of gender equality in a male-dominated occupation. Insights were also gained on how to improve on the growth of women seeking to pursue those professions.

Data Analysis

The phenomenological data analysis structure follows that procedures are divided into statements or horizonalization, the units are transformed into clusters of meaning, then tie the transformation together to make a general description of the experience, including textural description, what is experienced and structural description, i.e., how it is experienced (Creswell, 1998). The horizonalization approach used for this qualitative analysis, which aid in significant supported statements taken from interviewed transcripts provides a framework for text analysis (Flipp, 2014). Significant statements are quotes directly taken from the transcript that describe how the participants experienced the guided probes and placed into clusters of meaning. The cluster of meaning is putting the supported statements from the participants into themes of how the guided questions were answered. Presenting long text passages of the interviewed participants' experiences by using essence to give an understanding of what it would be to in the same shoes as the participants. The essence is the central core meaning of the experience shared within the different lived experiences.

The participants of the study shared what year and major they declared at the University of Wisconsin – Stout, along with college courses they had previously taken. The first participant was Ellie, a junior at the University of Wisconsin – Stout in Technology Education (TechEd), who indicated she never took any courses related to her choice of major due to the school she attended being unable to fund a TechEd program. The second participant was Mo, a sophomore at the UW – Stout in TechEd, who began her experience during the first year of high school taking computer-aided design and manufacturing. Mo continued to take related courses throughout her high school education. The final participant was Ayla, a junior at UW-Stout in Science Education, who started her education exploring science and began to advance into upper-level science-related courses such as biology, chemistry, AP Physics 1, AP Physics 2 and AP environmental science.

Results

This author conducted interviews with three females at the University of Wisconsin – Stout who were pursuing a Bachelor of Science in a STEM education fields. They were seeking to inspire the younger female generation to find a career in a STEM-related field. The long passages that follow were guided by females' experiences and responses to the six guided questions. The guided questions refer to the experience participants received in high school and college that resulted in their pursuing a degree to teach a STEM subject. The themes that emerged included how the instructor of their high school created a classroom environment ensuring female student return rates, the hurdles faced while achieving a degree, why they persist, and suggestions of ways to increase the female population in STEM fields.

Instructors' Return Rate Strategies

Ellie mentions how she was introduced into a related TechEd subject, robotics, by a family friend. He noticed that Ellie and her brother weren't doing a whole lot in the early evenings and invited them to start going to the robotics meetings at the school. Ellie got involved in TechEd, but an educator didn't do it. Mo stated that there were only two TechEd teachers at her high school. One of the TechEd teachers was her basketball coach, and she took the TechEd course because he taught the class. It was a secure "A" grade because the coach liked her, but she didn't learn a thing. She stated that "it was so silly being in that class, so I didn't take him anymore." Mo mentions that this first TechEd teacher took more of a counselor role than an educator role, which resulted in a more personal relationship. Mo indicated the TechEd teacher was a role model. The second teacher was terrible because he was more of a football coach than a TechEd teacher. Lastly, Ayla states that her educator had "a lot of interactive groups, group learning where we worked together, solved real-world problems and talked about the world instead of just like something

confined to four walls of a classroom." Women are sharing their experience, which can give insights into different ways educators continue to have a seat in the classroom filled by a young woman.

Hurdles

Ellie mentions that there were only nine students in her graduating class throughout high school. There were only two girls and seven boys. Ellie is comfortable around male students. She is part of the Marines, where one percent of Marines are females. Ellie stated, "it does not make any difference, I have always been a tomboy." She was referring to the surrounding of male figures throughout her life and being the one percent of females in marines, resulting in no alterations of her comfort with being the only female in the classroom. Ellie mentions that it was harder for her to join a sorority then hanging out in the TechEd classroom.

Mo experienced many hurdles being in TechEd. She began by stating that "one of the TechEd professors will make remarks comparing men and women." She gives an example of a quiz in the middle school TechEd course, asking how to get females in TechEd. Mo answered that "women are more conformable with a female teacher than a male teacher. Especially at that age, they don't want to be hanging out with a bunch of boys in a shop class with a male teacher. You want to be hanging out with your friends, and a female teacher will be more welcoming at that age". She states that it is close to what she put down as an answer to that question. She thought that it was going to be easy for her because she knows how to communicate with girls because she is one. However, the teacher of the class marked it wrong and said that Mo is a different kind of girl because she is pursuing TechEd. Mo stated her response to the teacher's remarks was "No, I am still a girl. Still a girl."

Ayla expressed that it was the male students giving her hurdles to face rather than the male professors. She began by stating that there is a minimal science education program at Stout. She is in many classes with male students majoring in engineering or construction and so forth. Moreover, those are majors where she finds herself being one of the two girls in the class. Ayla states that the males in her class won't always listen to her or do not think she knows information on the subject matter in class. She expresses that the professor are not the problem, and she has no issues with them. It is the other classmates who are mostly male students causing her hurdles. The obstacles these women have faced ultimately drive them to persist in achieving the career they are seeking. It is important to understand the interviewees' experience of hurdles faced when completing a STEM degree. Their persistence can be related to many other females who are experiencing the same impacts.

Persistence

Ellie indicated, "she persists in becoming a technology education teacher even

though she has faced or will be facing many hurdles." She states "It is what I want to do, and I like the major. It is what I want to do at the end of the day." Mo mentions that she came to UW - Stout for manufacturing engineering and then decided that she couldn't sit at a desk all day and needed to be working with people rather than with a computer. Then the one TechEd teacher she previously had was one of the most remarkable people she ever met. He helped her through switching majors and now is pursuing a degree in TechEd. Ayla stated she persists because she wants to teach chemistry or physics, the math-heavy subjects, because she likes the concepts and shows students that a female can excel in that field as well.

Suggestions

Ellie was introduced to robotics at a young age, which she stated that "when introduced at a young age it makes a big impact on the student's interest." Young children do their own thing, and it wouldn't be as weird for a first-grade female doing what a boy would be doing at that age. Mo had a different suggestion, and that is to be open. She states that she knows some will disagree with her statement or go along with her statement, but it just the way it is females are more interested in somethings than men are. Even though she is in TechEd people tend to think she wants to be out welding for hours on end or building stuff. There are female aspects that can be brought into TechEd. For example, one of the projects Mo worked on an Arduino in high school. She made a platform for her Arduino to light up two figures dancing. Since both males and females may like dancing, this was a gender-neutral activity appropriate for the classroom. It was still TechEd, but it was not gendered biased. Mo goes forward talking about her plans for teaching elementary STEM. She would like to get every student engaged in the subject and to build some passion whether it be in science, technology, engineering or math.

Lastly, Ayla states that through the curriculum there are opportunities to bring females into STEM-related courses. For example, in physics, there have been different innovations that have come out in the field. The innovations presented are things that were developed by males. Ayla also mentions that having the same gender group activities in classrooms can interfere with increasing female enrollment for those who are interested in a STEM-related career. For example, if a female is going to go out into industry when she is only familiar with working in female-only groups, it may cause a struggle at work because the industry is full of males. Women will need to cooperate with the men to overcome their males and females' internal biases. Women needs background experiences working with other genders besides their own because otherwise, they are going to burn out right away, or leave the field because they are just not going to be comfortable in that working environment.

Discussion

Despite the gains, the gender divides are still apparent especially with participation in the STEM field. Given the historically disproportionate involvement of males in industrial arts and technology education, male perspectives and interests tend to saturate the technology education curriculum. The Standards for Technological Literacy represent a positive movement in addressing this concern since the structure of the standards provides for diverse ways of developing curriculum and representing the interests of both genders (Weber & Custer, 2005). Weber and Custer expressed that the curriculum developers in technology education need to be informed by research and theory designed to comprehend "women's ways of knowing" if they hope to effectively recruit and retain women and girls into the study of technology.

The first strategy is to change the classroom to fill the seats with young female students interested in STEM subjects. The suggestions shared by the participating interviewed females had a similar solution to increase the female population in STEM fields, which were the implementations of presenting STEM learning as early as pre-kindergarten. Ellie, an interviewee who is studying Technology Education, stated that with younger children, there is not a big issue with gender roles. Young females are expected to play tea party and play construction as the boys do. As Ellie mentioned during the interview, "everyone is doing their own thing, and it wouldn't be as weird for a first-grade female doing what a boy would be doing at that age." There is a lot of stereotyping but not by the young children themselves. The implication of STEM during early childhood can benefit young females who are interested in engaging in a STEM subject.

The second strategy is creating mentors, after-school clubs, and other types of programs with an emphasis on female participation. Bringing in programs that are geared towards young female students will get females into STEM courses. For example, a program can be as simple as how a product was created where the students will reconstruct the product after the demonstration occurs. Mentorship is another strategy mentioned; however, there are two pathways to the approach. First, there is having a female already in a STEM profession come into the classroom as a presenter to share information with young women in high school. The presenter shows these young female students not to be afraid of STEM occupations. The second path is a one-on-one mentoring or developing group relationship that helps a young female reach her full potential. For example, most people can recall a person who had a positive impact on them. Mentoring can be a powerful way for young females to develop a keen understanding of their skills and character. In the end, this plays a vital role in their life.

The third step is to examine the STEM programs to see if the enrollment in classes, clubs and after-school activities mirror the recruitment of females in a school.

Ask female students why they are (or aren't) interested in STEM. Administrators could use this information to actively encourage women to pursue STEM and to make the programs more appealing (DeNisco, 2016). Teachers are encouraged to construct knowledge from students' experiences. While this is important for all students, it is particularly important that teachers and curriculum designers in the STEM disciplines attend to the experience base of female students. Students often feel that content lacks relevance to them. Connecting students to content through their life experiences is essential. Rather than continually using traditional tools, material, or examples to demonstrate technological concepts, teachers should use cases with which both genders can identify (Weber & Custer, 2005). As Ayla, the interviewee who is pursuing Science Education, states, that "through the curriculum, there are opportunities to bring females into STEM-related courses." Curriculum developers and STEM educators may find it difficult to change cultural and gender-related stereotypes, but it is possible that carefully designed and well-built activities could inspire female interest in STEM topics.

Conclusion

Gathered findings of the gender gap, a decline of interest in women pursuing a degree in a STEM field, and ways of engaging young women in STEM-related courses has shown there are changes that can be made in attracting women into STEM careers. Interviewing women who are currently seeking a STEM education degree, with their suggestions of how to increase the intake of young women joining STEM-related courses helps improve understanding of how to increase the interest and participation of young females in STEM learning throughout primary and secondary education. This stories of the interviewed women in STEM education creates a better understanding of how the role of a female teacher holding a STEM education degree can impact a young female's mind. Despite new efforts to increase the female population in STEM courses and occupations, more research is needed to develop to find a solid strategy to achieve that goal.

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The Meiji Secret: The Emergence of Zaibatsu Dominance in Japan

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Abstract

This paper examines how the intervention of American sailors in Japanese politics created a dramatic social shift in Japan freeing Japanese merchants to begin building corporate enterprises. These corporate enterprises became subsidized by the government, expanded rapidly, and eventually became capable of influencing the government on its path to WWII. The control these companies exerted over the Japanese through their control over the economy was extensive. So pervasive were these companies that dissolution was near impossible without collapsing the Japanese economy, to this day many survive and thrive well beyond the Japanese borders.

Keywords: Zaibatsu, industrialization, Japan, World War II

Introduction

The period between 1853 and 1945 saw tremendous changes and economic growth throughout much of the world. As western nation states expanded globally and colonized large sections of the world, the Japanese people, united through war, under the Tokugawa dynasty saw trade booming and social class structures changing. As the Chinese empire fell into decline and became subjugated by the powerful colonizing nations of the west, the Japanese took note and vowed not to become weak and dependent on the West like the Chinese.

In 1853, when Commodore Matthew Perry arrived in Japan and demanded the opening of a Japanese port to American trade, the Japanese responded to Perry's black ships in agreement; though they initially relented to him, the people began to question the current government. The Japanese took Perry to be a wake-up call, deposing their shogun (a military dictator) and installing their emperor, they began the march forward into a modernized state capable of competing with the strongest nations in the world. This rapid modernization astounded the world. As the Meiji

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period began, named after the emperor Meiji, great change took place in Japanese society and the door was opened for the merchant class to rise beyond its historically low station and begin transforming Japanese society.

The merchant class now able to grow more powerful began constructing corporations based around a single family, *zaibatsu*, which would rapidly take hold of the Japanese economy. These corporations would dominate the Japanese economy for more than one hundred years, being subsidized by the government in the beginning, moving into a powerful position quickly and influencing the government in its imperial ventures. Following the Japanese empire's defeat in World War II and the allied occupation, the US, connecting *zaibatsu* growth to Japanese aggression, moved to dissolve the *zaibatsu*.

However, the *zaibatsu* were so interwoven with the Japanese economy that the Allies were unable to truly cut them from the Japanese economy without opening Japan to potential Communist influence. Allied attempts to separate the economy and *zaibatsu* left behind *Keiretsu*, organizations made of several companies all run by different families but tethered together by a communal bank. The *Keiretsu* would create a new economic backbone. This paper will examine what created the *zaibatsu* and enabled them to devour the Japanese economy.

The rise of the *zaibatsu*

In 1945 Japan lay defeated, crushed by the nuclear bombs, the small nation spent forty-five years challenging some of the greatest nations at the time. For a year this small nation challenged the United States for control of the Pacific Ocean and possession of its resources. Japan's success had confounded many western thinkers and although this confusion had been happening for some time it reached an apex with Japan's ability to fend off one of the strongest nations on the planet. Following Japan's defeat, Westerners began to examine the Japanese nation to understand how it had transformed from a feudal state into one comparable to a European state in development and industrialization faster than any nation before it. "Japanese Industrialization and Economic Growth" by Carl Mosk goes further back than most observers to examine how the Japanese managed to rapidly industrialize. While most use Perry's black ships for a starting point, Mosk's paper makes a note of how the Shogunate had paved the way with basic forms of all the necessary tools for Industrialization.[2]

Under the Tokugawa Shogunate, samurai had lost their position in the system; without war they had no real jobs, becoming a burden on the nation. John Roberts' *Mitsui* follows the Mitsui clan which in the 1600's had the foresight to move from being a samurai clan to a lower-class merchant family, freeing them up to eventually become one of the most powerful *zaibatsu* until Japan's defeat in 1945. The

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2   Carl Mosk, *Japanese Industrialization and Economic Growth* (EH.Net Encyclopedia, 2004) Pg. 2

Mitsui clan also helped create some of the proto industry that Mosk mentions in his paper; as businessmen the Mitsui began starting small businesses in a variety of fields, brewing saké and making soy sauce to start with. The end of the *Sengoku Jidai* (warring states period) in Japan had brought prosperity to the nation. The now flourishing internal trade encouraged a loosening of the restrictions that had previously left merchants at the bottom of the Japanese social structure. The loosening of this social structure helped merchant families like the Mitsui to expand and develop themselves while also opening social doors.[3]

When Perry's black ships steamed into Uraga harbor in 1853, Japan's future changed dramatically. Perry forced Japan to trade with western nations and concluded treaties beneficial to the United States with the Shogun. Prior to Perry's arrival Japan had been stagnating with a decentralized government in place that failed to meet the needs of the people. The arrival of an external threat put pressure on the government which failed to appease the masses demanding a return of imperial power not seen since the first shogunate began in 1192. Perry's arrival left an image of stagnation on the minds of the Japanese and triggered a huge debate in how to act, which rapidly shifted into a civil war. The Shogun government tried to appease the foreigners and radical Daimyo (feudal lords) throughout Japan felt the reaction needed to be conflict with the west. The years before the Meiji ascendance were rife with internal struggle and conflict for Japan, with provinces such as Choshu and Satsuma radicalizing and challenging the rule of the Tokugawa Shogunate.[4]

In 1867, Emperor Meiji ascended the imperial throne, and with his advisors and government officials began the Meiji Restoration period pushing Japan into modernity. The previous government was decentralized and reliant on local authorities which needed to be replaced by a central government. The Meiji government completed a spectacular starting feat, creating a centralized government in roughly half a century. The centralized government was more capable of spotting problems as well as repairing them. One such problem was the drastic technological and productive differences between Japan and western developed states. To fix this the government rescinded the Shogun's ban on travel to other nations and even encouraged it by organizing some groups to travel to Great Britain or the United States to observe their advanced economies and industries.[5] Another problem to be settled was the treaties gained by the western powers from the Shogun. The western powers had used their treaties to control the majority of trade to and around Japan horribly restricting the nation and impeding its growth and development. This demanded industrial development to respond to and push out the foreign merchant

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3   John Roberts *Mitsui* (Boston: WeatherHill, 1973) Pg.11
4   Seiji Hashida *The International Position of Japan as a Great Power* (New York, The Columbia University Press, 1905) Pg.16
5   Marius B. Jansen *The Emergence of Meiji Japan* (New Jersey, Cambridge University Press, 1995) Pg. 172-173

powers. Professor Ohno's "the Industrialization and Global Integration of Meiji Japan" notes a beneficial connection between the private and public sectors during this period that enabled the rapid development of industry. Meiji-period Japanese entrepreneurs took on the challenge of developing high level manufacturing with an ease that impressed outsiders.[6]

The emergence of a strong merchant class in Meiji Japan allowed for rapid development of manufacturing and industrial business. The Mitsui helped to develop railways throughout Japan by working with the government to sell bonds through their own bank moving millions of yen in bonds for the Meiji government. The intercourse between government and corporations spawned from the national slogan "Shokusan Kougyou" (industrial promotion); such intercourse, however, complicated things. The *zaibatsu* had begun to align with government officials giving them special treatment. In 1874, the Mitsui were informed by some government officials of a raise in costs being applied to corporations in a few months. This knowledge kept them afloat but greatly hurt their competitors[7]. This intercourse between the *zaibatsu* and government officials would become dangerous later on.

With a strong merchant foundation made, the government then subsidized these corporations to compete with the westerners. The subsidized firms quickly supplanted the British and American trading companies around them and began to swallow up the surrounding markets. As the economy grew stronger the Japanese began to look beyond their borders and towards becoming an empire recognized by Europe.

In 1874, Japan disputed China's control over the island of Taiwan and made its intent to replace China as premier of Asia clear by launching an expedition to take Taiwan. After moderate success on the island, Japan and China came to an agreement costing China three million taels (Chinese silver currency) and allowing Japan to annex the Ryukyu Islands but not Taiwan. In 1894 Japan, adopting a Western diplomatic tactic, decided to "open" Korea to foreign trade as the US did to Japan less than forty years prior.[8] The opening of Korea would spark the first Sino-Japanese war and prove the Japanese might. The war lasted a year with the Japanese victorious. The Japanese military, reformed and modeled after European militaries, was able to arrive the victor of every battle fought and press through Korea into Manchuria (Northern China). Many European speculators thought the Chinese would win this war and crush the upstart Japanese, but no one thought the Japanese would destroy the Chinese military and win the war in a year. The treaty of Shimonoseki signed April 17, 1895 saw the Japanese become suzerain over Korea, as well as annex Taiwan and

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6   Kenichi Ohno *The Industrialization and Global Integration of Meiji Japan* (National Graduate Institute for Policy Studies (GRIPS) Development Forum, 2003) Pg. 3
7   Ibid, Pg. 39
8   Seiji Hashida *The International Position of Japan as a Great Power* (New York, The Columbia University Press, 1905) Pg. 22

the Penghu Islands.[9] While the treaty granted Japan Port Arthur and the Liaotung peninsula, Russia, France, and Germany had intervened forcing Japan to relinquish the peninsula for the "safety" of peace in Asia.[10] Japan had also gained extensive trade rights, equal to that of European nations, in China. Japanese corporations wasted no time in expanding into Chinese and Korean markets heavily exporting Japanese goods. Kazuo Hori in his paper "Economic Activities under the Japanese Colonial Empire" shows how extensive the Japanese began trading with these states, outpacing European nations and developing economic growth in the region.

By this time heavy competition had developed between the most powerful *zaibatsu* (Mitsubishi, Sumitomo, Yasuda, Asano, Furukawa, Kawasaki, Otani, and Okura). Each *zaibatsu* attempted to control its own market before expanding into competing *zaibatsu* markets. While the Mitsui clan took hold of mining operations throughout Japan, the Mitsubishi had developed a strong naval empire to beat back the Pacific Mail Steamship Company, and the British P & O line.[11] After the previous expedition against Taiwan (1874) strengthened the Mitsubishi clan, the Mitsubishi were enlisted by the government to transport the Japanese forces. Following the victory, they were given the extra ships purchased from foreign governments for the expedition as well as an annual subsidy of 250 thousand yen.[12] These economic incentives were meant to aid in pushing back the foreign corporations and helped the Mitsubishi clan grow rapidly to the point that the public began fearing and demonizing Iwasaki Yataro who led the *zaibatsu*.[13] As popularity for his clan waned Iwasaki sought to combine his shipping corporation with a Mitsui shipping corporation created when his influence began to fade. The newly formed N.Y.K became subject to Iwasaki as he chartered his governmental influence and support to save himself. In doing so, he weakened his main competitor, the Mitsui clan, and decreased their influence in the government.[14] Battles between *zaibatsu* like this were common through the period as each attempted to use influence and power to shut out competitors.

In 1893, the Mitsui were given a silk plantation used by the government to encourage more and better silk production across Japan.[15] The success of this silk plantation was quite great and by the end of the century, it helped Japan to produce three quarters of the world's raw silk.[16] Successful business ventures like this spurred *zaibatsu* into new markets, the Mitsui moved from silk into cotton. The power of these *zaibatsu* to control the economy was demonstrated by the Mitsui, Mitsubishi, and

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9   Ibid, Pg. 25
10   Ibid, Pg. 26
11   John Roberts *Mitsui* (Boston: WeatherHill, 1973) Pg.120
12   Ibid, Pg. 120
13   Ibid, Pg. 120
14   Ibid, Pg. 122
15   Ibid, Pg. 123
16   Ibid, Pg. 123

Sumitomo possessing all Japanese gold mines, using the gold to pressure competition out of existence. As these *zaibatsu* began to dominate their respective markets, they also moved into political office wherever possible to guarantee an advantage against competitors. For example, when the government offered Miike mine (an important coal mine) up for auction, it was the Mitsui clan who bought it with their family head Masuda Takashi, the current government appointed agent for coal exports, lobbying for its purchase. His competitor, the Mitsubishi, were being financed by Mr. Okuma, the foreign minister.[17]

In the 1900's The Japanese again prepared for war. Boxer troubles in China had the Japanese marshal their armies to subdue the rebels, but during this campaign, they found the Russians positioning themselves against the Japanese politically to secure their own control over Asia. The Russians secured possession of Manchuria and refused to relinquish it. While in possession of Manchuria, Russia had also moved to secure suzerainty over Korea which Japan opposed. Japan sought a defensive alliance with Britain to counter Russia's ally France and then surprise attacked the Russian fleet at Port Arthur. This attack marked the beginning of the Russo-Japanese war (1904). The loss of this fleet put the Russians at a serious disadvantage and to repair it, they maneuvered their Baltic fleet around the Eurasian continent to regain the sea. As the Baltic fleet moved it was watched by *zaibatsu* assets around the globe who all reported back to Japan preparing the Japanese navy for the oncoming armada. This armada would be beaten in the Sea of Japan in May of 1904. Similar to the Sino-Japanese war, the Japanese Army had pressed through Korea fairly easily and into Manchuria to defeat the Russian army. The resulting Treaty of Portsmouth returned Korean control to Japan as well as gave Japan a large indemnity of money for her effort in the war.[18] The Russians were forced to relinquish their control over Chinese assets like Port Arthur and to give the South Manchurian Railway and the surrounding mining assets to Japan. This victory planted Japan square in the center stage of global politics, as the defeat of a European great power had given Japan prestige in the eyes of the west.

The Treaty of Portsmouth had actually been very important for the *zaibatsu* on several fronts, the first being the arrival of an American rail mogul (E.H Harriman) to Japan to bring American economic interests into Manchurian resource development. The second was that it gave the Japanese access to resource rich Northern China. The value of Manchuria was not lost on the *zaibatsu* who in connection with the Japanese government created the South Manchurian Railway Company (SMR). A company whose function was to collect Manchurian resources and develop the lands.[19] The SMR was given prime land and rights in Manchuria and was largely composed of

investments from the Japanese Government, the Mitsui *zaibatsu*, and the Mitsubishi *zaibatsu*.[20] The importance of this Company and region was evident when in the 1930's the region was full of a million Japanese subjects accounting for 40% of the annual Japanese trade.[21]

In the late 1800's amid so much international travel, Japanese citizens began secret societies with a variety of purposes. Learned individuals could use these societies to study and research history, politics, geography, language, etc. while at the same time "continental Ronin" gathered information, recruited informants, smuggled gold or opium, sabotaged railways, fomented rebellions, etc. These societies all acted for the sake of the emperor and to expand the Japanese empire. These societies also acted somewhat like the union busters of the US, keeping workers in line and where necessary securing mineral rights and the like from problematic entities. One of these societies, the Black Dragon Society, had actually funded rebellious efforts in China leading up to the Boxer rebellion. Even after the rebellion and growth of Japan onto mainland China these societies showed their usefulness. They worked feverishly with the *zaibatsu* to "develop China, to promote a better understanding between the two countries, and mutually enjoy the happy outcome of coexistence and prosperity". Together they funneled millions of yen into China to develop it and stir pro-Japanese sentiment.[22] The *zaibatsu* were able to use Sun Yatsen to help them acquire assets in China. When the RoC (Republic of China) entered hostilities with the Manchu government plenty of Japanese merchants rushed in to sell arms to both sides.[23] Unfortunately for the *zaibatsu*, the merchants combined with their urge to throw money to Sun Yatsen, had weakened the Pro-Japanese sentiment in China and when Sun capitulated to Yuan Shih-k'ai the Japanese had lost everything they worked for. In 1914 WWI had broken out and Japan had taken sides with the allies. The war would be incredibly beneficial for the Japanese in both economic development and territorial expansion. Now at war with Germany, Japan moved swiftly to secure the Chinese and island territories that Germany possessed. Following the war, these assets remained in Japanese control. The Japanese gave thanks that the war truly took place in Europe leaving many western nations starving for ammunitions and resources. With the war being Europe's primary focus, Japan could happily build its infrastructure and industry in preparation for future expansion.[24] At the start of 1915, Japan submitted to the Chinese president a list of demands (the Twenty-one demands) made by the *zaibatsu* and things they had wanted for a long time.[25] While the war raged on, the Japanese leveraged the supplies they had been sending to Russia

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17   John Roberts *Mitsui* (Boston: WeatherHill, 1973) Pg.131-132
18   Seiji Hashida *The International Position of Japan as a Great Power* (New York, The Columbia University Press, 1905) Pg. 39
19   John Roberts *Mitsui* (Boston: WeatherHill, 1973) Pg.167

20   Ibid, Pg. 167
21   Ibid, Pg. 167
22   John Roberts *Mitsui* (Boston: WeatherHill, 1973) Pg.178
23   Ibid, Pg. 180
24   Buruma, Ian. *Inventing Japan* (New York: Modern Library, 2003) Pg.65
25   John Roberts *Mitsui* (Boston: WeatherHill, 1973) Pg.194

for more agreements between the two over possession of China and its assets.[26] As China had found itself without any European support, it acquiesced to the Twenty-One demands made by Japan in January of 1915.[27] As the war raged on and European economies were nearing collapse the loans they had issued to China had stopped and, in their place, Japan had stepped in, making large profits off of the war.[28] Japan offered several Chinese warlords large sum loans in return for more of the Chinese economy being given to the *zaibatsu*. The *zaibatsu* themselves had also stepped in and begun giving China extensive loans that in 1918 had amounted to as much as 295 million yen.[29] By 1916 things were working well for Japan. In July Japan formed an alliance with Russia to better rip apart China as well as secure their own interests and borders.

The war had allowed for Japan to export over a billion dollars' worth of goods a year. The war had even opened new avenues as foreign companies couldn't produce needed goods for Japan anymore thus *zaibatsu* began looking for ways to fill the gaps. Mitsui Corporation had made a foray into American companies just before the war started, buying Standard Aircraft Corporation, which gave them roughly a 14-million-dollar profit and immeasurable experience in aircraft production.[30] The wealth gained following the war enabled the *zaibatsu* to buy more stock in foreign corporations and also created a new social class the *narikin*[31] who were bolder with their money and more capable of reckless investments.

The *narikin* could be incredibly effective in their economic pursuits and occasionally, they would compete with the stronger *zaibatsu* corporations. One such narikin, the effective Kaneko Naokichi, had helped the Suzuki Shoten trading house to become so powerful that it held transactions amounting to more than a billion yen per year.[32]

The *zaibatsu* had fused themselves so well with the Japanese government that at the Washington conference (Nov, 1921 – Feb 1922) there were plenty of *zaibatsu* business men there as "People's representatives" for the Japanese delegation.[33] By this period massive anti-big business sentiment had begun to build and ferment in Japanese society; to quote Roberts' *Mitsui* "The concentration of ownership in the hands of the *zaibatsu* had made their oppressive presence felt in every aspect of the economy…their political and financial maneuvers… increased public distrust and hatred of big business and its corrupt political leaders."[34]

The Great Depression (1929 - 1939) made one thing clear for nations

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26   Ibid, Pg. 195
27   Michael A. Barnhart *Japan And The World Since 1868* (London, Hodder Headline PLC, 1995) Pg. 54
28   John Roberts *Mitsui* (Boston: WeatherHill, 1973) Pg.196
29   Ibid, Pg. 197
30   Ibid, Pg. 202-203
31   John Roberts *Mitsui* (Boston: WeatherHill, 1973) Pg.203
32   Ibid, Pg. 203
33   Ibid, Pg. 248
34   Ibid, Pg. 249

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dependent on foreign trade, the global market could collapse at any moment, and the collapse of global markets told the Japanese government it needed to expand its borders. With the imperial mindset of the government strengthened, the *zaibatsu* followed suit, undercutting competitors and pushing further into foreign markets. The Japanese state began to re-equip and arm its military. The military demands were reflected by the economy as a decline in light industry such as textiles (30%) was replaced by production in heavy industry which began to dominate over 40% of the Japanese industrial production.[35] Following WWI the *zaibatsu* had begun to assist the government wherever possible in return for economic benefit. Historian By Kozo Yamamura stated "Japanese governments looked to the *zaibatsu* for aid and assistance in financing public budgets, in building foreign trade and colonial enterprise, and in creating heavy industries required by the Army and Navy…"[36] With the government so dependent on them, the *zaibatsu* became incredibly powerful.

WWII began for Japan in 1936 with the Second Sino-Japanese war. The war demanded the expansion and growth of the munitions and strategic industries, and further expansion of the heavy industries continued through the war into 1941.[37] The Japanese invaded China for a second time hoping to annex all of China after stealing Manchuria. The theft of Manchuria occurred in 1931 when a Hyper-nationalist Japanese army went rogue and invaded Manchuria. The Japanese were initially successful capturing much of Northern China and pressing into Nanking. In Nanking atrocities committed by the Japanese helped bolster the Chinese desire to repulse the invaders and the Japanese advance began to grind to a halt.

In 1941 the Japanese attacked Pearl Harbor in a surprise attack aimed at destroying the American pacific fleet specifically the carrier ships that weren't present during the attack. The Pearl Harbor attack was synchronized with multiple naval invasions throughout the pacific giving the Japanese control over plenty of Indonesia and the Philippines as well as scattered islands between the United States and Japan. The attack had the effect of dragging the United States into the war against the Axis powers (Germany, Japan, and Italy). By the time the war in the pacific had come to involve western powers, following the fall of Germany in 1944, the *zaibatsu* were heavily involved in the government. They had their hands around resources from across a widespread empire and heavy national demand for oil, rubber, and steel fed the *zaibatsu's* industry. In Bisson's The *Zaibatsu's* Wartime Role it's clear that after restructuring their corporations around Heavy industry, allowed them to profit massively from war. To quote Bisson "The extensive heavy industrial enterprises of

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35   T. A. Bisson "Increase of Zaibatsu Predominance in Wartime Japan" Pacific Affairs 18 No.1 (1945) pg. 55
36   Kozo Yamamura "Zaibatsu Prewar and Zaibatsu Postwar" The Journal of Asian Studies 23, No.4 (1964) Pg. 550 - 551
37   T. A. Bisson "Increase of Zaibatsu Predominance in Wartime Japan" Pacific Affairs 18 No.1 (1945) pg. 56

Mitsubishi enabled this concern to derive maximum advantage from the war. At the end of 1942 the paid-up capital of its mining, electric, steel, oil, and chemical subsidiaries already totaled nearly 400 million yen." These massive corporations pushed themselves into the major industrial markets of war and used this control to leverage their positions against the government which during the war was primarily military men.[38] Roberts corroborates the impenetrability of the *zaibatsu* economy by military men and their government stating "Although the Kwantung Army's fascists rode roughshod over Japan…they never quite established the economic dictatorship they hungered for. In the very darkest days that loomed ahead, servitors or friends of the *zaibatsu* appeared in every cabinet…"[39] The *zaibatsu* had established total control over the Japanese economy.

Following the Second World War, MacArthur occupied Japan to enforce dramatic changes on the Japanese state. He tore into the *zaibatsu*, though fearing communism left them mostly intact creating the new *Keiretsu* which were more decentralized but much the same corporations. The process of dismantling the *zaibatsu* was as such "To dissolve the *zaibatsu*, the government effectively confiscated all shares held directly or indirectly by the most prominent *zaibatsu* families…It then resold the acquired stock. It finished the process shortly after the Tokyo Stock Exchange reopened in 1949…it left the internal affairs of the corporations largely intact." in the article "Does Ownership Matter? Evidence From The Zaibatsu Dissolution Program". The corporations had been separated into multiple smaller corporations all connected by a group bank. These *Keiretsu* would still be a powerful economic force. In the 1990's American writers were rife with fear of the growing Japanese economy. The idea that the United States had been out-negotiated on trade deals for years was easily found with books like *Trading Places: How We Are Giving Our Future to Japan and How to Reclaim it* being published while focusing on this topic.[40] The arrival of Japan into the great political game and its sudden emergence as a preeminent power confused many. Through careful research and study of Japan's past, many through the years have found at the heart of Japan's growth and development the *zaibatsu* and their economic dominance pushing Japan into new heights.

Conclusion

Through this paper I have shown how the *zaibatsu* used Japan's modernization for their own benefit. The *zaibatsu* grew rapidly under governmental subsidies, were gifted lands and resources by an expansive government, and quickly gained control over the Japanese economy. The *zaibatsu* wielded the economy like a weapon to control

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38   T. A. Bisson "The Zaibatsu's Wartime Role" Pacific Affairs 18 No. 4 (1945) pg. 355-356
39   John Roberts *Mitsui* (Boston: WeatherHill, 1973) Pg.323
40   George Weimer "Keiretsu, Kudzu, Zaibatsu, And You; Are we Japan's new colony?" Industry Week 241 No.6. (1992) pg.68, https://search-proquest-com.ezproxy.lib.uwstout.edu/docview/219729342/fulltextPDF/D912D08A7A1C4118PQ/1?accountid=9255

the Japanese government and influence its actions. Following Japan's defeat in WWII, many of the corporations that existed in this age of development and expansion for Japan continued on. Mitsubishi unfazed by the wars and actions of its government or foreign governments persists to this day as a corporate entity feared by competitors. Mitsubishi isn't alone as a *zaibatsu* to have survived the war and dissolution, Mitsui persists in a different form as does Sumitomo Corp. three of the biggest *zaibatsu* still contending with each other to this day.[41] With many of these corporations surviving on, their control of the Japanese economy was clear and their ability to dominate markets and the global system should be examined more closely.

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41   Tong, Alfred. "The rise and fall? Of the Keiretsu" Asian Chemical News 9 no. 385. Pg 14 (2003) https://search-proquest-com.ezproxy.lib.uwstout.edu/docview/205860137?accountid=9255&rfr_id=info%3Axri%2Fsid%3Aprimo

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68. https://search-proquest-com.ezproxy.lib.uwstout.edu/docview/219729342?accountid=9255&rfr_id=info%3Axri%2Fsid%3Aprimo

Navigating Modern Horror Films with a Feminist Perspective

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Abstract

As a female filmmaker, I wanted to tackle systemic issues within modern horror cinema. My main concerns were violence against women on screen and what kind of effect that could have on audiences. I began by identifying problems in cinema then learning about the problem's root causes, i.e. male gaze and the sadistic, voyeuristic look. I reviewed horror films then pulled inspiration from various tactics used to create a compelling film that does not desensitize the audience to violence against women. I then created my own horror film that addresses some issues head on. Upon completion of the film, I intend to take my film and place it back into my research by recreating previous studies done on horror films' impact on the male viewer. I would do this using modern horror/slasher films as well as my own to see if my own horror film is effective in both scaring audiences while elevating the treatment of women.

Keywords: Film studies, gender roles, women in film

Navigating Modern Horror Films with a Feminist Perspective

Horror films are one of the oldest themes within cinema, but yet there is a fundamental issue in the horror/slasher genre of movies that is perpetuated in modern film. The treatment of women, as opposed to men, is given less ethicality and fulfills fantasies about punishment and possession of women. My objective was to create a horror film that breaks tropes and patterns surrounding the treatment of female characters. As I am a film student, albeit that I am passionate about women's rights and treatment, it is crucial to have an expert opinion on the script and the treatment of the issues I am addressing. Without this kind of help, the film could have easily become a hit piece on men. If men felt victimized by my film, this would fundamentally go against what I was seeking to do. From my observations, when a group of people feels attacked, that group will then shut down conversations surrounding the issue. I want to spark a change in dialog, rather than isolate a group

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of consumers, which often happens with violence against women on screen.

I began my script writing process with background research on the genre of horror film as it relates to the roles of the women, so I would have a fundamental idea of what to avoid. This was crucial as there are some tropes that are easily identifiable, but there are also the subtler micro-aggressions that I needed to be aware of. I studied both horror films (classic and modern) and feminist theory to obtain a solid database that retains to the sort of film I wish to produce. I cannot claim to have a database that covers the entirety of horror films, but rather horror films that are deemed as classics and must-sees. My goal is to evaluate what someone with a base level of interest in horror films would think when prompted about the subject, and to then build off of those popularized concepts and techniques to make a healthier film.

In 1989, a study was conducted to gauge the response of female audiences to horror films as opposed to male audiences (Norbert Mundorf, et al., 1989). The researchers within this study asked a group of men and women to view clips from various horror films with different events taking place: a scene of a woman being tortured and mocked, a scene of women being murdered, a scene of men being murdered, and finally a scene with both a man and a woman being killed. The research conducted by Mundorf, Weaver, and Zillmann showed that women found graphically violent motion pictures less enjoyable than men, thus limiting the audience of horror films significantly. The women were more uncomfortable when viewing scenes with female victims but were also uncomfortable with male victims. This might be in part because "a person's level of fear of victimization and mutilation could prove a crucial factor mediating responses to horror" (Mundorf, 659). Mundorf, et al, means that because women face more fear of rape and abuse than their male counterparts, horror films may be acting upon those daily fears and possibly perpetuating them. Conditioned social roles may be a factor in why some women do not enjoy horror films and men do as "young men are taught to exhibit fearlessness and show mastery in the face of dangerous, fight-inducing situations" (Mundorf, 656) as opposed to women who are "taught to express fear in frightening situations, and presumably, signal the need for protection to men" (Mundorf, 657). If filmmakers continue to enforce these types of stigmas onto female audiences, they will continue to push away a bigger demographic in favor of making horror films 'a boy's club.'

There is a large female audience for the horror films even though they admit to being uncomfortable with aspects of the genre. "What disturbed them [the teenage women interviewed] most were the adults who they felt continually underestimated their intelligence. This group included not only authority figures, but filmmakers and producers, as well" (Kathleen, Kendall, 82). Female fans of the genre described having filmmakers talk down to female audiences about how women should act. This mistreatment of the female audience has inspired some young women to become

filmmakers. Two adolescent female filmmakers state, they "wouldn't have wanted the male to win" and cite as their inspiration, *Buffy the Vampire Slayer*. In fact, they felt that most of the characters in the television series of the same name are "quite strong, really intelligent and show that you can be more than just a bimbo" (Kendall, 86). They and other female filmmakers are beginning to make films that challenge the stereotypes and tests what a woman can and cannot be on the silver screen. They stated that they "were employing irony and humor to confront stereotypes about producers of horror, including assumptions about themselves" (Kendall, 86). It's by having these new narratives that feminism will prevail in the horror genre as it explores past male narratives and opens more story telling opportunities.

Female audiences have been subjected to a lot of discomforts, yet these fans are making films and stories that fit within the horror genre in spite of the clichés and stereotypes. These female creators are creating not out of spite for the genre, but instead to be the change that they would like to see. I fall into this group of young female filmmakers, and I too grew up with *Buffy the Vampire Slayer*. Creating such an iconic female lead who was powerful but not without her flaws was crucial to my development as a feminist, and I want to see more female characters develop both within my personal work and in others'. When I set out to make my film approachable to female audiences, it was clear that I would have to reevaluate my own misconceptions and be self-critical. The intelligence of a woman must be fully considered, but also her physical state, as on-screen violence has real-world repercussions.

There has always been violence toward women in film, but it is most apparent in the treatment of women in the slasher genre, which is a subset of the horror genre. The 1974 *Texas Chainsaw Massacre* (Dir. Tobe Hooper) is a key example of how women are treated as opposed to men. The first victim in the film, Kirk, is beaten to death with a sledge hammer. The killer, Leatherface, kills him with two blows to the head without any additional interaction between them, aside from Leatherface dragging Kirk's corpse away. The total interaction time between the two in the scene is 20 seconds. The second victim, Pam (who is Kirk's girlfriend), is chased out of the house before she is pulled back in and is brought kicking and screaming back onto house, then to a torture room. From there, Leatherface hangs her from a meathook by spearing the hook through her back. As she dangles in the air, Leatherface starts a chainsaw and begins to dismember her boyfriend in front of her. The scene ends on her prolonged torture and abuse, as opposed to the quick death of every man prior. The third victim, Jerry, is exploring the house, searching for his missing friends, when he comes face to face with Leatherface. Jerry first opens a freezer, to which reveals the living Pam inside who is slowly being frozen to death. She springs up as Leatherface enters. Jerry's death, an ax to the head, takes 4 seconds. Leatherface then pushes Pam back into the freezer, effectively sealing her to her death. Even in death, she will

slowly freeze rather than be put out of her misery, such as Jerry. The total on-scene time it took for her to die as she is tortured is 87 seconds. The fourth victim, Franklin, is speared several times in the chest with a chainsaw in the woods. The total time for him to die is 13 seconds. The final victim and only survivor, Sally, faces the most hardships within the film, as she is forced to watch her friend die and flee for her life at 52:16 in the film. The remaining 30 minutes of the film is centered around her and her being tortured and chased. Things get especially hard for her at 1:06:45 when she is tied up at the dinner table and mocked and ridiculed as she begs for her life. She is then held down as an old man attempts to kill her with a hammer, one time giving her a powerful blow to the back of the head. The torture is continuous until 1:18:30 where she is able to escape her male captors. The only other character to die in the film is the hitchhiker antagonist as he attempts to catch Sally and bring her back. His death is instant, however, when a semi runs him over. While the film may have deeper meaning as to why it victimizes women more so than men, without deeper thought put into the themes of the story, this is not clear to audiences. Rather, it became a popular film due to its use of violence and the concept of being trapped and killed by cannibals.

In the long drawn out scene of the dinner table, the sadist voyeuristic "look" is introduced. The sadistic voyeuristic look is based upon the 1975 Male Gaze Theory by Laura Mulvey. The male gaze, in essence, is how women are objectified by the camera for the pleasure of heterosexual male audiences. In addition, the voyeuristic look portrays the actions that are harmful to women. It can include physical, emotional, and mental violence. The woman is no longer seen as just a sexual object, but rather an object to play and torment, and in worst case scenarios, to kill. This can be seen when comparing the treatment of the women within *The Texas Chainsaw Massacre*, as opposed to the men. While a majority of the deaths that took place were male, the time spent torturing the women was more than tenfold that of the time spent on men. In the film, it took 37 seconds for 3 men to die while for just one female victim, it took 87 seconds. It is not the kill count that matters, but rather, what happens to the victim before they are killed that is impactful on the audience.

Some films take the violence on screen and push it further. In *The Nightmare on Elm Street* (Dir. Wes Craven) the antagonist, Freddy Krueger, visits a woman as she sleeps in the bath. The audience is shown his hand moving between her spread legs and toward her bare body. In a two-minute-long scene in the 1981 film, *The Evil Dead* (Dir. Sam Raimi), the audience watches as the female victim is forcefully held down and then raped by a tree. To clarify, I do mean that the female victim was forcefully raped by a demon possessed tree. Far too often are women and their bodies used for shock value. In the 1987 film, *I Was a Teenage Zombie*, a woman is raped by the zombie antagonist. The zombie then rips off the top half of her body and continues to rape her lower half. This can be seen as symbolic of how a woman is not necessarily

important as a person, but as an instrument to utilize.

In 1984, researchers Linz, Donnerstein, and Penrod had conducted a study that "measured the reactions of college-age men to films depicting violence against women over a five-day period with five horror films" (Daniel Linz, et al. 758.) At the end of the five-day period, the men were then asked to view a real rape trial. At this point, the men had begun to show less sympathy for the fictitious female victim onscreen so the researchers wanted to see real-world results. When viewing the rape trial, the men were less anxious, less depressed and once again, less sympathetic to the female victim, regardless of this woman being real and having had endured sexual violence. These results are opposed to a control group of men that had not viewed the films. The control group had higher levels of sympathy for the woman. Again in 1988, men were exposed to three slashers (a sub-genre of horror) films that depicted women in different ways: "(a) those that are overtly violent, (b) those that are not overtly violent but are sexually explicit and arguably depict women as sexually degraded objects, and (c) those that are not sexually explicit but, like the sexually explicit material, nearly always portray women as sexual objects" (Linz and Donnerstein, 759.) Both of the studies showed that the violence against women on screen had real-world effects on the viewers and their treatment toward women as the second experiment bore similar results to the first. The men would become desensitized to the violence and alter their views on women, both fictitious and real. As this experiment has been conducted multiple times with similar results each time, it is relatively conclusive that on-screen violence to women is harmful in how men view female victims.

In a similar study to the 1984 study "Effects of Long-Term Exposure to Violent and Sexually Degrading Depictions of Women," Dr. Linz continued his work this time accompanied by Dr. Charles Mullin. This study was rather similar to the first but, "effect[s] of slasher films on mood changes was found, but the affected mood was hostility rather than depression or anxiety. Viewers were apparently finding themselves more comfortable with the violent material, and thus the ability of the film to induce a feeling of hostility and annoyance was diminished somewhat with repeated viewings (Mullin, et al. 456)." In addition to discovering hostility to the content had gone down, Mullin, et al touch on an important topic of re-sensitization. They theorized that "long-term, frequent exposure to violence may cause viewers to become more easily desensitized during subsequent exposures (Mullin, et al, 458)." They then reference the 1967 study by Kimmel & Goldstein that resulted in evidence that after re-sensitizing and distancing one's self to a stimulus that, that person will be quick to re-habituate to that stimulus in the future. In the case of horror films, this means that men that have already been exposed to degrading imagery and been desensitized will quickly pick up those thought patterns again in the future when exposed to similar content. In 2002, a group of researchers found that "young

adolescents in [their] region commonly watch movies that depict extreme, graphic, or sexualized violence. Exposure to movie violence is not counted in studies of television violence and could be a major contributor to violent behavior because movie violence is more salient than that shown in television programming. Surveys of media exposure in adolescents find similar overall exposure by gender. In contrast, we found that boys have substantially higher exposure to movie violence, probably because of their preference for action films (Sargent, et al. 451)" which can be daunting as films that depict sexualized violence are more impactful on male audiences and can further divide men and women on issues like assault, either physical or sexual in nature. A group of researchers in 2007 conducted an experiment that recorded results from a variety of film genres (not limited to horror) and they found that their participants "perspectives suggest that these types of images may serve to intensify perceptions of dramatic conflict that viewers do appear to find gratifying" (Mary Beth Oliver, et al. 608). Though men are my main concern in this study as to who is affected by violence desensitization, as I mentioned prior, film desensitization has negative effects on women, albeit in a slightly different way. A 2006 study did show that "women's sex and violence predilections were moderated to an extent by their exposure to sexually violent media that was based on a true story. Unlike the men, rape myth acceptance was ameliorated to some degree for the women. This finding varies from earlier research on sexually violent media, which suggested that both men and women become desensitized to such fare (Tara Emmers-Sommerperry, et al, 318)." Women also need to be better advocates for one another, as they too are susceptible to desensitization of violence against women.

Recently, modern horror cinema and cinema as a whole has been utilizing intertextuality more predominantly. Intertextuality meaning the relation between two texts, and in this context, I am referring to remake and sequel culture. In addition to remakes and sequels to films such as *Star Wars* and *Jurassic Park*, there has been a resurgence of remakes and sequels to horror films such as the 2017's *Jigsaw* from the *Saw* Franchise, 2018 *Halloween*, the 2018 *Insidious: The Last Key*, the 2019 continuation of the *Chucky* franchise with *Child Play*, film and so many more. This is in part because these franchises are established and already have a decent following, so the investment put into these films has a more guaranteed profit than a new concept. What this means for cinema, however, is that old tropes are being recycled, which makes progress regress. As stated prior, horror/slasher films are no exception to this. In 2010, the *Nightmare on Elm Street* franchise was given a reboot and the film shared the same bathtub scene that its 1984 counterpart had. I do not think there is anything fundamentally wrong with paying homage to a classic film (I even really enjoy when it is done subtly); I do, however, take issue with what it is referencing or if a scene is created one to one that was originally harmful in nature. The female victim in the tub was sexually assaulted by the antagonist when she was a child. This scene sexualizes

her and shows that she is still vulnerable to the antagonist. The way that her legs are spread, framing his hand as it makes its way toward her vaginal region creates a sense that the victim can be easily taken. By having her legs spread in such a manner, even if unintentional due to her being asleep, could possibly be interpreted as her inviting the intrusion/sexual assault. The *Evil Dead* franchise also received a reboot in 2013 and it also decided to include the original's scene of the woman being raped by the tree. Regurgitating scenes like this are regressive in nature, as they bring back ideology that was once accepted but has no place in modern society. Bringing these types of scenes back blurs the line to audiences about what "has been" and what is "still being" accepted.

That is not to say that progress is not being made. Films such as the *Rosemary's Baby*, *The Shining*, and *The Babadook* all have strong feminist themes and have even become a bigger part of the horror film discussion outside of small, niche circles. These films reference a lot of mentioned violence, but it is not shown on screen. *The Shining* references violent acts but more often than not, the audience does not actually see a character get hurt. What these films do is take the sexual aspect of violence against women out of the film entirely, or at least out of the scene directly presented, and instead leave a nuanced idea of what is happening for the viewer to imagine, which almost makes the film more eerie and terrifying as the audience is left to wonder about all the things that could possibly happen to the victim. This can be validated by *The Shining* being on various horror film lists as one of the most terrifying films to date. These films were heavily influential to my scriptwriting process. It may not be a fair comparison of these films to slasher films, as they apart from one another in sub-genre, but the reason that I continue to compare them is because my focus is on what is commercially known from the horror genre, which I believe becomes itself a subgenre of horror. A majority of these films are pillars to the genre and have the most notoriety, as they are the blockbusters of the genre.

When writing the script, I was in frequent contact with UW-Stout professor and anthropologist Tina Lee. She would read over my script and make suggestions for alterations. We went through a revision process multiple times until we came to a script that both she and I were satisfied with. I asked multiple men, including men that I know closely, as well as strangers, to review the script to gauge their reactions. After finishing the writing process, I began the production of the film with a solid understanding of what makes a compelling feminist horror film.

 I started with knowing that I could not talk down to my male audience, though I felt that the female audience would be able to pick up on the micro-aggressions of casual sexism more so than the men could. With that in mind, I worked closely with several male cinema students that are also at Stout in addition to my academic advisor for the project, Peter Galante. Having male influence while also achieving my desired objective proved to be difficult as a decent amount of the

concepts that I was trying to get across were not hitting correctly. I kept rewriting my script until it was more understandable for my male audience, but to assure the integrity of the film, I also worked closely with Dr. Lee. My approach to sexism and furthermore, making conversations about sexism approachable to my male audience, was not a traditionally feminist path, but instead, something that I felt helped to make the story terrifying and to make male audiences rethink their own actions. I had to make the male character realistic to modern men, so that my audience may be able to see some of their own characteristics within him. I could not vilify him immediately, as that would push male audiences away or even make them feel attacked. The character needed to go through either a change, or to have more about his quality of character revealed over time. My solution: The faulty narrator.

The faulty narrator is a trope where the narrator or the protagonist of the story is not a trustworthy character and it would later be revealed that they had been misguiding the audience. I made my male character the main protagonist and framed the woman to be the antagonist. I wanted my audience to fall into sexist tendencies in order to flip their expectations at the end when the male character is revealed to be the true antagonist. I wanted to show my audience that it is easy to fall into sexist tendencies, as they can be so ingrained in our culture and lifestyles, however; I needed to ultimately underline the idea that even though it may be easy to do, that sexism is harmful and has consequences.

While addressing sexual relationships, I did not want to shy away from sex as a topic as it is natural to human nature and needs not be demonized further. More importantly, however, I did not want to *needlessly* sexualize my female character. One of the major keys to knowing why and how the male gaze works was for me to then use it in a way that knowingly conveys a message I want to get through. My female character is sexualized within the film; however, I did this with intention and purpose. The only time she is objectified and sexualized is in the male character's literal dreams. This was done to show how his sexualizing her was harmful to their real relationship and caused a dispute between them.

While I could justify sexualizing my female character, I could not allow her to be beaten on screen as the real-world ramifications are too high. I was heavily influenced by *The Shining* and its treatment of violence because as stated before, it does not show the violence outright. *The Shining* is regarded as one of the most terrifying films of all time, and yet it was able to break away from the voyeuristic look that so many other films of the same genre fall back onto as a crutch. It was reassuring to find that in a 1999 study (Berry, et al), when cutting film violence, and that audience enjoyment did not vary. The result showed that "cutting the movie significantly increased its enjoyability for the women; for the men, there was no significant difference (Berry, et al, 567)." Films do not need violence to be entertaining, and less violence makes the experience more enjoyable for some audiences. What this meant

for me was that I could make a horror film that has the potential to be successfully terrifying without unnecessary violence. All the actions of harming the female character happen just off-screen. The audience knows that the male character is harming the female character, but it does not indulge the fantasy of seeing the woman suffering.

Once the script was finished after months of rewriting and research, I began to cast my actor and actresses as well as build my crew. It was important to me to cast a diversity of people as it is important to bring in new perspectives and talents to cinema as well as more representation. The rest of the process was rather streamlined and quick as it was set building and filming. Filming has recently wrapped and it will soon be fully edited, but from the raw footage alone, I believe that my team and I have succeeded in creating a film that makes people feel awkward when watching unsolicited advances and casual sexism on the screen while also being eerie and unsettling without showing prolonged violence against women. Creating a horror film that does not utilize violence was hard to achieve as it is ingrained in horror cinema culture, but if I have done my job correctly, I have succeeded.

Even if my film is not the most successful at exposing sexism and the need for change, it did prove something important: that the change I seek is possible to obtain. This cause continues to drive me forward within my own filmmaking career. Following the completion, I intend to bring the film back into an academic setting. This film, *Le Ossa*, was created stemming from feminist ideas, various studies, and previous films. However, that does not guarantee that the film will be well received as it goes against what modern cinema has attributed horror to be. I intend to replicate the Linz, Donnerstein, and Penrod 1984 experiment in a modern setting to see if the results are still applicable. I would have a group of male volunteers watch 3 various horror films, like the previous experiment, but with all modern, blockbuster, horror films. I would also place my own film among the films watched to gage their response by issuing surveys after competition of each film. The group would watch the first two horror films together then for the last screening day, the group would be divided into two. One group would watch my horror film and the other would watch another film like the previous two they viewed. It may be that the modern man has become even more desensitized to violence against women as the content is far more accessible now. If that is the case, then hopefully my study will help to create more dialog surrounding violence in films.

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Orisha, Divination, and Death in the Yoruba Culture of West Africa

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Abstract

Each culture of the world has developed its own explanation for the phenomenon of death. In West Africa, the Yoruba people have developed a perspective of the afterlife largely informed by the gods and demi-gods they worship, known as *orisha*. *Orisha* are the intermediaries between humankind and the supernatural, and are said to have descended from Olorun. Olorun is regarded as the high god of Yoruba religion to whom all are believed to return in the afterlife. This project seeks to provide a cultural overview of the Yoruba people, investigating the central figures of their religion as well as the ways in which religion influences their views towards life, death, and the afterlife that awaits.

Keywords: Afterlife, death, divination, orisha, Yoruba

Introduction

Death is a force all living things will inevitably face during their lifetime—whether it be one's own death, or the death of a loved one. Death traverses the bounds of race, class, religion, and culture, which explains its deeply rooted universality and presence in art and literature around the world. Early humans developed their own explanations for the phenomenon, many of which are much clearly expressed in early folklore and mythology. The Yoruba people of West Africa in particular have attributed death, as well as much of the world's phenomena, to deities and semi-gods known as *orisha*. This study will provide a lens through which one can view a universal phenomenon while highlighting a culture that is not often the focus of academic or entertainment media. This research combines three areas of cultural study that are not often examined in relation to each other and will investigate the ways in which they interact with one another to create the Yoruba culture as we know it. This review intends to investigate Yoruba religion, how it influences the views of the Yoruba

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towards death, and how their beliefs inform the conduct in their everyday lives.

Cultural Overview

The Yoruba people are one of the largest ethnic groups in West Africa, living primarily in Yorubaland, a cultural region encompassing Nigeria, Togo, and Benin. They are not a single group, but rather a collection of diverse people bound together by a common language, history, and culture.[2] Despite their long and rich history as a people, the term "Yoruba" was not always used to describe them as an ethnic group. The term instead originally described the speakers of the Yoruba language, and was not used as an ethnic description until the 19th century.[3] Yoruba culture and religion largely focuses on folktales, philosophy, cosmology, and mythology.[4] They are known for their excellent craftsmanship, and are considered one of the most skilled and productive groups in Africa.[5] They have developed a variety of artistic forms including pottery, weaving, beadwork, metalwork, and mask making, all of which are practiced to honor gods and ancestors.[6]

Yoruba History

Yoruba people are said to have originated from Ile-Ife—an ancient city in the southwestern part of Nigeria where the gods are said to have descended to earth.[7] The city was founded by Oduduwa and Obatala—heroes from which all Yoruba people are believed to have descended.[8] While these two figures are notable in Yoruba culture, their roles in history possess a certain fluidity due to the Yoruba culture being one that is carried on through storytelling, and thus ever-changing. This mode of transfer causes traditional customs to vary from community to community as changes in influence and interpretation arise.[9] For example, one myth holds that Obatala was a divine being and Oduduwa was his wife, while another claims that Oduduwa was male rather than female, and led as the divine king of the Yoruba people; one credits the two gods with creating the world, while another credits Olorun alone—the high god of the Yoruba religion.[10] Following his death, Oduduwa's sons left the city of Ile-Ife to establish other Yoruba states. Today, the royal dynasty of Ile-Ife is over 800 years old, carried on by its current king, Alayeluwa Oba Okundae Sijuwade Olubuse II.[11]

Orisha and Divination

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2 "Yoruba." Every Culture.
3 "Yoruba People." New World Encyclopedia.
4 Kennedy. "10 things that might surprise you about Yoruba culture."
5 New World Encyclopedia.
6 "Yoruba People." Come to Nigeria.
7 Ken Chiedozie Egu. "Ile Ife, Nigeria (ca. 500 B.C.E.-)."
8 "Yoruba."
9 Ibid.
10 Horton, "Yoruba Religion and Myth."
11 Egu, "Ile Ife, Nigeria (ca. 500 B.C.E.-)."

Due to the diaspora of slaves during the slave trade, many Yoruba traditions have been influenced by other cultures and religions. Their traditional polytheistic religion was challenged throughout history by Islam and Christianity—with missionaries of the latter sect practicing Christian conversion through the use of religious schools to draw people away from traditional beliefs.[12] Traditional Yoruba religion—often referred to as Aborisha—has played a significant role in influencing other groups as well, merging many traditional customs and values with the religions and cultures of South America and the Caribbean.[13] Yoruba religion and mythology are popularized in Latin America, especially in Haiti, Cuba, and Puerto Rico, and have given origin to several New World religions such as Santeria in Cuba, and Candomble in Brazil.[14]

Around 20% of Yoruba people still practice the traditional religion of their ancestors,[15] but most contemporary Yoruba practice Christianity and Islam.[16] Traditional Yoruba religion holds that there is one supreme being—Olorun (also known as Olodumare), and hundreds of minor gods known as *orisha*.[17] Olorun is considered the creator of the earth, humans, and non-human beings.[18] *Orisha* are divine intermediaries between humankind and the supernatural, and are revered for having control over elements of nature.[19] They reflect the manifestations of Olorun, and were described to early Christian missionaries as minor gods that descended from a single, almighty god, just as Jesus was the son of the god in the Christian faith.[20] Each human possesses his or her own guardian *orisha* to which they pray and consult for guidance. And while there are there are over 401 gods known in the Yoruba religion today,[21] there are only three gods who are available to all: Olorun, the high god, Eshu, the divine messenger, and Orunmila (also known as Ifa), the god of Divination.[22]

Orisha are not equal in power or ability—there are some that are viewed as more significant than others. Eshu, known as the "trickster god," is a very important *orisha* in the Yoruba culture. He is regarded as Olorun's divine messenger and negotiates between negative and positive forces in the body as a god of chance, accident, and unpredictability.[23] Ogun, another significant deity, is the god of war, hunting, and ironworking and serves as the patron deity of blacksmiths

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12 New World Encyclopedia.
13 "Yoruba."
14 New World Encyclopedia.
15 "Yoruba."
16 New World Encyclopedia.
17 "Yoruba."
18 Mohammed Akinola Akomolafe. "Yoruba Ontology: A Critique of the Conceptualization of Life After Death."
19 "Yoruba Religion." Wikipedia.
20 Horton, "Yoruba Religion and Myth."
21 Come to Nigeria
22 "Yoruba."
23 "Yoruba Religion."

and warriors.[24] He is also believed to preside over all deals and contracts, and is considered to be terrible in his revenge if a pact is broken in his name. Obaluaye (also known as Shokpona), is the god of disease who rose to significance during times of inter-tribal wars, during which many smallpox plagues broke out. The Yoruba believe that Obaluaye is also responsible for high temperatures and boils, and were once so terrified by his powers that they feared to say his name.[25] Despite the nature of his powers, however, Obaluaye is not considered an evil *orisha*. Oya, goddess of wind and the dead, is the personification of the Niger River.[26] She interacts closely with Shango, the god of thunder, as well as Iku, the personification of death. As the gate keeper of the afterlife, Oya is responsible for negotiating with Iku to spare human lives. For those unable to be spared, she provides safe passage into the next world and maintains ancestral connections for future generations.[27]

Orunmila, also known as Ifa, is the god of divination, wisdom, knowledge, and fate, and is, according to Yoruba mythology, the founder of the Yoruba system of divination.[28] Referred to as *Ifa*, this system is believed to grant an individual unreserved access to the teachings of Orunmila, and provides an avenue of communication to the spiritual realm.[29] Ifa is often utilized to help an individual confront a problem or interpret dreams or other omens.[30] It has remained popular in Yoruba culture, as many Yoruba people do not make major life decisions without consulting it.[31] Folklorist and anthropologist William Boscom explains the process of Ifa:

> If a is a system of divination based on sixteen basic and 256 derivative figures (odu) obtained either by the manipulation of sixteen palm nuts (ikin), or by the toss of a chain (opele) of eight half seed shells. … The sixteen palm nuts are grasped in the right hand, leaving only two nuts in the left; if two nuts remain, a single mark is made on the divining tray; if one nut remains, a double mark is made. Repeating this procedure four times will give one of sixteen basic figures ... Repeating it eight times gives a pair or combination of the basic figures, i.e. one of the 256 derivative figures.[32]

This process is carried out by Ifa diviners, known as *babalawo*.[33] Each figure has its own name and own set of verses that correspond to it. These verses come in a variety of forms, including myths, folktales, praise names, incantation, songs,

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24   "Yoruba."
25   Horton, "Yoruba Religion and Myth."
26   New World Encyclopedia.
27   Kimberly Moore. "52 Goddesses: The Goddess and Orisha OYA."
28   "Ifa." Wikipedia.
29   Ibid.
30   William Bascom. *Ifa Divination : Communication between Gods and Men in West Africa.*
31   Horton, "Yoruba Religion and Myth."
32   William Bascom. *Ifa Divination : Communication between Gods and Men in West Africa.*
33   Ibid.

proverbs, and even riddles.[34] Before beginning to practice divination, a *babalawo* must know at least four verses for each of the 256 figures, or a minimum of over a thousand verses. They must also learn the elaborate sacrifices and "medicines" which accompany each verse.[35] It takes a prospective *babalawo* up to 20 years to learn divining, most continue to study throughout their lives,[36] making them widely accepted as authorities on Yoruba religion.[37] When the *babalawo* has arrived at a figure, he or she recite its respective verses aloud at random—it is the responsibility of the client to listen through irrelevant verses until the *babalawo* recites one that can be applied to his or her problem.[38] The verse is then accepted as the answer to their question, which the client never openly discloses to the *babalawo*. The Yoruba also utilize possession and water-gazing as methods of divination, but Ifa is regarded as the most important and reliable.[39]

Death in Yoruba Culture

The Yoruba hold a realistic attitude towards death, understanding that it is an unstoppable force that will eventually come for all. Those who fear death are referred to as *ogberis*, which translates to "ignorant folks."[40] They believe that those who fear death do so only because it marks the end of an existence that is known and the beginning of one that is unknown.[41] Death is believed to be both natural and unnatural. Natural deaths are favorable because they provide the transitional process through which one completes his or her journey on earth.[42] The Yoruba believe that the purpose of one's journey on earth is to deliver the message of Olorun by promoting the good of existence.[43] Once one dies, they return to Olorun to give accounts for their deeds on earth. Those who have led fulfilling lives are granted eternal life with Olorun in the afterlife while those who have failed to complete their task on earth are reborn again in order to do so. It is in this way that death is not considered to be the end of life, but rather a change in life's form. Alternatively, an unnatural death is one that obstructs one's life, which does not allow them to live to a fulfilled age. This includes deaths involving accident, illness, suicide, sorcery, magic and witchcraft. The deaths of old people are often considered natural, whereas deaths of children and young adults are often attributed to unnatural causes. One scholar holds that death was made for the specific purpose of recalling any person who has

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34   Ibid.
35   William Bascom. "The Relationship of Yoruba Folklore to Divining."
36   Bascom, "The Relationship of Yoruba Folklore to Divining."
37   Bascom, *Ifa Divination : Communication between Gods and Men in West Africa.*
38   Bascom, "The Relationship of Yoruba Folklore to Divining."
39   Bascom, *Ifa Divination : Communication between Gods and Men in West Africa.*
40   "Yoruba Culture." Wikipedia.
41   "Yoruba Culture."
42   Akomolafe. "Yoruba Ontology: A Critique of the Conceptualization of Life After Death."
43   "Yoruba Culture."

fulfilled their time on earth.[44] The Yoruba believe that each person, upon birth, has a pre-determined number of years that they will spend on earth.[45] It is possible that some people have an unusually short time allotted during a given life cycle, causing the divide between the natural and unnatural to be relatively undefined.[46]

The Yoruba believe that ancestors play very important roles in the afterlife. The lives of those who have passed and left a good name for their loved ones are celebrated. This is reflected in their funeral rites, which are more elaborate for authority figures and those who made impacts in their community than for those who have not.[47] It is widely accepted in Yoruba culture that ancestors have the ability to watch over their descendants after they are gone.[48] In order to receive protection from deceased family members, many Yoruba offer libations and kola nuts on the graves of their relatives.[49] At least a few groups believe that ancestors become demigods after death,[50] and may occasionally turn to them for guidance when not consulting their guardian *orisha*.[51] They believe that the love between a parent and child should continue even after death, and that the bond should remain strong even after the parent has ascended to another plane of existence. This custom of ancestor reverence in Yoruba culture is often misidentified as ancestor worship—a concentrated focus on ancestors in a group's religion and everyday lives.[52]

The concept of reincarnation within a family is widely accepted by the Yoruba.[53] Children who are born immediately after the death of an elder are given names such as *Babatunde, Iyabo, Yetunde*, and *Yeside*, which translate into variations of "the dead father or mother has returned."[54] This furthers the Yoruba belief that the dead are not actually gone. This rebirth is received as a sign that the elder has come back to look after their families and continue their work in this world.[55] Reincarnation does not always have positive repercussions, however. Children can also be born as Abiku—spirits that die and are reborn several times into the same family. Abiku have characteristically short life spans, and will complete several life cycles with one mother, plaguing families with long-term grief and frustration. These spirits are believed to reside in secluded and obscure corners of towns and villages, and are believed to follow pregnant women home and replace the fetus in their wombs with themselves. Abiku have no intention to remain in life. A *babalawo*

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44   Akomolafe. "Yoruba Ontology: A Critique of the Conceptualization of Life After Death."
45   New World Encyclopedia.
46   Akomolafe. "Yoruba Ontology: A Critique of the Conceptualization of Life After Death."
47   "Yoruba – Religion and Expressive Culture." Every Culture.
48   Kennedy. "10 things that might surprise you about Yoruba culture."
49   New World Encyclopedia.
50   Horton, "Yoruba Religion and Myth."
51   New World Encyclopedia.
52   "Yoruba Culture"
53   "Yoruba Religion"
54   Akomolafe. "Yoruba Ontology: A Critique of the Conceptualization of Life After Death."
55   Ibid.

is usually the first person that parents of Abiku turn to for assistance, but they are often of little to no help. Parents often take matters into their own hands by giving the Abiku child names that will persuade them to remain alive, including names like *Durojaiya* (wait and enjoy life), *Kokumo* (It will not die again), and *Pa-kuti* (shun death and stop dying).[56]

Conclusion

Like many other cultures of the world, the Yoruba of West Africa have developed their own understanding of life, and what waits for us after life has ended. They believe one's existence to be perfectly and systematically considered by Olorun, the Sky God. Fate plays a large role in their beliefs towards death, and is a prominent theme in their everyday lives, as displayed by the importance of Ifa divination in their culture. Further research might include a more expansive look at the pantheon of Yoruba *orisha* and explore each of their powers and significances in Yoruba life in more detail. Additionally, with divination being such a significant part of Yoruba culture, it would be beneficial to research the training that *babalawo* must undergo before becoming official practitioners in their field. Further research may also examine the numerous variations of this culture and the evolutions that it has undergone over time. This study has allowed a universal phenomenon to be explained through a cultural lens that differs from one that we may understand. A given limitation of this research is that it is being conducted on a culture that the author does not actively participate in, thus creating the possibility of misinterpretation or other cultural barriers in research.

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56   Timothy Mobolade. "The Concept of Abiku." *African Arts* 7, no. 1 (1973): 62-64.

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Toward Magnetic Nanoparticle Synthesis and Characterization for Medical Applications

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Abstract

Magnetic nanoparticles (MNPs) are used for various biomedical applications. Biomedical applications rely on nanoparticles to be surface-modified for specific functionalization. MNPs unique properties, surface to volume ratio, and superparamagnetic properties allow external magnetic fields to treat patients with superparamagnetic iron oxide nanoparticles (SPIONs). Before *in vivo* use, MNPs must be characterized for their stability, particle size, distribution, and shape. The problem of characterizing nanoparticles in aqueous solution stems from MNPs tendency toward aggregation. The gap in expected knowledge between PhDs and undergraduates in this rapidly evolving field was narrowed slightly because of this work.

Keywords: Nanobiotechnology, biomedical, magnetic nanoparticles

1. Introduction

Biotechnology is an emerging research area combining nanotechnology and molecular biology. One area of significant advancement in biotechnology is the production and application of magnetic nanoparticles (MNPs). At the macro-level, MNPs includes a wide-range of particles developed for an infinitely diverse and even undiscovered applications. The main advantage to using them for biotechnology applications are derived from surface properties of MNPs, such as their high surface-to-volume ratio, and their ability to be functionalized (or customized) through surface modification.

Modifying their surface chemistry prevents MNPs from aggregating,

which is a consequence of their high surface energy. This aggregation would cause significant problems with the internal body (*in vivo*) applications. *In vivo* applications include drug delivery, magnetic biodetection, particle imaging, resonance imaging, contrast agents, separation, and therapeutic use. To be appropriately functionalized for *in vivo* applications, they must be biocompatible and biodegradable because multifunctionality allows nanoparticles to be applied in a variety of situations. They can be applied therapeutically to treat damaged cells, like in the case of cancer. Similarly, MNPs functionalized with targeting antibodies, proteins, and enzymes give them the ability to self-assemble at the damaged site. This ability to self-assemble also increases the effectiveness of NPs to act as fluorescent contrast agents for MRI tests. Soon, MNPs could help end the need for invasive treatments such as radiation and chemotherapy.

    In vitro applications can work in synergy with *in vivo* NPs. The first example is nanosensors that detect NPs that bind targeted antibodies to diagnose pathogens. MNPs can also be used for blood purification to remove noxious compounds by binding to them and removing them. Similarly, there are environmental applications for the removal of organic pollutants such as dyes or inorganic pollutants such as metal ions in wastewater. This removal is achieved by MNPs using their specific binding ability to detect or clean biological samples after being changed by biomolecules. Lastly example is tissue engineering uses NPs to repair or reshape damaged tissue using specific nanomaterial scaffolds and growth factors.

    There are differing main characteristics to consider when developing MNPs for *in vivo* and *in vitro* applications. For *in vivo* applications, the four most important characteristics for MNPs are their biocompatibility, surface functionality, toxicity, and size concerning their diameter and size distribution. Particles sizes in the 10-40 nanometer (nm) range are used in prolonged blood circulation. This particle range has other advantages, like being able to cross capillary walls, and later, are biodegraded naturally by being destroyed by immune cells. [1]

    Medical applications take advantage of surface modification to accept specific binding of biomolecules MNPs. Currently, only iron oxide nanoparticles (IONPs) are FDA approved in a clinical setting because of their low toxicity, biocompatibility, and biodegradation; making them the ideal MNP to synthesize for medical applications. Reducing MNPs to under 20 nm causes them to become superparamagnetic—meaning they are only magnetic while an external magnet is acting on them—combining these properties with IONPs result in the particle of interest, superparamagnetic iron oxide nanoparticles (SPIONs).

    SPIONs' size have their advantages and are shown to be more readily allowed into cells via endocytosis (taking in matter, by folding its membrane to form a vacuole), which is imperative in targeted drug delivery. [4] Another therapy, are placing SPNPs in an alternating current as heating regulators for cancer therapy

(hyperthermia) [5]. This heat at the site of a tumor can destroy the cancerous cells while causing less damage than to the healthy cells; due to tumor cells being more sensitive to temperature increases.

    SPIONs at 20 nm satisfy the needed particle range for *in vivo* use and are better at staying suspended in solution reducing the chance of aggregation which would be disastrous in the body. [2] To prevent this aggregation, NPs are surface modified by creating self-assembled monolayers on the NPs—molecular assemblies that spontaneously form on the surface to create order. [3] Most surface modifications use either a polymer coating or chemical ligand exchange to create this surface order to serve a biological function. Even without modifying and targeting surface ligands, SPIONs' size positively affects biodistribution.

    Ten years ago, nanotechnology research was done primarily by PhDs and their research assistants, but every year more universities are adding undergraduate majors in the field. Therein lies a gap in expected knowledge, a gap that this experiment narrowed slightly. Undergraduate researchers and those not familiar with technical details regarding MNPs can miss simple procedural steps when trying to reproduce the experiments from researchers in this field. Undergraduate students could fill this role while gaining traction with the seemingly limitless applications in this field. As you will discover my experiment was partially successful but went awry at the end. Ultimately, this paper is intended to inform undergraduate researchers about lessons learned.

2. Methods

    The type of IONPs made in this experiment is magnetite (Fe_3O_4) NPs, which is among eight producible iron-oxides. Extreme sensitivity to oxidizing agents dominates the chemical synthesis of IONPs. Pre-oxidizing magnetite can act as an oxidation barrier—preventing the sudden oxidation of the magnetic nanoparticles to air but can increase particle size. As particle size decreases, the surface area and thereby surface energy increases significantly, increasing the likelihood of particle aggregation. [4] This is where surface modification comes in. Surface modification of SPIONs can be carried out either during synthesis or in a post-synthesis process. The ideal molecules used for stabilization of SPIONs should be biocompatible and biodegradable; hence, the most common molecules used are surfactants such as oleic, lauric, and phosphonic acids. [5]

    Production of magnetite NPs by co-precipitation is an accessible method. Co-precipitation combines ferric and ferrous ions (Fe^{2+} and Fe^{3+}) in a 1:2 molar ratio in alkaline conditions at 20-90°C. Important variables include temperature, the iron, ion ratio, the pH, the type of salt used (chlorides, sulfates, nitrates), stirring rate, and the rate at which pH is increased, produce differences in the size, shape, and distribution of magnetite NPs. The choice of different precursor anionic salts plays a role in

the size of the magnetite NPs–the smaller the anionic precursor, the smaller the magnetite. [6] These are the reasons for using ferric and ferrous chloride over other precursors to create IONPs, trying to reduce their size to make them SPIONs. The flexibility of co-precipitation is that it allows for comparing small, variable changes to produce different MNPs. Other common alternative methods to co-precipitation are microemulsion and thermal decomposition reaction. The microemulsion method takes two immiscible liquids, and through the reaction, the nanoparticles have a film of surfactant molecules surrounding them to keep them from aggregating. [7] While a thermal decomposition reaction takes the decomposition of the metal precursors and heat is applied to disrupt their tentatively stable nature. [8] This experiments reasons for choosing co-precipitation over microemulsion or thermal decomposition reaction were the ability to control numerous variables and apply them biomedically. It is more difficult to control the size distribution through the thermal decomposition reaction; however, it is more difficult to apply the microemulsion method biomedically.

| Firm (N)	Estimated Sales	% of Market	Cumulative %
1. Slumberland	3,000,000	60%	100%
2. Furnish123	1,100,000	22%	40%
3. Rassbach's	900,000	18%	18%
Total:	5,000,000	100%	

Table 1. Market share of sales for firm in Menomonie, WI.

Table 1: Iron Oxide Nanoparticle Synthesis Steps. [9]

Synthesis of magnetic nanoparticles can be broken down to 6 steps: Solution Preparation, Base Addition, Separation, Surface Modification, Washing, and Characterization. (Numbers correspond with Table 1)

1) **Solution preparation**: First prepared ferrous-chloride tetrahydrate ($FeCl_2$*$4H_2O$) and ferric chloride hexahydrate ($FeCl_3$*$6H_2O$) solutions in separate flasks with a molar ratio of 2:1. Next, combined the two solutions into one stoppered-flask and stirred at 400 RPMs for 5 minutes. The pH should be between 1 and 3.

2) **Base addition**: Next add the choice of base. For this experiment, three different bases were used; 1M sodium hydroxide, 0.7M ammonia (NH_3), and ammonium hydroxide (NH_4OH). The rate of addition can be varied, from dropwise by burette or quick addition. Lastly, continue stirring at 400 RPMs for 30minutes. The pH should end between 11 and 13. For reference, the reaction that occurred with the addition of the ammonium hydroxide is:

$$2FeCl_3 + FeCl_2 + 8NH_3 + 4H_2O \rightarrow Fe_3O_4 + 8NH_4Cl. \text{ [10]}$$

3) **Separation**: The solution was then magnetically separated by placing a magnet underneath the flask for 15 minutes. Next the supernatant was decanted—keeping the magnet underneath. For greater separation, the ferrofluid was lastly centrifuged for 2 minutes at 2000 RPMs, again magnetically decanted the supernatant.

4) **Surface Modification**: The remaining ferrofluid was then transferred to a falcon tube to be surface modified. Eight milliliters of 25% tetramethylammonium hydroxide [$N(CH_3)_4$+OH] was added to the falcon tube.

5) **Washing**: The second to last step was washing the IONPs with 50 mL of DI water 3 to 4 times to bring the pH down to neutral 7.

6) **Characterization**: Attempted to suspend the solution for characterization by Malvern Zetasizer. Dynamic light scattering (DLS) requires the nanoparticles to stay suspended in solution and not settle to the bottom.

You may have noticed the characterization section of the methods' section lacks finality on the IONPs size and to determine if they were SPIONs. It was discovered after compiling all the data and pictures that noticed that the IONPs aggregated and settled on the bottom of the cuvette, indicating that they were not correctly suspended for characterization by Malvern Zetasizer.

While proceeding with my experiment, I became fully aware of how essential it was to minimize IOMNPs exposure to air until they were adequately surface modified. Early runs began in an open beaker and moved to a stoppered flask connected to vacuum flask under light vacuum to attempt to minimize oxidation. This vacuum interfered with the length of time it took to magnetically separate from under 15 minutes to over 30 minutes. Second, using a magnetic stir bar may have interfered with size distribution, as more would accumulate on the stir bar and during the removal of the stir bar with a magnet. Lastly, not monitoring the pH between the six significant steps had me questioning if early parts of the experiment were being done incorrectly and restarting when it was not necessary as proved when I started testing using pH paper. All three of these major issues could have been rectified by using a 3-neck round bottom flask: This would allow for a pH probe to monitor in

one slot, a plastic mixer from above in the other, and a slot to add solution. Two other ways to reduce oxidation are using a sonic bath or the standard practice in the community, nitrogen gas to deoxygenate the solution.

3. Summary

MNPs occupy many areas of nanobiotechnology because they can be functionalized through surface modification. Currently, there is a reproducibility problem in the scientific community. The growing number of undergraduates in the field of materials science leaves open the possibility of mass-verification of new claims that more seasoned scientists cannot afford to spend time on. This could shift the way scientists in other fields report their research, while more students become interested in expanding their reproduced results in graduate school because of their contribution to the field. This paper is intended to inform undergraduate researchers in the material sciences on lessons I learned along the way. The modifications outlined will hopefully lead to more undergraduate research outcomes in the future.

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A Case Study of California's Syringe Exchange Programs on Illicit Opioid Use

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Abstract

Operating on several levels—judicial, health, and economic—attempting to treat a large-scale epidemic like the opioid crisis seems impossible. The national Department of Health and Human Services has dedicated a webpage to the titled "opioid epidemic"; legitimizing the ongoing publicity (Affairs (ASPA), 2017). While both licit/legal opioids in the form of prescription medications and illicit/illegal opioids in the form of heroin and fentanyl are to blame for the rise of opioid related deaths, an alternative form of pain management, marijuana, remains highly controversial. A case study of California—a state with large amounts of data and services related to marijuana and opioids—is used to provide potential policy solutions to the opioid epidemic. Using four criteria for policy evaluation: technical feasibility, economic feasibility, political viability, and legal and ethical grounds, several policy options are proposed and analyzed. A policy of implementing medical marijuana education and information into existing California Syringe Exchange Program facilities is selected for its technical and economic feasibility, pragmatic political viability, and legal and ethical intent that aligns with the parent sponsor of the National Syringe Exchange Program's mission. Although this case study focuses on California, the findings can be applied across the country to different affected groups. Overall, the study aims to provide innovative options to address the opioid epidemic that may not seem viable or possible to politicians and current policy makers.

Introduction

According to the Wisconsin Department of Health and Human Services opioid epidemic webpage, there were 916 deaths in 2017 from opioid overdoses, greater than the annual number deaths by car accidents ("Opioids," 2015). Opioids addiction can take on many different forms; from legal/licit painkillers prescribed

by doctors to illegal/illicit substances like heroin containing the synthetic opioid fentanyl. The wide variety of ways opioids manifest means the epidemic is all encompassing; children to the elderly are overprescribed and addicted to pain medications, some turning to illicit sources like fentanyl and heroin. Wisconsin is not an anomaly in the rise of opioid users and addiction. Last year the national Department of Health and Human Services dedicated a webpage with the title of "opioid epidemic"; legitimizing the ongoing problem at a national level (Affairs (ASPA), 2017). However, when finding alternatives to legal opioid medications prescribed, hope comes in the form of a plant.

According to a study published by CBS, marijuana could be a solution for opioid addicts ("Could marijuana," 2016). With the mainstream media publicizing credible scientific studies about marijuana, there is a feasible solution to a current opioid epidemic. As more research is revealed, the effectiveness of marijuana as a form of pain management, specifically for people who are recovering from opioid addiction, becomes increasingly complicated. A systematic review of thousands of studies surrounding effectiveness of cannibas use during opioid addiction treatment found a variety of results. Some studies found that cannibas helped to sustain members in recovery programs when used as a pain management technique, while other studies found it increased the risk of needle-sharing and other high-risk behavior (Smith, Ravven, & Boyd, 2015). Apart from the studies of the effectiveness of cannibas in treating opioid addiction, the study also correlates people who use opioids are more likely to use cannibas than the average American. When treating opioid users, cannibas becomes a salient component in treatment, which makes looking at cannibas laws and regulations also essential. However, there is one additional restraint to incorporating cannibas in opioid treatment: marijuana, along with heroin, is classified as the most illegal and dangerous drugs under the Drug Enforcement Administration's class one schedule ("Drug Scheduling," n.d.). There is thus not a simple solution to this complex health crisis. Operating on several levels—judicial, health, and economic—attempting to treat a large-scale epidemic like the opioid crisis seems impossible, but this study attempts to shed light on potential policy intervention that could deal with growing opioid and injection crises through the goal of increasing health and wellbeing for Americans. To obtain a full understanding of the history of opioids and marijuana within US policy, I will first share background information to set the epidemic and its potential solutions in a larger frame. Next, I will discuss solution guidelines and introduce potential policy solutions to provide alternative pain management options for opioid users with the ultimate goal of decreasing opioid deaths.

Background Knowledge

To understand the complexity of the current crisis, further explanation must be given to the different levels of classification that opioids fall into and the problems that arise due to conflicting classifications. The main trend in creating opioid addiction is the widespread use of licit/legal opioid prescription medications for pain management. In 2016, the Center for Disease Control (CDC) published a 'Guideline for Prescribing Opioids for Chronic Pain' which focuses on patients "who endure chronic pain outside of active cancer treatment, palliative care, and end-of-life care" ("CDC Guideline," 2018). They state that more than 11.5 million Americans over the age of 12 reported misusing prescription opioids in 2016. While the widespread practice of opioid prescription for pain management has become more monitored, prescriptions can still lead to misuse and abuse. Some listed side effects of these drugs include increased tolerance, physical dependence, and increased sensitivity to pain ("Prescription Opioids," 2018). These practices have also given rise to an increase in use of illicit or illegal opioids like heroin and fentanyl. The CDC states that, between 2010 and 2017, the rate of heroin-related overdose deaths increased by 400%, similar to trends of increasing prescriptions of opioid medications followed by gatekeeping practices to monitor prescription misuse (Hedegaard, 2018). Other synthetic illicit opioids like fentanyl have also become popular substitutes for licit opioid medications. In 2017 synthetic opioid deaths were the leading cause of all opioid deaths, greater than heroin overdoses and opioid prescriptions (Scholl, 2019). As the medical community continues to gain knowledge about the side affects and problems associated with opioid pain management, solutions must also be made to deal with the illegal opioids that are used in response to a decrease in prescription practices. However, opioids are not the only pain management alternative that is also deemed highly illegal.

As previously mentioned, The Drug Enforcement Administration created drug scheduling under the Controlled Substances Act of 1970, classifying drugs on a scale of toxicity and addiction levels (Kohl, 2010). Since then marijuana and heroin have been classified criminally with having, "no currently accepted medical use and a high potential for abuse"("Drug Scheduling," n.d.). This classification has created long-term problems for the Department of Health and Human Services, the agency that often deals with both substances and their users. As scientists have published studies claiming the effectiveness of marijuana at combatting addiction and pain management in users, the Department of Health and Human Services attempts to use this knowledge in practice. Yet, they must also work around the initial classification of criminality when treating patients. This struggle of drug and health classifications is a great barrier to treating the opioid epidemic. As long as a potential solution— marijuana—remains classified with heroin and other illicit opioids, there can be no official, widescale use or treatment within the United States to an alternative for

opioids as the de facto pain management option.

To explore the effect cannabis liberation may have on the opioid epidemic, a case study of California will be used. The selection of the state of California is intentional due to the long democratic history of California's cannabis laws and data surrounding illicit opioid treatment methods. Both substances have detailed reports and public information available on the California Department of Public Health website. Medical marijuana has been legal in California since The Compassionate Use Act of 1996, and in 2016 the state legalized recreational marijuana (Compassionate Use Act, 2011). However, California is not immune to the opioid epidemic. The California Department of Public Health states, "Heroin is the one exception to the statewide leveling trend among opioid related deaths. Heroin deaths have continued to increase steadily by 67% since 2006 (with a 2014 rate of 1.4 per 100,000) and account for the growing share of total opioid related deaths" ("Statewide Opioid," 2019). Largely, heroin depends on needle injection. In the 1980's Syringe Exchange Programs (SEPs) were institutionalized throughout California, providing a resource for current injection users to obtain clean syringes to decrease HIV transmissions and opioid deaths. Currently, California has 39 Syringe Exchange Programs under the North American Syringe Exchange Network (NASEN) ("Syringe Exchanges," n.d.). They also decrease HIV from opioid usage. Two charts reflecting this correlation between Syringe Exchange Program facilities (figure 1) and concentration of opioid
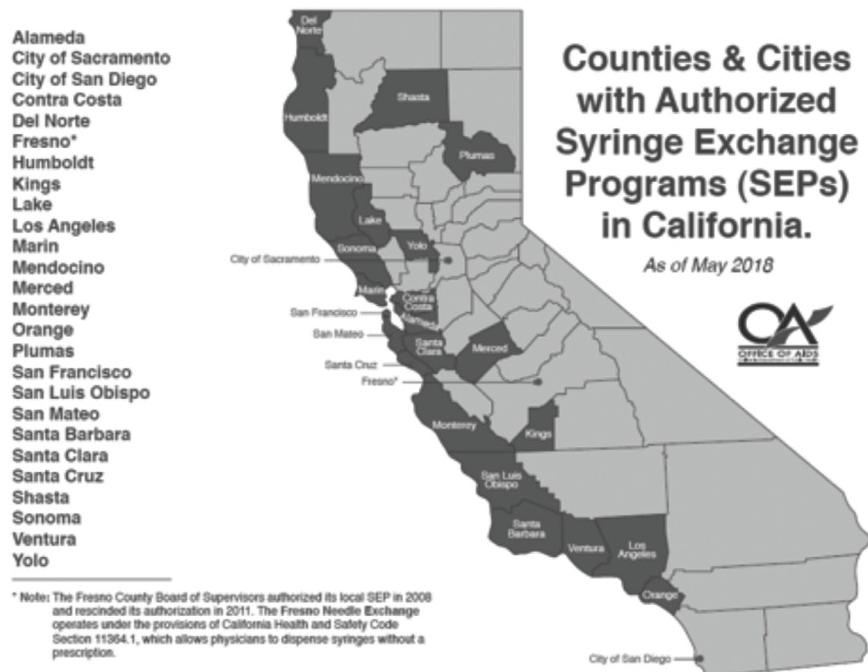
Figure 1: Counties with Syringe Exchange Program: dark green (CA Department of AIDS)
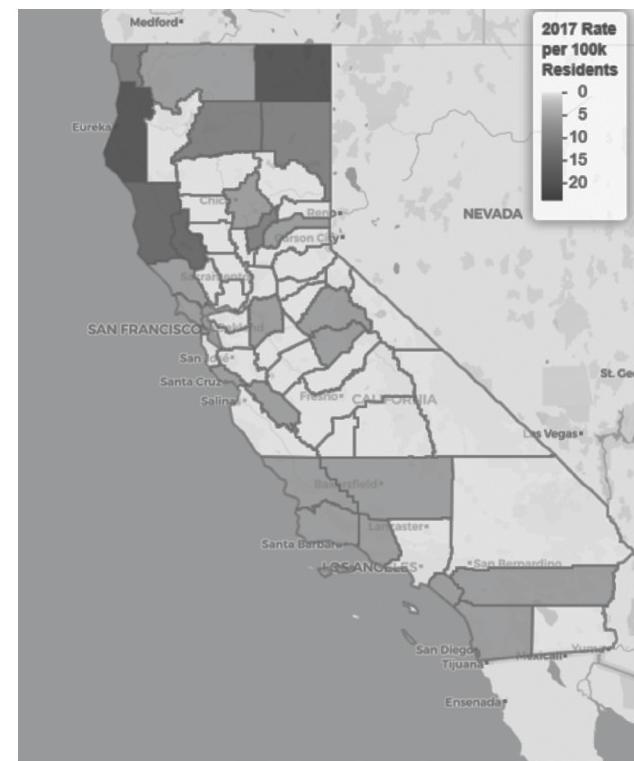
Figure 2: California Death, Total Population, 2016, All Opioid Overdose: Age-Adjusted Rate/100k Residents (CA Opioid Overdose Surveillance Dashboard)

deaths (figure 2) support that these can be resources for local communities to prevent illicit opioid deaths.

Supporting this correlation is a study done by the leading researcher on Syringe Exchange Programs, Ricky N. Bluthenthal, and his colleauges, who states that; "Clients of unlimited needs-based distribution and unlimited one-for-one plus [multiple syringes] exchange had a higher prevalence of adequate syringe coverage compared to clients of more restrictive syringe dispensation models" (Bluthenthal et al., 2007, p. 643). In other words, sterile syringes provided by a Syringe Exchange Program in return for used syringes decrease the spread of HIV among users. However, this will not effect opioid related deaths, which may be why California is still struggling with its opioid crisis. According to a study published in the journal Addiction by Shane Darke and Michael Farrell heroin deaths are correlated with use over time, specifically when use occurs in a community setting (Darke & Farrell, 2014). Facilities currently only deal with immediate needs of users given their resources (syringes) but addressing holistic aspects of users—like the setting of their use or decreasing opioid injection itself—could decrease spending and increase health in patrons. By providing additional resources—like medical marijuana for

pain management—SEPS may be able to prevent future opioid deaths as users would potentially begin substituting heroin for medical marijuana.

Criteria for Evalutation

To evaluate policy feasibiliy, I will be using four criteria for evaluation. First, technical feasibility refers to issues of effectiveness. Can this policy realistically happen? Second is economic feasibility. Policies may be created, but without economic support, they are ultimately useless. Budgets further restrict this category as scarcity and finite amounts of spending limit how much can actually be achieved, regardless of the importance of a specific policy. Both of these lend themselves to the third criteria, policital viability. Data can provide enormous clout for a policy's success, but politics are often value and culture based. One of the most salient factors to political viability is the constituents that will be impacted by the policy: those who benefit and those who do not. Connotating the affected constituents of the policy as criminals will limit the political clout needed for success. The emphasis of users as patients is thus vital to the success of the chosen policy. Finally, legality and ethics must be considered in all aspects of the criteria, but are pertenant to recognize in their own right. These substances have been categorized as highly illegal and thus users of these substances are demonized, which greatly affects current users and recovering users' lives. The acknowledgement of the connotations opioids hold and the stereotypes of opioid users is purposeful to create a different narrative of the substance and it's users to craft a alternative policy.

Policy Alternatives

There have been several proposed and implemented policy alternatives that may affect or be useful to the state of California to deal with heroin deaths and it's opioid crisis. Some, like those proposed by the Trump Administration, may be out of California's control to implement themselves. Yet others, which deal with legalizing and decriminalizing opioids, have been established in other countries with significant results. The advantage of an outside policy analysis and proposal is the freedom to speculate something that may seem to be beyond the possibilities for politicians, and to ponder what the future could potentially hold for constituents. Using this criteria, I will examine several existing policy proposals to halting the opioid epidemic, examing the pros and cons of each.

Federal Policy Proposal

One policy proposed by the current Federal administration recommends convictions for high-intensity drug traffickers, including the death penalty. The plan proposed by President Trump identifies three areas to control opioids: law enforcement and interdiction, prevention and education, and improving the ability to fund treatment through the federal government (Merica, Gray, & Drash, n.d.).

Congress has allocated $6 billion to address the opioid crisis, making this policy economically feasible. The main controversial, and therefore problematic, component is the death penalty for "high-intensity" drug dealers. Besides the value conflict this involves, there is also a huge economic cost. One study specifically highlights the economic problems associated with the death penalty. Costs do not only include the normal trial—$365,296—and execution methodology costs that the general public thinks of, but there is extra cost involving the multiple trials the death penalty entails, as well as the price experts cost to recommend such a fine: $30,269/prosecution (Spencer, Cauthron, & Edmund, 1998). Historically and politically, this option is neither technically nor economically feasible as over time the death penalty is not an enforced option in many courts.

As far as the educational advertisement campaign is concerned, this is similar to previous tactics to cut generational ties to drug abuse. Both President Trump and first lady Melania Trump have worked together on this section of the policy ("Trump's opioid," n.d.). Mrs. Trump wants to focus on the normative aspect of drug use. An official in the CNNPolitics article further explained, "The First Lady wants to focus on the well-being of children with ads that lay out you are a somebody, not a statistic, don't start with drugs, and educate them". "The President is more shock the conscience. He wants to shock people into not using it." This sounds like the policies of Richard Nixon and later Ronald Reagan, who coined the term 'War on Drugs', and whose wife Nancy Regan played a critical role in infamous advertisement campaigns. A continuation of this normative struggle that demonizes drug users as criminals does not provide technical nor political viability to lower opioid deaths. Treating addiction as criminal, rather than a public health matter, perpetuates the problem rather than dedicating energy to achievable, concrete solutions to lower opioid deaths.

Finally, the description of the third aspect of the new federal policy proposal includes improving access to funds for treatment through the federal government, but not enough information is available in the CNNPolitics article to complete a technical or economic feasibly prediction. Could the unique rehabilitative aspect of this policy be the beginning in a conntative and rehabilitative shift in the judicial process of illicit opioid users? Or is the nascent discussion of this section of the policy purposeful to further the more pragmatic aspects?

Legalizing Opioids

On the other end of the spectrum, the second alternative proposes that the state of California legalize opioids in an effort to allow users to gain better access to treatment. This would make the sale and consumption of illicit opioids like heroin and fentynal legal under state law. It would also legitimize, formalize, and create guidelines for the current illegal opioid market. Historically, this has proven to be

feasible for marijuana. Regardless of the federal law stating the illegality of marijuana, numerous states have medicalized and legalized cannabis without the federal government intervening in the state's endeavors. This had led to many successful uses of cannabis, including taxation which fuels some states infrastructure and education. In this way, Dr. Robert S Croswell—a Maine psychiatrist—proposes the same process for illicit opioids, such as heroin, which he believes could lead to less addition and overdose deaths by creating government restrictions and therefore standards on the substance (Telegram, 2015). Complicating this theory is a report published by *Addiction* which found that legalizing illicit opioids would not reduce overdose fatalities (Darke & Farrell, 2014). Darke studied the complications that would diminish the effect of legalizing illicit opioids, from the substance contents of pure heroin that is diluted with synthtic impurities, and complications due to the wide variety of distribution methods that opioid comes in (heroin, pills, etc.). Given these factors, the only proper policy they can recommend would be injection-assisted treatment, which is improbable on a state-wide scale.This policy option, while legally feasible, is not technically nor economically feasible. The number of patients seeking injection-assisted rehabilitation would rival the cost of the average prisoner in the current US industrial complex to be efficient at $30,620 ("Annual Determination of Average Cost of Incarceration," 2015). Darke also notes that injection-assistance is not culturally feasible. People who receive injection-assisted treatment in a controlled environment are not the ones with a potential for overdose (Darke & Farrell, 2014). If California wishes to legalize its opioids, intense budget reallocation must be made to fund this implementation to affect a small population of users, thus eliminating this alternative as an effective policy solution.

Decriminalizing Opioids

Another judicial option in terms of decreasing opioid related deaths and HIV transmissions would be to decriminalize illicit opioids in California. This solution differs from legalization because it does not legalize the substance, merely shift treatment of users from punitive—via the judicial system—to rehabilitative. Rather, those who would be convicted are now offered treatment and re-entry into society without the stigmization of being previously incarcerated. However, decriminalization in the United States does not attempt to reverse past convinctions for the substance. One example of this solution is a policy implemented in Portugal in 2001 that decriminalized all drugs. In 2009 The CATO Institute did an empirical study of the effects of decriminalization policy and found surprising results. Greenwald found that, "Although post-decriminalization usage rates have remained roughly the same or even decreased slightly when compared with other EU states, drug-related pathologies — such as sexually transmitted diseases and deaths due to drug usage — have decreased dramatically" (Greenwald, 2009). Decriminalizing

opioids, and potentially all drugs, would be instrumental in making Syringe Exchange Programs more effective. The main aim of this policy is to further the work that SEPs already do: treating those who use drugs like human beings and offering rehabilitative services. This would be one of the first policies to change the nature of the judicial system for the past half-century: from punitive to rehabilitative.

The main problem with this policy alternative, besides the economic cost of offering rehabilitative service, is the numerous drug convictions in California. Decriminalizing opioids would require revisiting the convictions of many currently incarcerated in California, and it is not likely to be policitcally feasible to do so. Constituents are unlikely to support reversing convictions and releasing prisoners. Historically, this has also been a problem with the legalization of cannabis. As of 2018, 46.2% of people in jail are serving time in the US due to drug related crimes, and the decriminalization of illicit opioids would raise questions about not only those serving time for heroin and other illicit opioids, but on marijuana charges ("BOP Statistics: Inmate Offenses," n.d.). Thus, despite the ethical and overall feasibility of this alternative, the political feasibility is dubious. The implementation of this alternative would force the federal government to address marijauna's current illegal status as a Schedule I drug and the entire prison-industrial complex that benefits financially from drug-related incarcerations.

Implementing Medical Cannabis Resources at SEPs

The final policy alternative is much smaller in scope and lends itself to the pragmatic nature of American government and society. The implementation of medical cannabis resources at current California Syringe Exchange Program facilities would decrease the number of opioid-related deaths by stopping addiction in early users. The Adult Use of Marijuana Act provides people over the age of 21 with legal possession of 28.5 grams of cannabis or 8 grams on concentrated cannabis (Cannibas: licensure, 2017). Those who are between 18-21 and under 18 that wish to use cannabis without a medical marijuana identification card will be adjugated under the law for possession. For those wish to use cannibas under the age of 21, medical marijuana identification cards are vital. However, there are limitations of who can apply and receive an identification card. Senate Bill 420 provides context of ranging conditions to receive an identification card and are as follows:

> Acquired Immune Deficiency Syndrome (AIDS), anorexia, arthritis, cachexia, cancer, chronic pain, glaucoma, migraine, persistent muscle spasms, seizures, severe nausea, any other chronic or persistent medical symptom that either: Substantially limits the ability of the person to conduct one or more major life activities as defined in the Americans with Disabilities Act of 1990; or if not alleviated, may cause serious harm to the patient's safety or physical or mental health (Medical Marijuana, 2003).

These prerequisites include many patients' current conditions that use Syringe Exchange Program facilities and may provide benefits for those under 21 who participate in Syringe Exchange Programs. Even if people do not qualify for medical marijuana, education about alternative pain management provide options for users of SEPs.

Technically and economically, this alternative provides the lowest cost and the greatest ease of technical implementation. The scale of implementation must also be considered; should there simply be educational brochures and medical marijuana identification card applications available at each facility, or should it be implemented with resources like certified doctors and financial aid to users who wish to seek medical marijuana identification cards? One such limitation that may hinder the scale of implementation is the complications of Senate Bill 420 that creates barriers for users of Syringe Exchange Program facilities. The bill has prerequisites for those applying other than medical conditions. Each applicant must submit a statement of address and identification, as well as pay for their identification card (Senate Bill No. 420, 2011). Users of Syringe Exchange Program facilities may not have these documents or the financial ability to pay for an identification card, as many SEPs provide free syringe exchange as well as other resources. This is also further complicated through a yearly renewal process. Additionally, medical marijuana users must reapply for an identification card every time they change physicians. The conditions of Senate Bill 420 creates barriers to effectiveness of identification cards and limits the overall health of patients who could receive benefits from alternative pain management who currently use illicit opioids. In terms of future study, a look at reframing medical marijuana laws may prove policy option more effective.

Recommendations and Conclusion

The recommended alternative would be the final alternative, to provide medical marijuana resources at Syringe Exchange Program facilities. This is the alternative with the greatest technical and economic feasibility and could be implemental at the lowest cost. Unlike the other alternatives that necessitate a large policy shift and change in state budget allocation, this alternative requires neither in its pragmatic approach. It also would have the greatest effect on the community who uses SEPs, by providing education and services to greater aide in NASEN's mission to, "disseminate information related to syringe exchange and disease prevention" (Des Jarlais, McKnight, Goldblatt, & Purchase, 2009). As the agent of implementation would be at NASEN SEPs, following their guidelines and mission statements in an important factor in the policy selection. Overall, this implementation will allow for users to have a greater chance at overcoming potential addiction and overdose with illicit opioids.

The implementation of this alternative is essential to the success and efficiency of the policy. The level of implementation was briefly discussed in the alternative analysis itself, but will be expanded upon. Pushing application for medical marijuana identification cards for users of SEPs may result in many applying and being denied due to necessary forms and doctor approval. Even if the facilities provided doctors to help applicants get approved for identification cards, every time an applicant switches physicians they must renew their identification card and reapply. Therefore, when figuring the implementation of the policy, providing educational resources for medical marijuana identification cards may be the best route.

Stated in the introduction of this paper, attempting to treat a large-scale epidemic like the opioid crisis seems extremely difficult or impossible. Throughout the discussion of background information, history, criteria for policy evalution, and the potential solutions to the opioid crisis, it is clear that many options come with important barriers to consider and find a way around. However, the solution chosen, pragmatic in nature, attempting to address all aspects of policy criteria: technical, economic, political feasibility while being legal and ethical provides slim chances to change illicit opioid users options for pain management, potentially changing their lives. Howver, at the root of all these statistics, data, effectiveness, and feasibility are people. The 916 deaths in Wisconsin in 2017 create a stream of connections of humanity, loss, and grief ("Opioids," 2015). So while finding the proper policy solution to a specific case study is important, policy makers must work steadfast with the focus on saving lives and changing affected communities, irregardless if that is in California, Wisconsin, the United States, or Portugal. In application to Wisconsin, there is already policy change occuring. On May 1, 2017 Wisconsin Department of Health Services and Wisconsin Youth Alliance were awarded a grant from the federal Substance Abuse and Health Heath Services Administration (SAMHSA) titled, State Targeted Reponse to Opioid Crisis (STR) (Wisconsin Department of Health Services, 2018). The grant outlined specific state policy actions towards decreasing pharmacudical opioid addiction. 63 Regional facilities with Wisconsin Youth Alliance applied and received grant funding towards a variety of policy tactics, including "permanent prescription drug drop boxes, drug take-back events, prescripion drug lock boxes, prescription drug deactivation unites, coordination of naxolone training and distribution, 'Dose of Reality' education materials, and town hall meetings and communtiy education events." The chosen policy options by each regional facility were distributed in 2018. Overall, community events remained the most popular choice, followed by 'Dose of Reality' educational campaigns. This policy alone shows great progress towards decreasing opioid deaths in Wisconsin.

2019 also shows more possibilities for combatting opioid deaths. State Representative John Nygren submitted 30 pieces of legislation aimed at combating the opioid epidemic as part of the HOPE Agenda, partnering with law enforcement, healthcare professionals, and communtiy leaders to decrease prescribed opioids

(Nygren, 2018). According to the briefing, between 2015 to 2017, 20% fewer opioids were dispensed across the state. Additionally, ten Buprenorphine trainings are being hosted throughout the year by Wisconsin Society of Addiction Medicine to help medical providers combat opioid addiction ("Opioids," 2018). The differences between Wisconsin and California's approach to treating the same epidemic gives insight to numerous solutions to save lives across the country.

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Tradition and Modernization: the Survival of the Japanese Kimono

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Abstract

The kimono is a historical garment that has been carved into the history and culture of Japan for over a thousand years, originating as everyday clothing and later becoming traditional wear. With the development of globalization, the garment and its features have spread throughout the world. However, because of globalization, the kimono has lost much of the traditional and cultural background as interest in the development of the kimono as an art form decline. Although in recent years the kimono has made a comeback in fashion as Japanese trends become popular, the knowledge of the techniques to create the kimono has not spread. Analyzing the historical garment based on its evolvement in history along with globalization; can open the discussion on the declined artform and what Japanese society perceives about the kimono in the modern era by looking at ways the garment is preserved.

Keywords: Kimono, motif, Japan, culture

Introduction

Kimono (着物), meaning "object to wear" deriving from the Japanese kanji ki (着) meaning an "object or thing" and mono (物) meaning "to wear" (Ito, 2012). The kimono is a traditional Japanese garment that has existed for over a thousand years in Japanese history. Originally the garment was called *gofuku* (呉服) meaning "clothing of Wu" due to origins from the Han dynasty (206 BCE-220 CE) of China (Fercility, 2017). Through the influence of Chinese fashion with collars and sleeves, the kimono took shape during the second half of the Kofun era (250 CE-538 CE). Introduced during this era, it was not until the Heian period (794 CE-1185 CE) that the garment started to become an art form and the basic wear of Japanese culture (Inoue, 1999). The name changed to kimono during the Taisho era (1912-1926), but many still use the name *gofuku*. As the kimono progressed through history, it has changed its form and meaning to encompass not only the Japanese culture but also, the historical happenings throughout the eras and social classes of Japan. These changes, although

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subtle, impacted the fashion industry not only in Japan; but also, internationally through western influences and globalization. Although its influence is spreading, the art form of creating and wearing the traditional multilayered kimono is slowly dying (Demetriou, 2010).

Kofun era (250 CE-538 CE) haniwa clay figure
Left: A depiction of what women wore during the Kofun era (Giovannetti, n.d.).
Right: A depiction of a king with a hawk during the Kofun era, representing men's wear (Scott, n.d.).

Literature Review

Before the kimono, traditionally men wore a kind of trousers with strings attached and a top that look like a coat; while women wore a form of dress that had a top like vest and a long skirt (Inoue, 1999). With the introduction of the kimono, the style of Japanese wear changed to include sleeves and collars. It was not until the later periods of Japanese history, starting with the Heian Era that the creative and manufacturing process of the kimono was born to represent the culture and Japanese craft. The main form of the kimono consists of the outer layer, undergarments, *obi* belt with the tie strings, ankle high *zori* socks, and specialized footwear called *tabi*. Kimono is only a general term for the garment, but many other types are depending on gender, events, age, and geographic; making it significant and unique to the category worn in (Ito, 2012).


Heian period (794 CE-1185 CE) male and female court clothing (Hogencamp, 2015).

From left to right: Male formal kimono (Montsuki), female formal kimono (Hikifurisode & Tomesode) (Shioizaki, 2018).

According to the Victoria and Albert Museum (2013), the traditional kimono created by one long roll of fabric that is about 36 cm wide by 11-meter-long is then cut into seven straight pieces.
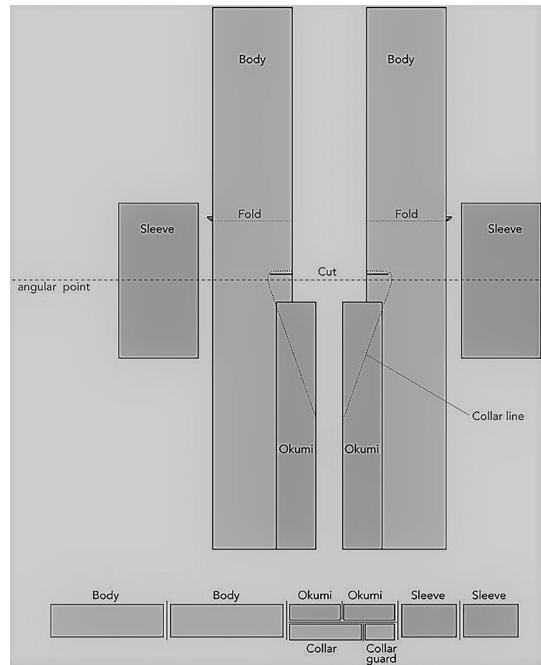
Upper image: Kimono pattern
Lower image: Kimono marker on the fabric
(Bryant, 2014)

This simple design and construction were easy to make at home while not giving shape to the wearer which shows the Japanese aesthetic of light and shadow. The imagery how a woman wearing the traditional kimono hides her whole body, apart from her dainty hands and white face represents the aesthetic beginning in the Heian era (Tanizaki, 1977). The kimono, a symbol of beauty by itself is also a symbol of beauty in the Japanese culture and the body.

The process of creating this one bolt of fabric paved the way for job opportunities for artisans. According to Soichi Sajiki, a kimono maker,

> From the silk cocoon to the final product, there are more than 1,000 processes involved in one kimono, each carried out by different specialist craftsmen. [These craftsmen] can take 40 years to master a single technique (qtd in Demetriou, 2010, p. 6).

However, with the times changing and many of the younger generation not wanting to learn these crafts, Japan will face a difficult situation of losing thousands of years of kimono making techniques (Demetriou, 2010). Already, parts of the traditional art have become lost not only through time but also, in the 21st century.

According to Japan - Mud, Sweat and Fears: The Making of a Japanese Kimono (n.d.), the general manufacturing process of one silk kimono starts from the silk cocoon to the silk starcher, the designer, the binder[2] , the dyer, the weaver, the inspector, the tailor, the sales personnel, and finally to the consumer.

In the dyeing, weaving, and embroidery process, there are different techniques used to create the pattern, aesthetic and luster of the kimono. A favorite method used in the weaving process is called *Nishijin-ori*, which is the basic one used to create the luster and feel in many kimonos. In the dyeing process, there are multiple techniques. The oldest one is *Kyo-kanokoshibori*, Japanese resist tie-dyeing. *Kyo-yuzen*, which has two styles: *Tegaki-yuzen*, hand painting, and *Kata-yuzen*, stencil dyeing. *Komon*, small print dyeing using small patterns; and *Kyo-kuromontsukisome*, black dyeing that was initially favored by the samurai due to its strength, but now mostly used in ceremonial robes such as the *haori, hakama*, and female mourning kimono (Inoue, 1999). In the embroidery process, there are multiple stitching techniques used depending on the fabric and what the ending result should look. Specialized stitches came from different parts of Japan. Example, in Tsugaru, in the northernmost part of Japan, the *Kogin* method was created to make diamond patterns on the kimono. However, there were basic stitches used in addition to the specialized ones. To create patterns such as flowers and leaves, a flat stitched (*Hira-Nui*) like the satin stitch in western culture is used and for larger areas both long and short stitches (*Sashi-Nui*). However, to get a 3-D appearance and texture to the kimono, the *Katayori* and knot stitch (*Sagura-Nui*) is used (Museum, 2013). Depending on the occasion and type will depend on the kimono making technique. Depending on the technique, will

Kyo-kanokoshibori: Japanese resist tie-dyeing (Smith, 2018).

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2   The person who makes a pattern from the silk that matches the design pattern.

Upper image: Japanese kimono weaving process

Lower image: Kata-yuzen, Stencil dyeing

Right image: Formal female kimono for different ages

(Kimono and textiles, n.d.).

Silk kimono fabric for kata-yuzen (McNulty, 2017)

influence the cost of the kimono (Inoue, 1999.).

By the Meiji era (1868-1912), silk became a common fabric choice as government restrictions lifted and the introduced western machinery. Although silk became readily available, cotton was still the main fabric choice as it was easier to use, care for and cheaper for the masses as many still sewed their own (Liddell, 1989). Although this one roll of fabric can create the outer kimono, it is not the full ensemble. The primary ensemble and framework consist of an undergarment called a *nagajuban* that is then covered by the outer layer with a thick obi belt and string securing the outfit. In addition to the clothing, *tabi* socks, ankle high white socks that separates the big toe from the others, worn with thick sole sandals called *zori* complete the primary ensemble (Ito, 2012).

As this is the primary ensemble, companies, and designers are unwilling to change the basic, but to adhere to the masses and modern society, the parts of the kimono that changed are the design and the technique used. To create an imitation of the traditional art the western printing technique is used, cutting the cost of manufacturing down by $100 or more, depending on the original art form (Demetriou, 2010). Although techniques are cut, Japanese motifs are found throughout the garment and modern fashion.

Spiritual Motifs in Japanese Culture

In Japanese culture and society, many motifs that represent different aspects of what the Japanese believe is in the designs of the kimono. Additionally, they are in many cultural references such as art, tradition, paintings, accessories, architecture, clothing, music and a person's daily life. These motifs mainly represent luck, prosperity, the cycle of life and social class. To show a person's social class, they are embroidered into the clothing or used as a family's crest. The symbols have been used since ancient times to modern day society as much of Japan's societal structure revolves around a person's family name and class structure. Although much has changed with modernization, throughout Japanese culture and society, the motifs are noticeable.

The motifs go hand in hand with the Japanese aesthetic of nature and its correspondence with the spiritual realm. Some of these motifs are the sun, moon, cherry blossoms (Sakura), butterflies, lotus, folding fan, chrysanthemum, daruma, cranes, plum, mountains, clouds, gourd, waves, and koi. The choice of these motifs is that these are the ones most seen throughout history and into modern day society not only in motif formats but also through superstition. Relating the motif to Shintoism and Buddhism, as both religions teach the importance of living with nature. The reason for this is that each motif when it came about, corresponded with Japan's history and what society is feeling, wishes to express or deem significant. Overall, although western culture and modernization have taken over most of the Japanese

Abe	Akagawa	Akai	Akamatsu	Akechi	Aki	Akita
Akiyama	Akizuki	Amako	Amakusa	Amano	Ando	Araki
Arima	Asahina	Asai	Asakura	Asano	Ashikaga	Ashina
Aso	Atagi	Atobe	Baba I	Baba II	Bessho	Chiba

Example of motifs use in Japanese family crests (Mon kamon, n.d.).
tradition, tradition can still be seen through the motifs.

Motifs and meaning

Sun- based on the Japanese sun goddess Amaterasu (天照) who founded Japan about 2700 years ago. In Japanese culture, the emperors were the direct descendant of the goddess, so they were known as the sons of the sun (Aung, 2015). Being the reason why the Japanese flag has the symbol of the sun, and Japan itself is the land of the rising sun (Aung, 2015).

Moon- a symbol of rejuvenation, in addition to the sun goddess Amaterasu, the moon goddess, Tsukiyomi (月読) is another influential figure in Japanese culture and can be commonly seen in Japanese arts and crafts. Due to Japan following the lunar calendar[3], the symbols correspond to it (Aung, 2015).

Cherry blossoms (Sakura)- closely associated with life and an appreciation for fleeting beauty since the flower only blooms during one season and for only a short amount of time. Additionally, since the Heian period, the

blossom has also been closely related to the philosophy of *Mono No Aware*[4] (Bond, 2017, p. 1; & Aung, 2015).

Butterflies- symbolizing metamorphosis and transformation. Depending on the type of butterfly and color the butterfly can have multiple meanings. For example, in Japanese folk tale and superstition, a big black butterfly is usually associated with a departing spirit, an omen or misfortune. Although this is stated, the butterfly is in many family crests (Aung, 2015).

Lotus- symbolizing purity, the reason for this is due to its ability to rise from the muddy waters and become a beautiful flower. "Most commonly associated with the Buddhist achievement of enlightenment, [as a prevalent] symbol of living [a person's] life to the fullest" (qtd in Aung, 2015, p 2).

Folding fan- symbolizing high social status and the journey of life. According to Aung, although adopted from the Chinese culture, historically all Japanese people of all ages, gender, and demographics have been using the fan to tell stories or convey secret messages through its beautiful paintings and frameworks (Aung, 2015).

Chrysanthemum- symbolizing endurance and rejuvenation, it was "first introduced as a symbol by the Japanese royal family as an imperial emblem during the Nara period" (qtd in Aung, 2015). In the modern era, the symbol of the 16-petal chrysanthemum is mostly used for official government seals and on the Japanese passport (Aung, 2015).

Daruma- symbolizing achievement. In the form of a traditional Japanese wishing doll. When received, a person will pick a specific goal that they are determined to achieve, then to show the commitment to the goal, one eye of the daruma is drawn. After, the doll is put in a visible area as a reminder of the commitment. When aching the goal, the other eye is drawn (Aung, 2015).

Cranes- symbol of longevity and good fortune can be ceremoniously "found during the Japanese New Year and wedding ceremony textile prints" (qtd in Aung, 2015, p 8). Cranes have been a part of Japanese origami, and it is stated

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3   A calendar based upon the monthly cycle of the moon's phases. Mostly used in the eastern hemisphere of the world to mark festivities.

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4   English translation: "the bittersweet poignancy of things" or "the pathos of things" This philosophy goes back to Japan's aesthetic of nature as it is but a fleeting moment by its beauty and finally to its melancholic nature as it passes by until the next time it comes again. Giving more appreciation towards it and symbolizing a human's life as it is but a passing moment in another person's life or time.

that if one folds 1000 paper cranes and makes a wish on it, the wish will come true (Aung, 2015).

Plum- symbol of refinement and purity is "one of the first blossoms to open during the year and has always been closely associated with the coming of spring" (qtd in Aung, 2015, p 9). It is also a symbol and reminder of former lovers.

Mountains- symbol of being unyielding and strength seen in traditional art and embroidered in men's clothing (Museum, 2013).
Clouds-symbol of elegance and high status, "in Buddhism, clouds signify the "Western Paradise" beyond earth; and in Shintoism, the spirits of the dead" (qtd in Museum, 2013, p 17).

Gourd- symbolizing good luck, health and prosperity, is "often associated with divinity and found in many regional folk tales stemming from Taoist beliefs" (qtd in Aung, 2015, p 10). The symbol is originally from China.

Waves- symbolizing flow and a free mind, power and reliance. According to Japanese art and design themes, waves continuously ebb and flow and so it also symbolizes having a great tactical ability (Museum, 2013).

Koi- symbol of aspiration and perseverance, the Koi became a symbol based upon the story of the koi who swam upstream and climbed the waterfall to become a dragon as dragons themselves are a symbol of strength and power (Aung, 2015).

Although the image is like ones seen in Chinese culture, the meaning behind them is formed based on Japanese culture. The symbols that derive from Chinese culture are the ones most related to Buddhism and Taoist beliefs as they came from China before implementing themselves into the Japanese culture (Museum, 2013). However, the symbols more specific to Japan, such as the sun, chrysanthemum, sakura, and others, come from the Shinto religion and aesthetic of nature as it corresponds with the cycle of life. As these symbols have been used since ancient times and brought into the 21st century, it is understandable that tradition, although lost through time, the motif is still preserved through these symbols as art, stories, superstitions, and beliefs.

Methodology

To answer the research question, what is the Japanese kimono and the outlook in the present world, the researcher used two types of research methods. Firstly, a documentary analysis was conducted using secondary sources such as historical documents based on the kimono. These secondary sources showed the evolvement of the kimono and the manufacturing process since it was difficult to see the process first hand. When analyzing the modern kimono industry and influence, secondary sources that consist of recent news articles within the last eight years are looked at.

The other method used was observation. To further study the kimono, the researcher stayed in Nagasaki, Japan for five months and traveled to different parts of Japan to observe the interactions of society and the kimono. The observation consists of interacting with Japanese nationals who have used a kimono before and after the start of the 21st century. The observation also looked at the market by understanding what stores are doing to retain and gain customers. By doing so, two companies were chosen in the concluding research to represent the observation.

Participants

Participants in the study consisted of Japanese citizens and foreigners who have experience with the kimono in Japan. There is no form of categorizing participants experience in any order. Participants interactions with the kimono are the focus used as an analysis of the garment. Participants are allowing for an understanding of the industry and the garment in modern Japan.

Procedure

The procedure the researcher used was an analysis of textbooks, research journals, and historical data. This analysis gave origin, meaning and changes throughout Japan's culture. This procedure allowed the researcher to understand how the kimono adapted to history, while still able to keep its foundation and value.

Speaking to participants in this study while living in Japan surrounded by the Japanese culture gave an aesthetic appreciation, understanding, and comparison of how the western culture has influenced Japanese culture but has not entirely lost its traditional techniques and values in the fashion industry as depicted from a westerner's viewpoint. By interacting first hand with the Japanese culture, a conclusion was able to be drawn based on what is seen and told from the Japanese perspective.

Results & Discussion

With the introduction of western clothing styles, the use of the kimono has dwindled as they were constricting, tedious, and impractical for work in the 21st

century. Today, kimonos are mostly worn by women on special occasions as it can be too expensive to buy and care for. According to Danielle Demetriou (2010),

> Even if a formal occasion does demand a kimono, they are likely to put on machine-made version - much cheaper than a traditional handmade kimono which costs between 180,000 and 1 million yen ($1,600-$8,890) (qtd in Danielle, 2010, p 8).

The most expensive kimono is made of silk while the cheaper ones are of cotton or hemp; the use of synthetic fibers not recommended due to the properties and the techniques used in dying the fabric.

> As kimonos have gone out of fashion, the number of companies making them in Tokyo has shrunk - dwindling from 217 [companies] to [only] 24 over the past 30 years. Even in Kyoto, the historic center for traditional Japanese culture, there are now just 64 kimono makers left (qtd in Danielle, 2010, p 9).

The kimono industry is declining due to the lack of demand, and the lack of craftsman.

During the Edo period (1603-1868) with new laws, regulations and international movement, the kimono became simpler, with less layers and fabric; but it was not until after World War II that the kimono industry was at its peak. According to the Ministry of Economy, Trade, and Industry, in 1975 the industry had a market size of 1.8 trillion yen or 17 billion US dollar (AFP, 2018). However, according to a survey conducted by Yano Research Institute, in 2008 it had shrunk to 406.5 billion yen and in 2016, 278.5 billion yen, (AFP, 2018). Although the demand is declining among the Japanese populace, the demand amongst foreigners is increasing using rental kimonos; these are mainly priced under $200 but owned individually can cost up to $2,000-$3,000. To many kimono businesses and designers, the idea of expansion is not the focus, but the spread of culture and preservation of the artform. The preservation of culture globally happened when it was introduced to the world market through New York Fashion Week as an *haute couture*[5] garment by designer Hiromi Asai. When introducing it to the western market, Hiromi Asai did not change the shape or traditional wear as she wished to keep the tradition alive (Mcnearney, 2016). This example is an excellent concept to gain the attention of not only the fashion world but also the world as people begin to understand how traditions are changing with time and movement of the world.

Japanese designers are showcasing the kimono, craft, and tradition to the

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5   Expensive, fashionable clothing that is mainly produced by leading fashion houses. Sometimes they are the first change makers of fashion.

world. Japanese kimono businesses are focusing on increasing the knowledge and the kimono in the local market of Japan. Chiso, founded in 1555 Kyoto, is one of Japan's largest and oldest textile and kimono store, dedicated to "using history and tradition as its guide to meet the shifting of trends and tastes over the years" (qtd in Chiso, n.d.). The company makes about 22.57 million USD per year in the business of production, sales, planning, and production of various textiles. The company also has a Chiso Gallery that shows a collection of historical kimonos and art, in addition to restoration and repair services. Another business that operates in the kimono industry is, Tokyo Yamaki Co., Ltd., founded in 1961 is a retail and kimono distribution store that is moving with the times as they find success in recycling kimonos and become more environmentally friendly (Tansu-ya, n.d.). With the focus of modernization, rentals, and resales of used kimonos, according to Iida (2017), as of 2016 the company racked up a total of about 44 million USD of sales. As both companies are generally about the kimono, the way that their business operate focuses on different perspectives. As Chiso aim towards *haute couture*, tradition, the continuation and perseverance of Japanese art; Tokyo Yamaki Co. aim towards modernization, and mass production while being environmentally friendly. Although the kimono is a complicated garment that many of the younger generation do not want to concern themselves over, with fashion and the yukata, the industry is stable.

The yukata, the summer kimono is not as intricate and detail-oriented as the kimono, it mostly consists of one or two layers, *obi* and the *geta* (Japanese block sandals). Through the simplicity of the design, it is more comfortable to make and wear which many of the younger generation adhere to since the world is moving at a fast pace. However, the older generation hope that with the yukata as an interest for the younger generation, tradition is preserve as the yukata is easier for movement and change throughout the fashionable seasons. The yukata can be adaptable to whatever

Male and female in yukatas, summer kimono, in Harajuku, Japan (Japanese yukata fashion in Harajuku, 2017)

Types of ways a yukata can be worn and changed, using the child yukata as a example (William, 2013).

fashion sense the wearer as compared to the kimono as the thought that the kimono is a traditional garment is harder to digest as a fashionable addition because the wearer does not want to destroy tradition and history compared to the yukata (Ito, 2012).

Influences of the kimono in Japanese fashion during the 21st century is through the silhouette, simplicity, and motifs. In Japan's societal fashion scene, clothing styles refined from western fashion are clean cut and simple, with color choices leaning more towards shades of black and white with accents (Ito, 2012), bringing it back to the cultural aesthetic of light and darkness, analyzed to a certain point in Junichiro Tanizaki's book In *Praise of Shadows*[6] (Tanizaki, 1977).

Another influence are motifs used throughout Japan's history as symbolism, secret messages or expression of either what was happening during the era, family status/name or fashion itself. Even in the 21st century, these symbols are not only in fashion but also, architecture and Japanese culture and livelihood as depicted through the historical photos and traditional motifs (Inoue, 1999).

Conclusion

The kimono may be stabilized using western techniques and global integration, but the craft itself is in decline. Many of the younger generation do not want to learn the craft and make it into an occupation as income is hard to obtain, and the time it takes to learn the art form is long. Thus, interest in kimono-making as an occupation has declined. It is leading to the vanishing historical craft of making the kimono as the older generation who understands the art pass away due to old age or through time if no preservation method is in place other than government protection of the methods.

The kimono has transcended through time and reflected each era that Japan goes through; having never lost its meaning and aesthetic. It has instead become a symbol of Japan. It may seem like western ideals have overtaken the kimono, but not. The one overtaken is the traditional craft of a kimono as newer and more efficient ways are being used to make it. Thus, lowering cost, resources, and increasing the survival of larger kimono houses such as Chiso in comparison to smaller kimono houses which do not have the same capacity to make it traditionally. Through this study, with modernization, tradition itself is being harmed, but preservation is through dedication and awareness. The preservation methods are through Japanese designers, businesses, and the introduction of the yukata sparking an interest in the full kimono.

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6   A philosophical book that compares Japanese and western aesthetic.

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Wearable Technology and Its Benefits in Urban Settings

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Abstract

The harmful effects of frequent and prolonged exposure to airborne contaminants is both a common problem and an unfortunate reality for millions of commuters in urban environments around the world. Along with a thorough review of existing solutions that offer protection from air pollutants and how commuters currently navigate this issue, this study will assist in the process of designing a wearable device that proactively alerts the user and shields them from possible contamination. Such a device will operate through utilization of a functionally intuitive graphical user interface (GUI), various instruments, sensors, and software. Initial interviews and observations were conducted in dense urban locales, encompassing a diverse sample size of pedestrians who travel frequently and may be regularly exposed to potentially hazardous pollutants. Through both casual observation and direct conversation, these interactions ascertained which devices commuters routinely brought with them while traveling, along with their personal knowledge and perspective on the current means of protection from common contaminants. As the researcher, understanding certain categories and sources of various pollutants will also assist in providing the most secure and effective defense via wearable technology traversing urban environments.

Keywords: Wearable, device, technology, urban, pollution

Wearable Technology and its Benefits in Urban Settings

Air pollution caused 4.2 million premature deaths worldwide in 2016, according to the World Health Organization (2018). There have been many studies conducted on how pollution in urban areas is affecting the health of commuters around the world, such as Zuurbier's et al. (2010) study on commuters' exposure to particle matter (PM) based on modes of transportation. As urban areas are typically heavily populated, this study will primarily focus on the average commuter's normal,

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everyday exposure to pollution. Most of these deaths occurred in low- and middle-income countries such as Southeast Asia and Western Pacific regions. Wearable technology is known for regulating changes in the human body and alerting the users when abnormal activity occurs.

The goal of this study is to find a small-scale wearable solution that protects users from the harmful airborne pollutants. It will attempt to discover what needs commuters have that can be incorporated into this device to benefit them as broadly as possible. I will develop best practices will be developed for implementing wearable technology focused on protecting commuters in urban settings from pollution. This project involves a series of interview questions asked to individuals that have experienced the use of a face mask whether it was intended for the protection from pollution or other health related uses. A device worn on the body can allow existing technologies to be more directly integrated with the user. The most commonly seen face masks worn in public are surgical face masks usually given to ill patients to stop the spread of contagious sicknesses.

Another primary goal of this research study was to determine why face masks are viewed as unnecessary and identify ways to improve this perceived stereotype. Americans like to blend into the crowd rather than stand out, and I want to understand the reasoning. They dress very inconspicuously and usually only wear things that are on trend. Some avoid loud, colorful clothing or anything that will bring them any attention, negative or positive.

Headphones have become more of an easy way to avoid conversations on public transportation as they imply that commuters are preoccupied. Finding behavioral gestures like this is important because it's considered accidental design. This is when a designer means for an object to achieve one thing, but it actually achieves another. In Egli's (2015) article on how surgical masks became a fashion statement; he states that people in Japan are wearing facemask to cover their makeup less faces when they're not wearing makeup like how Americans wear hats to cover bad hair. This is merely for convenience reasons; therefore, I want to explore these types of mannerisms because there are surrounding problems that can also be addressed when designing a product for a specific issue.

Literature Review

Urban areas such as Chicago, New York, and Los Angeles are heavy populated by both foot and automotive traffic. Commuters that travel every day by foot or bike, motorized or otherwise, are exposing themselves to heavy amounts of air pollutants. In addition, motorized vehicles produce carbon emissions that coalesce and concentrate within the city. A study conducted by Zuurbier et al. (2010) confirmed how different modes of transportation, fuel type, and routes taken can affect a commuter's health in an urban setting. The study tracked 34 individuals

on their everyday commutes in high trafficked areas. The particle matter (PM) and exposure to pollutants were measured through the relation between heart rate and minute ventilation. The data was collected from individuals who commuted by car, bus, walking, and on bike. The method of collection included measuring the inhalation rate and heart rate of an individual and collected Particle samples were for a total of 1000 hours during 47 separate weekdays. This approach in collecting data during a specific time frame allowed for the possibility of finding trends in the data. Researchers found that PM exposures were highest in diesel buses (38,500 particles/cm^3) and for cyclists along the high-traffic intensity route (46,600 particles/cm^3) and lowest in electric buses (29,200 particles/cm^3). They also found that cyclist's minute ventilation (volume of air per minute) was twice the rate of inhalation of those commuting by bus or car. It was concluded that commuters that commute who used bicycles inhaled two times the amount of pollution compared to the average person.

Existing portable pollution protection devices that are currently in use include the ubiquitous and inexpensive surgical face mask. In Yang's (2014) article, it was noted that Asian populations used face masks for a number of reasons. Geographically, it was due to the increasing number of factories and pollution in East Asian countries. Thus, the use of face masks has become more of a cultural norm for this specific population. The average American generally wears such masks only in isolated or extreme conditions, conversely, as a response to airborne contagions. In addition, masks are primarily used as a reactive measure once an individual becomes sick, rather than a preventative step to avoid contracting the illness at its onset. This is where the cultural differences are most apparent.

Looking at Japan's history during the 20th Century when a massive pandemic of influenza killed about 20 to 40 million people around the world, scarves, veils, and masks were commonly used as face coverings to ward off the disease. This influenza pandemic was known as the Spanish flu of 1918 that killed millions around the world, and some 675,000 Americans (Editors, 2010). When the Great Kanto Earthquake struck Japan in the 1918s, the sky was filled with debris and smoke for months afterward, and once again the use of face masks was considered an absolute necessity. This culmination of both natural and cultural events has led to somewhat of a social design revolution.

Particulate matter pollution is on the rise and poses a colossal threat to the air quality that humans are breathing. PM pollution consists of micro particles that are released into the air through vehicle exhaust, coal plants, and many other sources. PM is measured from PM 2.5 – PM 10 and anything under PM 2.5 can cause serious health issues, since it can penetrate through human bronchi and lungs. In Liu's et al. (2015) study, Stanford Associate Professor Yi Cui and his students researched and developed a filtering mesh that blocked out PM 2.5 particles but allowed light through defined as transparent filters. These filters are unique because they allow

for light to pass through but stop any unwanted particles that may be harmful to the lungs.

This study progressed and identified ways to help stop pollution from entering homes and buildings through windows. The material was called polyacrylonitrile (PAN) and was a material commonly found in making surgical gloves. This filter was made using the PAN material and taking it through a process called electrospinning. The material was converted into a liquid and then a spider-web-like fiber that was one one-thousandth the diameter of a human hair. Yi Cui predicted this mesh could be used in the making of face masks, car exhaust filters, and power plants filter. The development of this mesh filter was important as it opened up the design for use in a variety of applications.

Professor Matthew Johnson, co-founder of Airlabs, stated that pollution inside cars was becoming a much bigger problem (Pickering, 2017). Toxic air pollution passed through car vents and openings from outside the car, which caused the air in a car to become harmful. When researching pollution in urban areas, commuters were unaware of the pollution that could seep into cars. Researchers in Copenhagen have developed a device that quickly removed nitrogen dioxide (NO2) and PM from inside a car called the Airbubbl. In this study, they measured the amounts of NO2 exposure that happened while in traffic and they found that it is above 20 to 40 times above the exposure levels. This device worked by filtering air through a Nano carbon filter that removes 95% of nitrogen dioxide and a high-performance filter for road and brake dust. There were two fans located on either end of the device that blew the filtered air back into the car. The device straps onto the back of the head rests and is powered by a lithium ion battery. There are removable filter that can be replaced and changed through long usage in a highly polluted area. Portable devices can provide the user a sense of personal protection and ease of mind, while bigger scale filtration devices help the mass without them knowing.

When contamination and smog in bigger cities became an issue, larger-scaled filtration devices were made available. In 2018, China built an air purifier that demonstrated how large structures with powerful filtration devices could help clean the air. This study identified that the limitations with large structures were that they can only clean within a small radius of the city. The tower stood 328 feet tall and was placed in Xian in the Shaanxi Province. China usually experiences heavy pollution during the winter due to heating methods that rely primarily on coal. To combat this, the tower worked by utilizing a system of greenhouse coverings at the base of the tower. Toxic air was "sucked into the glasshouses and heated up by solar energy. Hot air then rises through the tower and passes through multiple layers of cleaning filters." (Chen, 2018). These methods significantly reduced the pollution to moderate levels and this system currently produces more than 353 million cubic feet of clean air each day. Although this tower method was proven effective, it only covered a limited area

around the tower of approximately 10 square kilometers.

Today, face masks have not only become widely accepted as the norm in certain parts of the world, but have evolved into a fashion trend and are now present in many designer magazines from these regions. LeTrent (2014) explains the QIAODAN Yin Peng Sports Wear Collection shown at the Mercedes-Benzes China Fashion Week showcased both fashion and functionality in the same breath. His incorporation of some outfits had built-in face masks, while others featured smog masks coordinated to match the ensemble. This awareness of face masks as a fashion item has not yet caught on in Western countries, where their use may be viewed as unnecessary or even abnormal.

Methods

Observations and interviewing was focused on what commuters mainly brought with them on their commutes and their knowledge on pollution protection. The study's target audience was primarily active commuters in their mid 20s who walked or biked to work. The selected participants were people who experienced any kind of urban environment. Information was gathered primary on the greenways and coffee shops of Chicago, New York and Nashville. Individuals wearing facemasks were of high interest to the student researcher, as their perspective on facemasks may have been different from the norm.

The primary topic of pollution was the emphasis of the interviews, but interest was also taken in the commuter's everyday life. A questionnaire was made in advance to direct the conversation, but it was not limited to only those inquiries. Participants were asked to give verbal consent to participate in a conversation about their experiences with pollution and living in the city. This interview was not to be conducted as a questionnaire or script, but rather as a natural conversation. This was an important distinction as answers from participants would be open and honest, and other possible concerns that were not directly addressed in the opening were a useful addition to the discussion.

Commuters were asked if they struggled with breathing when it comes to air quality and many of them said yes. They stated that they can feel the difference in air density when it comes to Wisconsin air compared to air in L.A. or New York. A commuter with asthma stated that it's especially hard to breath in humid and crowded spaces. When asked about their concerns about air quality in today's world, many of them brought up global warming and climate change. That there is little to no progress when it comes to keeping the air quality clean in urban areas. Every person interviewed expressed their concerns with pollution effecting their health in the long run and know that there are existing products out there, but at a costly price. Sustainability and recycling was also a common solution that commuters brought up in the case to combat pollution.

After reviewing this data, it was clear that commuters were concerned about pollution more than expected. That global warming and pollution go hand in hand when it comes to air quality. Existing products that users brought up consisted of home air purifiers but never anything portable to bring with. Only the commuter with asthma stated that they used their inhaler when they were having trouble breathing. Common items that commuters brought with them on their commutes were water bottles, wallets and keys. When asked about their experiences with breathing in cold weather, some of them stated that they usually cover their bare hands over their nose and mouths and exhale to create warmth. Moving forward with these findings, I want to incorporate a device that helps users with extreme cold weather and how they can warm themselves while keeping them protected from pollution.

Findings / Discussion

During the interviews, it was evident that most individuals were concerned about pollution but uncertain on how to directly tackle the issue. A comparison of the pollution levels between the U.S. and China was brought up several times in conversation. Out of the 23 people interviewed, only two participants had lived in the eastern hemisphere and had experienced the actual use of facemasks. These two individuals stressed how the cultural difference made such an immense difference in wearing facemasks in public.

One individual stated when someone was seen with a cloth facemask, it was more for fashion than it was for protection. Only one individual interviewed was aware that cities with high emissions were given public warnings during hazardous levels of pollution. An individual in particular was given surgical face masks after having gone through a heart transplant procedure. They stated that they had never seen the need for wearing a facemask until their doctors explained why patients with heart transplants were more sensitive to airborne illnesses and pollutants.

Uncovering what commuters encountered on a daily basis was extremely beneficial in identifying a device that would fit into their lifestyle. Commuters who traveled to work in the city stressed how much they relied on their mobile devices to check for emails, appointments, or to just listen to music. One even stated that it was a nice way to avoid conversation on the subways and maintain privacy in public. Ear buds were also identified as a very common item that most participants mentioned not being able to leave the house without. They noted the ability to listen to navigation from their mobile devices and also have private phone conversations while keeping their eyes on the road. Many of the roadblocks to wearing facemasks brought up were the social stigma of maintaining privacy in public spaces. For example, one individual felt it was "weird" to wear a face mask in public because they would get uncomfortable stares. Anything that was protecting them from an issue, such as

pollution or illness, made them feel uncomfortable. This also was true when asked if other forms of face coverings were deemed strange in public spaces. Existing clothing accessories such as scarves and jackets with high collars were brought up as alternate solutions to integrate a face mask.

Conclusion and Future Study

This research study concludes that many individuals are worried about pollution, but there have not been any concrete reasons for commuters to be concerned. It is not affecting them at the levels deemed dangerous by the World Health Organization (WHO). According to McCarthy (2015), a Forbes journalist, anything over 10 micrograms per cubic meter of PM2.5 is considered hazardous. McCarthy states that Bakerfield, California is United States' highest concentration of PM2.5, with a of level 18.2. He goes to compare this to a city in China with the highest concentration of PM2.5 which is at a level of 155.2. Studies like these give Americans the confidence to not wear facemasks if they don't want to, and at the same time the consciousness that pollution is present.

It was also concluded that commuters preferred wearable technology as it immediately notify them without having to utilize their mobile devices. For example, they stated that smart watches helped them keep track of their steps and it is something that they could just put on and not think about it. This study brings awareness to the eventuality that air pollution in the U.S. could potentially become as troublesome as other countries such as China. This is the focus of the research since the current issues are at the intersection of good design and social utility. It is evident that commuters in the U.S. want to remain inconspicuous as possible when it comes to protecting themselves from pollution. If it is not deemed necessary by a medical professional for a user's health, then there is no use for wearing a face mask in public. Interviews showed that commuters wanted a multipurpose functional face covering with a main purpose for protecting against the cold. They stated that a face covering used for combating pollution would be secondary and merely just a benefit of cold proof clothing.

In summary, product exploration will combine both form and function and seek to solve a number of issues including affordability, reusability, and social acceptance. The graphical user interface (GUI) will ultimately define the user experience with such a product like this. Information such as pollution levels and indicators showing how commuters are being protected are reasons why they tend to gravitate towards wearable technology. People love seeing statistics on their own health and wellness and a properly designed GUI will make this experience more personable.

There is a way to achieve environmental and cultural design goals that are responsible, respectful, and sensitive to the needs of affected populations. Design

challenges like this help designers think critically about designing for a purpose and a population rather than just for the sake of the product itself. This is about more than just representation, but also realizing that design is universal, when everyone benefits from it.

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Why Do You Taste So Ugly: Examination of Flavor on Perceived Attractiveness

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Abstract

Previous research on attractiveness has found that perceptions of others can be influenced by scent stimulation (Foster, 2008). For example, Demattè, Österbauer, and Spence (2007) found that unpleasant scents resulted in reduced perceptions of attractiveness relative to neutral or pleasant scents. The purpose of this research was to examine the effect of flavor on perceptions of attractiveness. A quantitative survey was used to measure the relationship between jelly bean flavor ratings and perception of others' attractiveness. Ratings of attractiveness were significantly less favorable after having experienced an unpleasant flavor relative to a pleasant or no flavor condition. A t-test revealed a significant difference between males and females on their ratings of the general attractiveness of faces with males rating facial attractiveness more negatively compared to those who identified as female. The results of this study will allow for more research regarding the application of flavor's influence on perception of attractiveness to dating practices and other situations in which attractiveness plays a role.

Keywords: Attractiveness, flavor, perception

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Why Do You Taste So Ugly: Examination of Flavor on Perceived Attractiveness

Flavor means more than how something tastes, as evidenced by the use of flavor words in the English language. It is common for words such as honey and sugar, denoting a pleasant flavor, to be used by romantic partners as terms of endearment (Ren, Tan, Arriaga, & Chan, 2015). Previous researchers have also found that flavor and taste have the ability to impact other sense perceptions, such as smell and touch (Cook et al., 2017; Mony et al., 2012). However, can it affect how we perceive potential partners visually as well?

Our senses unknowingly alter our perceptions of the world every day, including influencing our experience with food. For example, research examining the impact of temperature of water on the perception and acceptance of food discovered that water served at a lower temperature (4° C) significantly affects one's perception of chocolate (Mony et al., 2012). Specifically, drinking colder water decreased perception of chocolate's sweetness and creaminess, and correlated with lower hedonic pleasantness ratings. Mony and colleagues (2012) speculate that the North American preference for cold water with their meals may contribute to the heightened preference for sweetened foods: to achieve a pleasurable hedonic experience in conjunction with cold water. As such, food would need to be sweeter to be enjoyed, than if one was not drinking cold water. This affects individuals and food companies alike on a daily basis. Similarly, Van der Wal and Van Dillen (2013) noted that when one is not allocating their full attention to eating and drinking, their sensory experience is dulled. Their research analyzed the impact of task load on taste perception, finding that those with larger task loads (e.g., multitasking) perceived water and grenadine solutions as less sweet than those with smaller task loads. This research offers an additional explanation for why busy Americans prefer highly sweetened foods, while also emphasizing how one's taste can be impacted by external forces (Van der Wal & Van Dillen, 2013).

Even the music one hears can change their hedonic experiences. For example, Kantono and colleagues (2016) found that participants gave higher ratings of pleasantness for gelati while listening to music they liked, relative to those who rated gelati while listening to neutral or disliked music. This further demonstrates the complexities of the connections between our senses and the perceptions that result.

Additionally, the visual presentation of one's meal can influence one's liking of the food (Zellner, Roos, Zearfoos, & Remolina, 2014). Specifically, Zellner and colleagues (2014) found that when presented with the same meal, participants liked the food more if it was served in an aesthetically pleasing arrangement. What one sees can change what one tastes, but can what one tastes impact what one sees?

Interestingly, our taste preferences can also, in turn, impact our visual perception. Schwab, Giraldo, Spiegl, and Schienle (2017) found that when experiencing a bitter flavor, in comparison to a neutral flavor, participants were less aroused when looking at images of foods with higher caloric value (in comparison to vegetables). Specifically, participants visually perceived the food pictures as less arousing due to the interfering influence of their sense of taste.

Other senses and external forces have also been found to impact visual and relational perceptions, such as how one views another person (Cook et al., 2017; Demattè et al., 2007; Foster, 2008; Ren et al., 2015). For example, scent has been found to influence perceptions of attractiveness and facial pleasantness (Cook et al., 2017; Demattè et al., 2007; Foster, 2008). Foster (2008) found that for fertile women, ratings of a man's body odor were significantly predictive of their attractiveness; however, the olfactory ratings were less predictive than visual ratings of their photographs. Additionally, Demattè and colleagues (2007) discovered that pleasant (geranium and male fragrance) and unpleasant (rubber and body odor) scents significantly impacted attractiveness ratings of male faces when rated by women. When paired with an unpleasant scent, the faces were rated as less attractive than when paired with either a pleasant or neutral scent (Demattè et al., 2007). Particularly, this shows that while a bad scent can lead to decreased ratings of attractiveness, a good scent does not necessarily lead to increased ratings of attractiveness. In another study, however, Cook and colleagues (2017) found that pairing desirable scents with images of faces did result in higher ratings of facial attractiveness. Specifically, they found that when exposed to a pleasant scent, jasmine, participants rated happy and disgusted faces as significantly more pleasant than when exposed to a neutral, clean air scent, or when exposed to Methylmercaptan, an unpleasant, rotten cabbage, scent. This suggests that simply experiencing an odor is sufficient to influence our aesthetic perception of others. Interestingly, it was also discovered that the expression of the face evaluated (happy or disgusted) influenced how participants rated the intensity of the scent they experienced (Cook et al., 2017). Specifically, in regard to Methylmercaptan, when paired with disgusted faces, the scent was evaluated as more intense, which in this scenario is worse (Cook et al., 2017). The findings of this study are yet another demonstration of how what one perceives is the result of an amalgamation of the sensations they experience. Similarly, Ren and colleagues (2015) found that sweet flavors, relative to neutral flavors, resulted in increased romantic interest in others (with or without a photo). Participants, also expressed greater willingness and more positive expectations regarding a hypothetical relationship with another person, suggesting that perceptions of flavor may have broader social implications for when and with whom we choose to form relationships with.

Overall, what can be gathered from existing research is that our sensations influence our perception and that, in certain situations, they can change how we view another person visually and relationally. However, current research is lacking on the specific connection between one's experience of flavor and their visual perception of

one's attractiveness.

Current Study

    The purpose of the current research was to examine whether or not the sense of taste has an effect on how one perceives someone else's attractiveness. For the present study, the word 'attractive' was defined as generally aesthetically pleasing. The basis of the current research was to have participants experience either a pleasant or unpleasant flavor and then examine how ratings of attractiveness were influenced by these taste experiences. Specifically, participants in the experimental conditions were asked to consume a Bean Boozled Jelly Bean, which has the potential to have either a pleasant or unpleasant flavor. They were then asked to rate the flavor they experienced, before rating the 'attractiveness' of faces.

    Hypothesis 1: Flavor ratings of the Bean Boozled Jelly Beans will be positively correlated with ratings of the general attractiveness of the observed faces.
    Hypothesis 2: The experience of pleasant (unpleasant) flavors will result in exaggerated positive (negative) ratings of attractiveness relative to the ratings provided by individuals who did not consume a jelly bean while rating the faces.

    Rubenstein (2005) found that men value the physical appearance of their partner more than women. Men were also noted to report higher expectations regarding their partner's appearance. Given this finding, it was also hypothesized that men, relative to women, will be more negative in their ratings of the general attractiveness of faces (Hypothesis 3), regardless of jelly bean flavor. Although specific predictions were not made, the researchers were also interested in how sexual attraction may influence the extent to which unpleasant flavor experiences influence facial attractiveness scores. Therefore, participants were coded based on their identified sexual preferences to examine how flavor may impact ratings of attractiveness more broadly.

<div align="center">

Method

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Participants

    Baseline Attractiveness Group. Participants in a baseline attractiveness group completed a face rating activity online. This group consisted of 171 individuals ranging from 18 to 80 years old ($M = 29.97$, $SD = 13.70$). The baseline sample was 49.12% female and 14.62% male, with 2.34% selecting non-binary, 1.17% reporting as other, and 32.75% not reporting. Additionally, the majority of the sample identified as straight (53.22%), with 14.03% identifying as asexual, bisexual, lesbian/gay, or other, and 32.75% not reporting. The majority of participants identified as being white

(59.65%), with 32.75% of participants not reporting.

    Experimental Attractiveness Group. Participants that took part in the experimental conditions consisted of 145 individuals who participated in person, in a lab-setting, and took part in one of the two experimental conditions (consuming either a pleasant or unpleasant jelly bean). Participants in this group ranged in age from 18 to 31 years old ($M = 18.96$, $SD = 1.66$). Overall, the experimental sample was 65.52% female and 34.48% male. Additionally, the majority of the sample identified as straight (89.66%), with 10.34% identifying as asexual, bisexual, lesbian/gay or other. Most of the participants in the experimental conditions identified as first-year students (69.66%), with 30.35% identifying as a sophomore, junior, senior, or other. The majority of participants identified as being white (66.90%).

Materials

    Overall, the current study utilized a quantitative survey design, involving a baseline group and an experimental group with two conditions. Those in the baseline group completed a survey distributed via Facebook, pretesting a set of facial images to obtain baseline attractiveness ratings. Those in the two experimental conditions completed a survey rating attractiveness of facial images selected from those presented to those in the pretest group in a psychology research lab setting.

Figure 1. Facial images rated by the experimental groups.

Attractiveness Measure. In the baseline group, participants completed a survey in which they rated a series of 14 facial images twice on their objective attractiveness on a 14-point scale of attractiveness (1-*Extremely Unattractive*, 3- *Highly Unattractive*, 5- *Moderately Unattractive*, 7- *Slightly Unattractive*, 8- *Slightly Attractive,* 10- *Moderately Attractive*, 12- *Highly Attractive*, 14-*Extremely Attractive*). The researchers then chose three images of both male faces and female faces from the image set with the lowest deviations among their attractiveness ratings, while maintaining diversity, to be presented to the experimental group. The participants in the experimental conditions rated the selected series of 6 facial images (see Figure 1) on their objective attractiveness using the aforementioned scale, with each image appearing twice.

Hedonic Scale. In the experimental conditions, participants consumed a randomly selected Bean Boozled Jelly Bean, that would either have a pleasant (e.g., tutti-frutti) or unpleasant (e.g., stinky socks) flavor. Participants then rated the pleasantness of the flavor on the 9-point Hedonic Scale (Peryam & Girardot, 1952): 1 - *Like Extremely*, 2 - *Like Very Much*, 3 - *Like Moderately*, 4 - *Like Slightly*, 5 - *Neither Like nor Dislike*, 6 - *Dislike Slightly*, 7 - *Dislike Moderately*, 8 - *Dislike Very Much*, 9 - *Dislike Extremely*.

Additionally, participants were asked to complete a set of demographic questions, regarding their age, gender, sexual orientation, and ethnicity. Those in the experimental group were also asked about their year in school.

Procedure

Baseline Attractiveness Group. After consenting to participate, participants in the baseline group completed an online survey, which the researchers distributed via Facebook utilizing a snowball sampling technique. During the survey, participants first read through the definition of objective attractiveness that they were supposed to use while rating the faces. Specifically, they were instructed with the following prompt:

> "For this survey, the word 'attractive' is defined as generally aesthetically pleasing. When rating the following faces, please keep this definition in mind. Please do not rate the faces based on if you find them to be sexually attractive, instead rate the faces based on their attractiveness in *general*."

To ensure that participants were paying attention to this set of instructions, they then completed a multiple-choice question, asking them which definition of 'attractive' they should be rating the faces with: a) Sexually attractive, b) I am attracted to this person, or c) Generally aesthetically pleasing. Participants who got the wrong answer the first time viewed a reminder of the instructions and were prompted with the question again. Additionally, participants were asked a similar multiple-choice question again at the end of the study. Specifically, they received the following item,

"While completing the survey I rated the faces based on how: a) Sexually attractive they were, b) Attracted I was to them, or c) Generally aesthetically pleasing they were. The participants then rated a series of 14 facial images on their objective attractiveness using the Attractiveness Measure, with each image appearing twice. In this condition, no mention of flavor experiences was mentioned.

Experimental Attractiveness Group. For the experimental groups, the researchers escorted participants into a lab room, and obtained informed consent. Following consent, participants were given a randomly assigned Bean Boozled Jelly Bean, which are designed to have a pleasant (e.g., tutti-frutti) or unpleasant (e.g., stinky socks) flavor for each color of bean and asked to follow the prompts on the computer regarding what to do next. The researchers instructed the participants to chew the jelly bean to experience the flavor, instead of simply swallowing it whole, and advised that if the participant was unable to swallow the jelly bean that there was a garbage can available in the lab room. Participants were then left alone to complete the session using the computer prompts via a Qualtrics survey. Prior to consumption, the participants were directed to select a jelly bean image that most closely resembled the one that was selected and then were prompted to eat the Bean Boozled Jelly Bean. Participants in the experimental conditions also received the same objective attractiveness directions and manipulation checks as those in the baseline attractiveness group. Immediately after, the participants proceeded to rate the pleasantness of the flavor on the Hedonic Scale (Peryam & Girardot, 1952). Participants then rated the attractiveness of the six facial images using the Attractiveness Measure, with each image appearing twice. At the end of the experimental survey, the participants answered demographic questions and identified the flavor of jelly bean they experienced based upon which jelly bean image they selected earlier in the survey. If neither of the options associated with the jelly bean picture seemed to match the flavor being experienced, participants received a prompt to write what flavor of jelly bean they thought they had. Then, the researcher debriefed the participants by thanking them, offering them gum, answering any questions, and asking them to not disclose the details of the study to protect its validity. Finally, the participants were given an information sheet with the researchers' contact information for any future questions and then escorted them out of the lab.

Results

In order to test hypothesis 1: flavor ratings of the Bean Boozled Jelly Beans would be positively correlated with ratings of the general attractiveness of the observed faces, a Pearson r correlation was conducted. A significant positive relationship between flavor ratings of jelly beans and ratings of the general attractiveness of the observed faces was found, $r(137) = .261$, $p = .002$, $r^2 = .07$. Specifically, as flavor ratings become more pleasant, attractiveness ratings increased,

with 7% of the variability in attractiveness ratings capable of being predicted by flavor ratings.

To analyze hypothesis 2: the experience of a pleasant (unpleasant) flavor will result in exaggerated positive (negative) ratings of attractiveness relative to the ratings provided by individuals who did not consume a jelly bean while rating the faces, the researchers conducted a between-subjects ANOVA. For this analysis, comparisons were made between the two experimental groups (pleasant and unpleasant flavor) relative to the responses from the participants in the baseline attractiveness group to see if the addition of a jelly bean flavor experience would modify ratings of attractiveness. This analysis resulted in a significant difference in facial attractiveness ratings, $F(2, 242) = 4.99$, $p = .008$, $\eta^2 = .04$. This is a small effect. Post hoc comparisons using the Tukey HSD test revealed that there was no significant difference between the mean scores of the pleasant (M = 8.08, SD = 1.63) and baseline ($M = 8.09$, $SD = 1.34$) attractiveness conditions, $p = .999$. However, the test did reveal significant differences between the unpleasant condition ($M = 7.35$, $SD = 1.81$) and both the pleasant ($p = .026$) and baseline attractiveness conditions ($p = .010$). Specifically, this finding provides partial support to the second hypothesis as the unpleasant jelly bean flavors resulted in lower ratings of attractiveness, whereas pleasant jelly bean flavors did not impact attractiveness ratings.

To analyze hypothesis 3: men, relative to women, will be more negative in their ratings of the general attractiveness of faces, the researchers conducted an independent t-test. For this test, differences between those who identify as male and those who identify as female on how they rate the general attractiveness of faces was investigated. This hypothesis was supported, $t(246) = -3.52$, $p = .001$, $d = .45$. This is a large effect. Specifically, those who identified as male ($M = 7.34$, $SD = 1.50$) on average provided lower ratings of attractiveness to the facial images relative to those who identified as female ($M = 8.10$, $SD = 1.58$), supporting the hypothesis that males will be more negative in their ratings.

Lastly, two between-subjects ANOVA's were conducted to investigate whether potential sexual attraction influences the extent to which unpleasant flavor experiences influence facial attractiveness ratings. For the purpose of this exploration, participants were grouped into those who identified as being attracted to males and those who identified as being attracted to females, with those identifying as asexual being excluded. Separate analyses between the two attraction groups were necessary in order to include participants who identified as bisexual within both attraction analyses. It is important to note that these groups were predominantly comprised of straight women (88.42%) and straight men (92.00%). The researchers found that for those who identified as being attracted to males, unpleasant flavor ratings significantly decreased perceptions of attractiveness of male faces, $F(2,162) = 4.35$, $p = .014$, $\eta^2 = .05$, consistent with the finding from hypothesis 2. Post hoc analyses

revealed that unpleasant flavors ($M = 7.19$, $SD = 2.07$) resulted in lower ratings of attractiveness compared to ratings with the baseline attractiveness group ($M = 8.18$, $SD = 1.92$; $p = .015$) group and marginally so when compared to those who ate a pleasant jelly bean ($M = 8.13$, $SD = 1.53$; $p = .058$). Interestingly, the effect did not hold up for individuals who identified as being attracted to females, $F(2,160) = 2.57$, $p = .080$, $\eta^2 = .03$. For participants who identified as being attracted to females, unpleasant flavor ratings ($M = 6.78$, $SD = 2.03$), relative to pleasant flavor ratings ($M = 7.40$, $SD = 1.34$) and baseline attractiveness ratings ($M = 7.37$, $SD = 1.78$), did not influence the subsequent perceptions of attractiveness female faces.

Discussion

The overall results of the study suggest that the flavor of a disgusting jelly bean does, indeed, impact one's perception of attractiveness. This was especially true for those who were attracted to males, mostly straight women in this case, when viewing male facial images. However, it should be noted that while a significant effect was found, it was only evident for those who experienced an unpleasant flavored jelly bean. This partially supports the researchers' first and second hypotheses. Experiencing a good flavor bean had no influence on perceptions of attractiveness. This finding is similar to that of Demattè and colleagues (2007) who found that ratings of attractiveness were negatively impacted by unpleasant olfactory sensations (scents of body odor and rubber) but were not significantly impacted by pleasant olfactory sensations (geranium and male fragrance). However, a possible explanation for this lack of effect in the current study may be because of the nature of the baseline attractiveness group. Participants who rated the faces on their own time may have been consuming food, or had some other pleasant flavor stimuli, such as gum, in their mouth while completing the task. Thus, it is possible that the baseline group may be more similar in makeup to the pleasant flavor group, relative to a truly neutral (no flavor) group. This is important to note as other previous research supports that pleasant sensations can impact attractiveness perceptions, specifically with a pleasant scent (jasmine) leading to increased ratings of facial attractiveness (Cook et al, 2017). Future iterations of this study would benefit from utilizing a control condition instead of just a baseline facial attractiveness group for comparison. The third hypothesis was supported by the results showing that males were overall more critical when judging the facial image set overall. Those who identified as male rated the facial attractiveness of the faces more negatively compared to those who identified as female. Overall, the findings of the current study indicate that bad flavors have the strongest influences on ratings made by individuals attracted to males which in this sample was predominantly straight women.

It is important to note some limitations that could have impacted the data. As previously mentioned, the baseline group, may not have served as a very strong

control group for comparison, given the lack of control for the presence of pleasant or unpleasant stimuli in their surroundings. Additionally, of those who participated in the baseline study, there were several participants who opted to not include demographic information (32.75%), making it difficult to know how comparable the two groups were demographically. Additionally, the measures all relied on self-report data, and thus, could have been affected by social desirability or false responses. That being said, the participants were instructed that their results would be kept confidential and were alone (for the experimental conditions) when completing the measure, in an attempt to decrease the effect of social desirability.

Understanding the relationship between flavor and attractiveness perceptions could lead to future studies investigating its application to dating practices and other situations in which attractiveness plays a role. As evidenced by past research, one's flavor experience can impact one's interest in beginning a romantic relationship with a hypothetical person, with those experiencing a sweet flavor being more interested (Ren, et al., 2015), providing support for flavor experiences being socially consequential, and leaving the door open for future investigation of flavor's impact on perception of attraction to and romantic interest in real potential partners. Ren and colleagues (2015) also found that while flavor influenced evaluations of a hypothetical relationships, it did not impact evaluations of real relationships. Therefore, future studies may want to examine how unpleasant flavors influence attractiveness ratings of faces that are already known, relative to ratings of new faces. Until future research is conducted, it is recommended that one should choose carefully when suggesting a restaurant for a potential date, just in case.

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Gnosis: In knowing

Ka Moua
Senior, Studio Art: Painting; Minor: Philosophy

Mentor: Darren Tesar

Sickness is natural order, akin to death and birth. One experiences death many times before one can accept change. Once upon a time, death came calling in the form of an illness *(disease)* that consumed someone whom I had cherished, and also hated. In order to rid myself of those painful memories, I chose to create art that would help me understand how I could connect to the spiritual. Fragility exists in each living and non-living being, because one is born sick. How can one be sick and healthy? I seek to understand how the living and non-living thrive as undesirables, while simultaneously coalescing into one.

> *If you are aware of a state which you call "is" — or reality, or life — this implies another state called "isn't" — or illusion, or unreality, or nothingness, or death. There it is. You can't know one without the other. And so, as to make life poignant, it's always going to come to an end. That is exactly, don't you see? what makes it lively. Liveliness is change, is motion.*
> British-American Philosopher Alan Watts

My art practice draws from reservoirs of mental and visual worlds. Thus, I tend to pose impractical questions that further lead to more questions than answers. I research philosophical, scientific, psychological theories and phenomena that act as a guide for me to do my own empirical studies that are presented in the form of art. I approach artmaking in a scientific manner which allows me to communicate my findings as both: artist and researcher. I also research various religions. It is mainly because Christianity is a part of me that I cannot get rid of, as it has infected me. Every notion about one's belief is religiously connected to a non-corporeal realm. The belief of a higher being and or the existence of many deities comes from our unknowingness to the invisible realm. Art is the vessel to communicate the unknown: the invisible. Both realms of the *real* world and spiritual are of the same universe. It is one's perspective that changes. Everything—living and non-living—is one being; they are shattered pieces of a stranger something we do not see and can only speculate that exists. The other side of the *real* world emanates voices. The voices are innocent, without sickness; they seek to take part in the sickness. But a consequent is not without approval.

Painting becomes a portal enabling us to see into the spiritual realm; it is enigmatic in the way it communicates a visual language. My body of work is influenced from corporeal experiences: a source of an object, readings, myths, and the self. The materials I choose manifest an endless dialogue. I use a language which the viewer must decode, akin to how the materials I select are to me. I allow the artwork to take on a presence. To create this type of work allows me to be both expressive and informative. When I paint, I layer various tones of color that are added and subtracted onto the surface; the colors overlay one another, cascading in translucency. During this process an awareness occurs, resulting in ritualism; scratching and cleansing as I paint. It is a form of boundaries that does not exist in the spiritual, but the *disease* must be contained to be viewed in the *real* world. Hence, the art expands like a *disease*. There is no cure. The *disease* calls for an audience to be recognized. This sickness wants to be appreciated, not as a stranger, but celebrated as a living presence. For the *disease* to be understood, its presence becomes embodied within in my paintings. This *disease* requires many viewers' gaze to polish the surface with radiance. Without the stranger and the *disease*, one cannot understand beyond the physical realm.

Waning Arch
2018
charcoal, sepia and paper on stretched canvas
72"x 48"

The Middle Way
2018
oil, spray paint, mod podge and plant particles on stretched canvas
24″x 36″
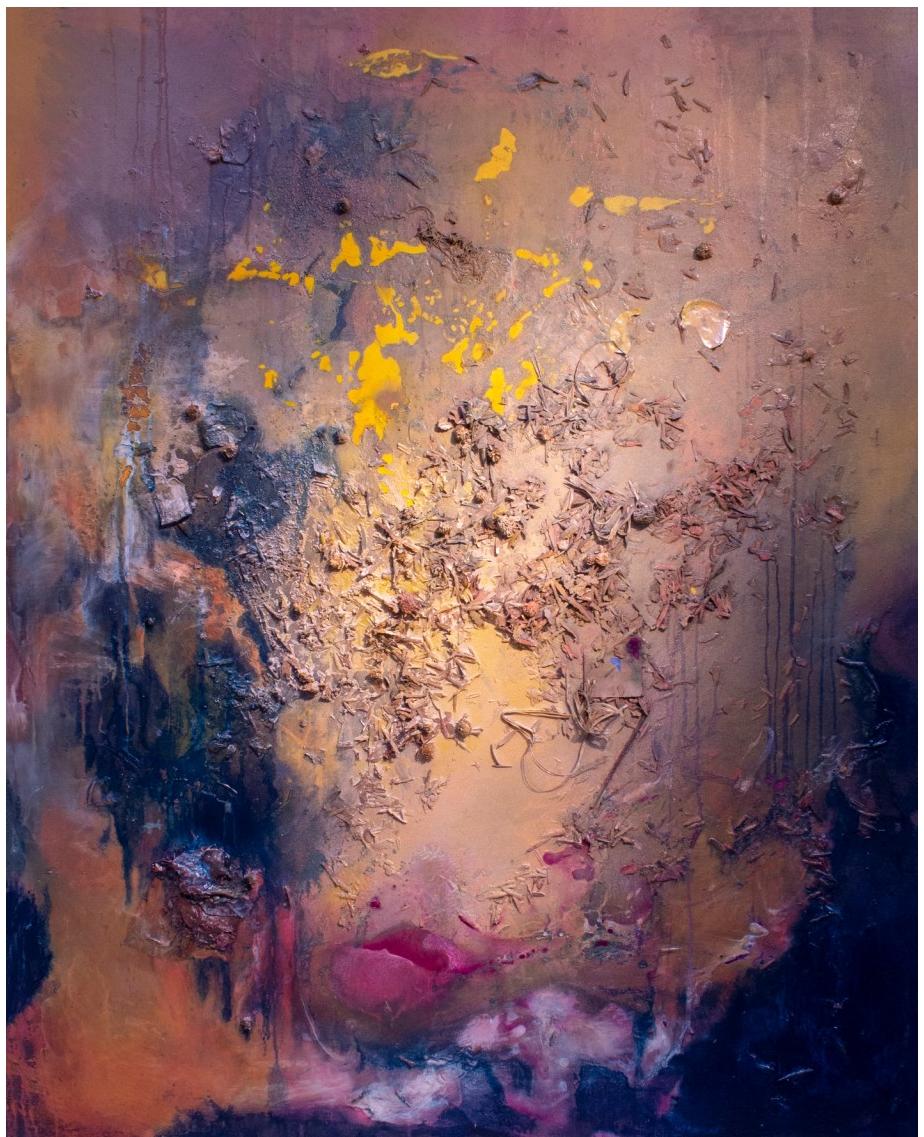
Subversion
2018
mixed media on stretched canvas
72″x 60″

Out of Routine

Melissa Lackey
Senior, Studio Art

Mentor: Charles Matson Lume
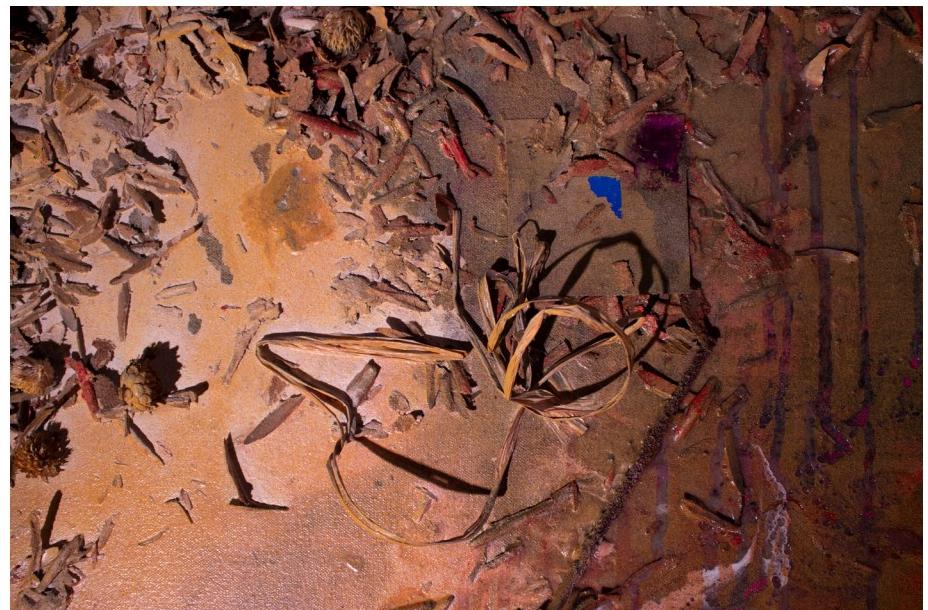
Subversion (detail view)
2018
mixed media on stretched canvas
72″x 60″

The essence of an object is not purely derived from the physical form. Through referencing specific objects and spaces, I connect my viewer with fragmented memories and encounters as a way to address existence and existentialism. I highlight objects that are a part of mundane life and strip them of their functionality, to bring them to the forefront and acknowledge how many aspects of human life go unrecognized.

I create ceramic installations that capture a fragmented space or experience. These fragments have been "othered" by being replaced with objects that fail to function in space as the object that they are attempting to mimic. The objects that occupy the installations function like the pod flowers in the *Invasion of the Body Snatchers* (1978), failing to reach criteria. They are not the objects that they refer to. The objects that I have created have no function, even though they often reference functional forms.

The works are not the objects that they appear to be. I have sculpted the objects that comprise the installations out of a paper clay body. I use a gestural, haphazard building technique to contribute to their lack of function and separation from the real, as well as making it more apparent that the objects that I am sculpting are not trying to assimilate into the referential. I also use color and arrangement to highlight their separation from reality, and to establish that I am not trying to create specific settings for specific scenes, but rather ambiguous fragmented "scenes" or arrangements that lack logic, aside from the representational forms.

The general craft of the objects serves as a sort of lens in which reality can be distorted.

I have begun recently incorporating found objects in my work to ground the installations to this mentioned sense of reality and contrasting with hand sculpted elements in the work that take the viewer out of the molded reality. The scenes are not arranged in a functional orientation in an attempt to alienate the viewer.

I invite the viewer to question why these objects are being elevated and what they have to do with each other. The installations are visually stimulating to look at but are about nothingness.

The work exists as the arbitrary ways that we view the things or don't view things in our daily lives serves to question the perceived meaninglessness within the

mundane. The subject matter that I chose to elevate within my sculptures is mostly chosen arbitrarily in order to go about creating a sense of space and interaction with as few details as needed. The work only exists within the installation, and not within the objects. The specific way that the objects in the installations interact with one another is crucial to the reading of the work.

Out of Routine (1 of 4)
2018
Terra Cotta and Mixed Media
Dimensions Vary

Out of Routine (2 of 4)
2018
Terra Cotta and Mixed Media
Dimensions Vary

Out of Routine (3 of 4)
2018
Terra Cotta and Mixed Media
Dimensions Vary

Out of Routine (4 of 4)
2018
Terra Cotta and Mixed Media
Dimensions Vary

rapport

Bailey Mastin

Senior, Studio Art : Metals and Contemporary Art Jewelry & Contemporary Sculptural Practices

Mentor: Masako Onodera

… love does not cling to an I, as if the You were merely its 'content' or object; it is between I and You… Relation is reciprocity. My You acts on me as I act on it.

-Martin Buber, I and Thou

Inspired by my relationships, I look at physical and mental closeness through my work and how it differs with friends, family, and lovers in my life. I create new spaces for connections between people by exploring physical distances that relate to existing mental intimate spaces. I address this space by constructing large scale sculptural apparatuses that encapsulate human intimacies.

In making the work, I look into myself to find what mental and physical intimacies I share with others in order to decide the performers' proximity. I write often about my relationships to understand better what they mean to me; this is my type of research. I highly value the equality and trust between connections that I continually find. For this body of work, it's essential for me to show that all of the pieces have this constant reciprocity. When these apparatuses give agency to the wearers to be closer together, they have a more accessible mental intimacy. They create a need to hold, or give attention, and are allowed to do so in such proximity. It is this attention and care I want the viewer to feel. With wearers being farther apart, they're forced to make this intimate relation work over distance. Their comfort is strained, and efforts are tested; these pieces require the most strength and trust to continue their intimacy. It is the balance and reciprocity in emotions that allows these long-distance relationships to work. It is this will and longing I want the viewer to feel.

In considering my materials, I exploit stretchy fabrics creating an intensity and intimacy due to the pushing, pulling, and the strain put on these materials to be flexible. These colors relate to the body and internal anatomy creating a stronger bond from apparatus to wearer. Yellow in relation to the body is a sign of disease, and a reminder to me of the lines in the middle of the road. How five-hundred miles or so feels like an incredible distance and weight, and my connection at this length suffers from heartache. The connection is sweet, two trying to see each other, yet the means are bitter due to the distance. Keeping in touch seems like an impossible feat,

yet that same yellow is the intimacy that stretches the distance and connects them. Although most of these pieces I relate to my relationship with my boyfriend, it's not exclusive to just us. I feel a longing for my parents as I am away at school, and I feel I can talk, and let things off my chest with my girlfriends in the same respect. I had a vision for the pink chest tube piece after I had a conversation with my best friend about her boyfriend troubles. I took that weight for her, allowed her to breathe, and she's done the same for me. These mental intimacies are not exclusive to a sexual relationship, and I believe my work encourages the viewer to think differently about that.

These works are also centered around trust and balance. As stated before, it is critical to have reciprocity in my pieces. In creating these works, allowing for an equal back and forth expression, the performers can have confidence in each other that they'll be there to catch the weight, and be there to embrace.

I need you, here and now (exhibition shot from rapport)
2018
knit fabric, velcro, thread, elastic, performers
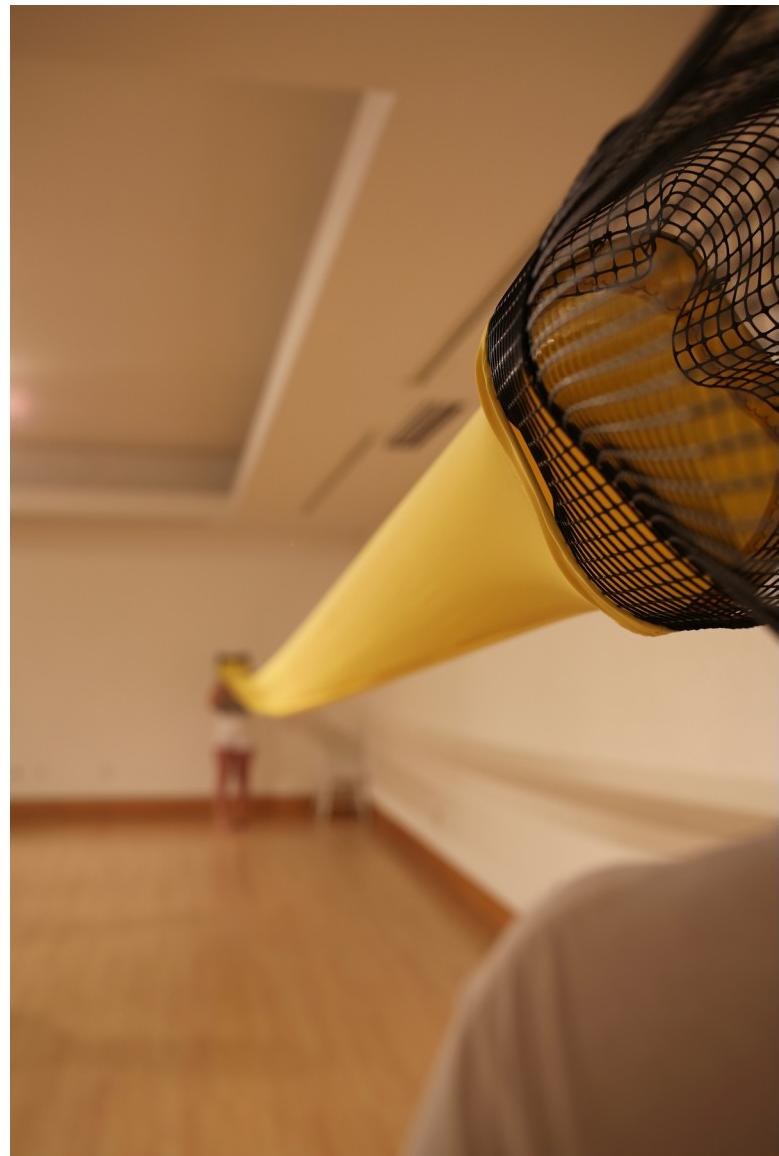
from WI to KS (exhibition shot from rapport)
2018
knit fabric, thread, fencing, performers

my neighbor, my friend (exhibition shot from rapport)
2018
fabric, thread, concrete, fencing, aluminum, wood, performers

Us

Sarah Bennett
Senior, Studio Art - Ceramics and Art Education

Mentor: Charles Matson Lume

the body, a barrier to us (exhibition shot from rapport)
2018
knit fabric, thread, performers

Clay is flesh and bone. It is malleable, soft, flexible, and impressionable. It has the ability to wrinkle and pucker and stretch, but after living through the processes of creation—fabrication and firing—it reaches a point of perpetuity. It becomes a solid structure, rigid and resolute in its stance, feeling no fear of rejection and no need to alter its appearance. The final physique of the clay body emerges with an adamancy that can only be reached by enduring the intensity and severity of water and fire.

My ceramic sculptural work takes inspiration from the human body's associations with the vessel form and organic materials. We address different areas of pottery in terms of human anatomy—pots have bellies, feet, shoulders, necks, and lips. Why must we project ourselves onto that which we create? The sculptural forms I construct use wheel thrown pieces that are connected and combined to build abstractions of the human body. They contain references to fat, skin, and bone, while also invoking the volume and vertical structure of pottery. These forms exist with no concern for judgement, despite their surface imperfections and lack of symmetry. There is a push and pull of the effects of gravity on the body—sagging of skin and creases on the surface that develop with age. While areas droop and slump, they seem to have a skeletal structure underneath that maintains the body's integrity. This gives the sense of youthfulness due to the lifting of the forms, which almost contradicts the age that is shown in their weight. There is evidence that these bodies have endured long, demanding lives, and yet they continue to persevere.

The finished glaze work elicits the softness of skin, prompting a temptation to touch them to determine if the surface is solid or malleable. Some areas are smooth while others are bumpy, wrinkled, or scarred due to stretching of the clay, giving a wide breadth of the different textures and qualities that flesh may contain. The hue of the glaze is soft as well; it creates a glowing effect where certain areas present a pinkish warmth. Iron deposits from the clay body peek through in spots to create freckles on the skin. Without actually replicating skin, the surface becomes a kind of flesh, containing the perfections and imperfections that occur with the evolution of the body, and showing the progression of life throughout each individual piece.

I use fabric to form relationships between pieces and give the agency to individuals to allow them to obscure or reveal as much of themselves as they wish. Ceramics has a long history of functionality, and the fabric acts as a barrier to the

viewer. It evokes a desire to see more of the form, but ultimately viewers must accept the amount they are given. This alludes to clothing as well, questioning the areas and amount of our bodies we are willing to show. The majority of the fabric uses different shades of green that resemble earth tones and embody elements of nature. There is a rawness in the material of the fabric that mimics the rawness in the use of the clay. It is not overly manipulated, and it is allowed to drape and hug the forms with little interaction from my own hand.

It is my belief that every person should feel the same assurance that my sculptures present, despite any flaws and blemishes that they may contain. The beauty of bodies is inherent in their ability to withstand a multitude of experiences, and as the body ages and endures, these are shown physically through the form and surface. It is easy to forget that humans are just as natural as every other being on the planet. I utilize the organic structure of the body to give the impression of various forms in nature, and allow viewers to connect their bodies with the entities that exist all around them.

"Black Ties (nude)"
ceramic
16″x12″x14″

"Black Ties"
ceramic and mixed media
55"x16"x16"

"Harmonious Will"
ceramic and mixed media
57"x13"x14"

"Visceral Tendencies"
ceramic and mixed media
64″x34″x28″