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The Undergraduate Research Journal at North Carolina Wesleyan College

Fall 2021 | Issue 3

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Editors' Note

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OUR MISSION. *Omnium, the Undergraduate Research Journal at North Carolina Wesleyan College*, is a collaboration between the Writing Program and the Writing Center at NCWC, providing our undergraduate students with the opportunity to explore the major genres of academic writing, join in scholarly conversations, share their ideas, perform original research, and see their work published in a professional venue. *Omnium* also serves as a teaching resource for NCWC faculty—and faculty at other institutions—as the essays and research articles published here reflect the skill and knowledge of real students at various stages of their academic careers, from first-year composition essays to projects created in senior seminars. The materials lend themselves well to in-class discussion, analysis, and emulation, and we hope that students will be energized when they realize that there is no single arcane secret to writing well. All it takes is practice, motivation, and direction.

Welcome to the third issue of *Omnium*, a joint effort of the Writing Program and the Writing Center at NCWC. This journal collects written work by promising undergraduate scholars. We hope this issue, published in the summer of 2021, finds our readers—our students, colleagues, and all who might chance upon our publication—in good health and spirits. The world has endured more than a full year of the COVID-19 pandemic by now, and readers will note that the political and public health crises of the past year have left indelible traces in our students' work.

We invite our readers to enjoy and learn from the fifteen new essays collected here and also encourage teachers in any discipline to use these essays as models in their own courses. Please use attribution when you do so.

Our thanks go to Drs. Jason Buel, Mary Jackson, Chad Ross, Rachel McWilliams, George Whitwell, Bennie Felts, and Jackie Lewis for reviewing the papers in their respective disciplines and for doing so speedily and conscientiously. Our colleagues aided us in selecting the most outstanding essays in each of the traditional five categories, following the structure of our College Divisions: First-Year Composition, Humanities, Social Sciences & Education, Business & Computer Information Sciences, and Natural Sciences & Mathematics.

The *Omnium* Editors,

Doreen Thierauf
Keely Mohon-Doyle
Julie Perino
Margaret Love
Assistant Professors of English,
North Carolina Wesleyan College

Photo by cottonbro

CONTENTS

1 EDITORS' NOTE

FIRST-YEAR COMPOSITION

4 Magical Rhythms: They Can Control the Way You Think by Stephen Perry

9 Speed Demons by Amari Kiere Carswell

11 The Importance of Interpersonal Social Interaction by Naomi Shane Pilapil

HUMANITIES

16 Vestal Virgins: The Price of Cultivating Purity Culture in Modern-Day America. by Bijaya Lamichhane

25 Generational Attitudes Toward Digital Feminism: Is Social Media the Path to True Intersectionality? by Mary Catherine Davis

32 A Social Rollercoaster: Power Plays, Hierarchies, and Love in *Jane Eyre* by Grace deMontesquiou

SOCIAL SCIENCES & EDUCATION

41 Effects of the Written Emotional Disclosure Paradigm on PTSD and MDD Symptoms by Maria Laura Padron

56 Cognitive Behavioral Therapy Treatment for Irritable Bowel Syndrome: A Systematic Review by Angela Groeneveld

62 The Impact of Human-Animal Co-Sleeping on Human Sleep Quality by Rebecca Mitchell

BUSINESS & COMPUTER INFORMATION SCIENCES

68 Gender Segmentation in Marketing and How It Affects Consumers by Mary Catherine Davis

74 Technology and Insurance in the U.S. Healthcare System by Madison Gill

76 The Cost of Healthcare and How It Affects the Elderly by Kataryna Wallace

NATURAL SCIENCES & MATHEMATICS

80 Cell Death Mechanisms in X-Linked Retinitis Pigmentosa with Mutations in the RPGR Gene by Maria Angelica Padron

84 Coronary Artery Bypass Graft Surgery and the Role of Exercise by Alissa Avery

89 Preexisting Conditions Associated with Severe COVID-19 by Isabella Lynn

FIRST YEAR COMPOSITION

Photo by LinkedIn Sales Navigator.

STEPHEN PERRY

MAGICAL RHYTHMS: THEY CAN CONTROL THE WAY YOU THINK

INTRODUCTION

Did you know that, in 2016, Spotify was streaming nearly 800,000 tracks a minute ("How Many Songs")? With the average song being around four minutes long, this is enough musical content to keep you busy for fifty-three thousand hours, or roughly six years of nonstop listening, all being played in a single minute. With the massive amount of musical content we consume daily, you would most likely assume that we know a great deal about music. While this is true to an extent, there is still a lot that we do not know and a lot that is still debated among music scholars. One of the biggest debates in musicology, the study of music, is music's relation to cognitive function, and whether music is beneficial or detrimental to cognitive and task performance. Many scholars have researched the possible connection between music and the human brain, and I have used that research to determine how music, rhythms, and beats affect us. I have broken down my research into its key components which are the connection between music and the human brain, factors that impact this connection, the positive and negative aspects of this connection, and how this connection is already being used today. Through my research I have concluded that there is an observable connection between music and the brain that can be utilized to improve cognitive function as well as influence productivity, workflow, and behavior.

BACKGROUND INFORMATION

The first step in understanding the connection between music and the human brain is to have a basic comprehension of two things, the brain and music. Human brains are exceptionally complex and still are not completely understood by neuroscientists. That being said, we have begun to understand the way our brains function, and, when looking at the brain while music is playing, there are some sections of the brain that are more important to look at than others. The frontal lobe is the part of the brain that is responsible for thought, decision-making, and planning. The temporal lobe is used in emotional and language functions, as well as to determine what it is we are hearing at any given moment. The hippocampus is responsible for making and receiving memories. And, finally, the cerebellum controls motor functions and movement. All these sections of the brain are affected by music in some way, and many of them run at a higher rate while listening to music.

Many terms in music have varied definitions, or even no singular definition at all, the easiest example of this being music itself. Some argue that any type of beat following a rhythm can be called music, while others believe that, without a beat, sound is just noise. For this reason, the term music will be used to mean any type of sound that fits a specific beat and causes some form of groove. Another example of this is the aforementioned term groove, and the term will be used to mean the way a beat feels, as defined by FreeMusicDictionary ("Groove").

THE CONNECTIONS BETWEEN MUSIC AND THE HUMAN BRAIN

When listening to music, the aforementioned parts of the brain are affected. According to Johns Hopkins Medicine, an organization consisting of multiple universities and hospitals, music is a good workout for the brain. The researchers at Johns Hopkins even go as far as to equate it to going to the gym and say that "There are few things that stimulate the brain the way music does" ("Keep Your Brain"). This means that not only is there a connection between music and the way our brains function, but that the connection is impressively strong. The brain is doing more than we think while we listen to music. Sound is a vibration that is picked up by our ears and converted into an understandable signal by our brains. Music is often complex with multiple sounds, melodies, timbres, and rhythms happening all at once, and our brain is receiving, converting, and comprehending all these different things at one time.

Scans have shown that several parts of our brain light up when listening to or performing music. An fMRI scan can show active regions of the brain in real time ("Magnetic Resonance"). This means that when an fMRI scan is

performed, the resulting image will show the activity in the brain in real time and allows researchers to compare it to normal levels of activity. An fMRI scan (**Fig. 1**) performed by the University of Southern California's Brain and Creativity Institute shows the brain of a participant listening to music (Rubin). In the scan, you can see the areas of the brain with above-average activity (red) and below-average activity (blue). This suggests that our brains are not only being affected by what we are listening to but that they run at above-average levels in some places as a result. This is just one of many scans that show a visible connection between music and brain activity.

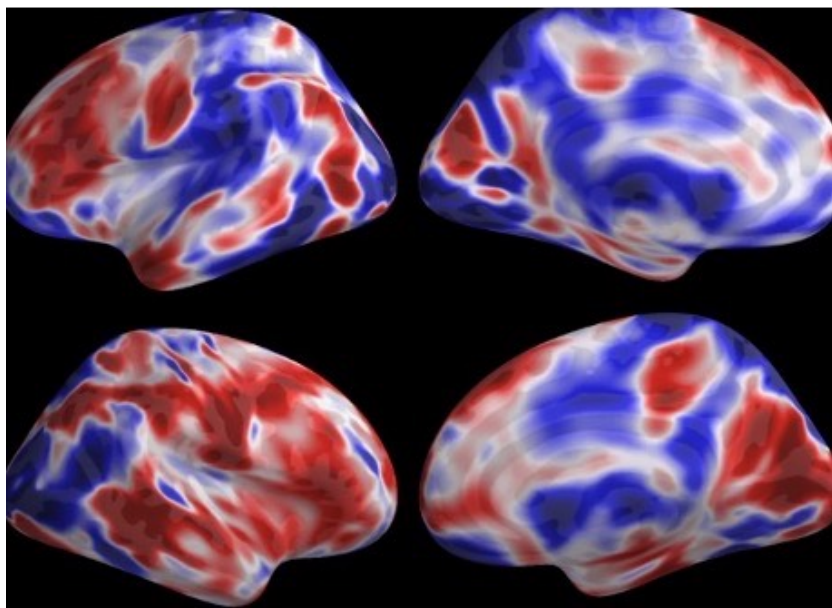

Fig. 1. Rubin, Peter. "How Does Music Affect Your Brain?" *YouTube*, *Wired* channel, 15 Mar. 2019. Image shows high brain activity (red) and low brain activity (blue).

Further proof of this concept is the connection between music, arithmetic, and even reading. A 2002 study by professionals in the field confirmed that arithmetic ability in young children was positively affected by musical expertise. This makes sense, seeing how music at its core is nothing more than a sonic rendition of basic mathematic principles. Because of this, playing, reading, and understanding music on more than a basic level requires an understanding of math, mostly fractions. With each measure of a song being broken down by beats and then further broken down into notes that take different amounts of "time" in those set beats, it is understandable that those who can properly comprehend music will have a stronger arithmetic ability. This same study also claims that the same correlation can be observed between music and reading, and in some cases, the correlation was greater than that between music and arithmetic capabilities (Shellenberg 503).

Music has also been shown to impact our emotions in various ways. Shahram Heshmat, in an article for *Psychology Today*, claims that music can influence the same areas of the brain as sex, food, and drugs. Heshmat also explains that music can influence memories, which can lead to an emotional response that depends on what memories are stirred up. Another excellent point is that music can incite a specific emotion based on the tone of the piece, an example being a song with a slow tempo in a minor key causing a calm, relaxed, or sad mood. The inverse is a song with an upbeat tempo played in a major key causing people to feel happy, energetic, and motivated. Heshmat also mentions escapism, which suggests an interesting parallel between music and film. Some of the world's most popular movies are fantastical in nature because people enjoy watching a movie that can take them out of their everyday lives, and, according to Heshmat, the same is true for music. This escapism can be used to help regulate and control mood by allowing the listener to relax and remove stress temporarily. The connection between emotion and music also strengthens the link between music to cognitive function, as it can often strongly depend on the emotional and mental state of the individual in question (Heshmat).

WHAT INFLUENCES THIS CONNECTION?

When looking into the many factors that can impact the connection between music and the brain, the most important ones to look out for are arousal and the task at hand. Arousal is the state of being stimulated physically or psychologically (Hohmann). This means that the more something stimulates an individual, the higher levels of arousal it causes. This can be a bit of a problem regarding a piece of music's effects on cognitive function (Haake 110). However, like many of the other influences that will be listed here, it can be used to increase cognitive function if utilized properly. Certain tasks are going to respond well to different levels of arousal. When performing physical and visual tasks, listening to music that causes high levels of arousal will lead to an increase in output, as shown by experiments performed by J. G. Fox and E. D. Embrey. In these experiments, people were tasked with finding defective parts in a group of one hundred as they came by on a conveyor belt. Many of the tests started in silence and then had music gradually implemented as the tests went on. In some cases, the subjects could pick their music while, in others, they were not allowed to select music themselves. In every experiment, there was an

observable increase in faulty part detection rate when music was introduced, and the results improved further when listening to music chosen by the participants (Fox and Embrey). This being said, high levels of arousal can also be detrimental to tasks that require deep understanding and processing, such as reading.

Another important factor influencing the connection between our brains and the music we listen to is the individual's experience and musical aptitude. As hinted at earlier, when talking about the connection between music and arithmetic, someone who has a better understanding of music is more likely to see the benefits of listening to background music while working. This does not mean that people who do not understand the ins and outs of music cannot reap the benefits of background music, it just means the effects may not be as prominent. It seems that utilizing music to increase cognitive function does not work like a light switch. Rather, it functions as any other skill would and requires training. People who normally work in silence should not be expected to suddenly increase work output by putting music on in the background, as this would drastically alter their normal working conditions. Instead, it would be more beneficial to slowly introduce music into the background and to experiment with various genres, moods, and volumes, as done in the experiments listed in the previous section.

Genre and personality can also influence the impact of the correlation we see with our brains and music. The first one is obvious, as some genres naturally cause higher levels of arousal and can be attention-grabbing, which can be harmful to productivity in the long term. This can be observed in a study conducted by Manuel Gonzalez and John Aiello where experiments showed that the more complex a piece of music was, the more it tended to hinder an individual's performance if they stated they had a preference for external stimulation (Gonzalez and Aiello 6-8). **Fig. 2** shows the impact of complex rhythms on test scores as well as how personal preference, or personality, can impact them as well. The impact made by personality is a little more complicated, however, with several factors at play. A study looking into how personality affects musical preferences determined that most people can be put into one of two categories, each of which leaning towards a particular type of music. Empathizers tended to choose more mellow music, while sympathizers tended to choose more complex pieces (Greenberg 16-18). This can feed directly into the previous statements about genre and complexity impacting the correlation between rhythms the cognitive function.

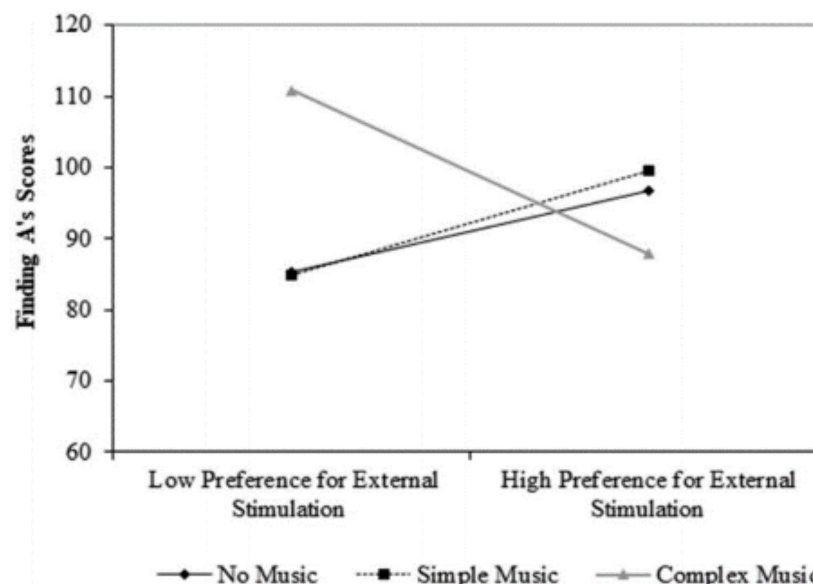

Fig. 2. Gonzalez, Manuel F., and John R. Aiello. "More than Meets the Ear: Investigating How Music Affects Cognitive Task Performance." *Journal of Experimental Psychology*: vol. 25, no. 3, 2019, p. 7. This graph shows how different levels of music complexity affects task performance in individuals with and without a preference for external stimulation.

IS THE CONNECTION POSITIVE OR NEGATIVE?

Arguments for this connection have been made both ways; however, in my research, I have determined than many of the negative aspects of this connection can be used in such a way that turns them into positive one. Some of the best benefits of this connection are increased productivity, a decrease in the pain felt by people after surgery, decreased blood pressure, reduced anxiety, and other positive outcomes (Shellenberg 508). Some of the biggest negative aspects of this connection are easily debunked. Some believe that listening to music at work is unprofessional; however, if it is turned into an office-wide activity or made known by everyone that it is acceptable and encouraged by management, it would be no different from any other tool used to aid employees throughout their day. Others think that all music is detrimental to focus and workflow, but this could not be further from the truth, and if people were better educated on the effects of music on productivity, they would understand that music can often be beneficial, given the music being played is appropriate for the task at hand. That being said, employees should not be forced to listen to music, as this can lead to a stressful working environment for some.

HOW THIS INFORMATION IS BEING USED TODAY

Music therapy is the use of music to help an individual deal with anxiety, depression, and substance abuse ("Music Therapy"). Louisa Hohmann wrote a paper about how music therapy can be used as a treatment for substance abuse disorders. In her paper, she includes several long charts outlining the effects music can have on various moods and mental states. Hohmann reported that music therapy increased the subjects' willingness to participate in therapy, their overall attendance, a 51% decrease in anxiety, and a 42% decrease in anger. Music therapy also increased happiness and decreased feelings of fear and distrust (Hohmann 11-12). While the test determined overall that Hohmann and her colleagues could not tell a definite benefit to the use of music therapy as opposed to more traditional forms of therapy, they likewise did not conclude that music therapy is inferior to traditional therapy. It is hard to deny that there were ways in which music therapy was doing good to the individuals in question.

Music is used in nearly every form of advertising we come across, and for good reason. Not only does music impact our emotions, but it can shape buying behavior as well. In the late 1990s, a study into the relationship between music and consumer behavior determined that people were more likely to choose one wine over another based on the type of background music played. The conclusion was made that a wine from a certain country would sell better if the music that typically comes from that country is being played (Shellenberg 512). Another good example of how music can affect buying behavior is shown in a short video on YouTube's "The Art Behind Marketing" channel. The video shows an older Chevrolet ad with a sad tone, then plays it again but with a different type of music with an upbeat tempo and tone. After watching the video myself with twenty-five of my peers, we determined that the version with a happy tone would influence us more and make us more likely to consider the car shown in future car-buying decisions ("The Power of Music").

Another way music is being used today is to keep morale and productivity high at Google, one of the world's most profitable companies. Google is often looked at as an employer that anyone would be lucky to have, with a laissez-faire management style and seemingly endless benefits available to their workers. It is obvious that employee morale is important to the higher-ups at Google, and they have started

Photo by Charlotte May

implementing music into the everyday routines of hundreds of their employees for this specific purpose. Google has set up areas to listen to music in several of their offices and have even begun making music lessons available to employees (Meyer 98-99). Marcel Meyer argues that strategies like this can be used to make a business or organization more ethical.

HOW THIS INFORMATION IS RELEVANT TO YOU

Music has the amazing ability to influence the way we think, feel, and behave. Not only does this connection exist but it is observable through experimentation, analysis, and various brain scans. Music can improve cognitive function when performing tasks such as mathematics or physical labor, but can also hinder performance when performing tasks such as reading. This information can be used by anyone to improve workflow. It can be used by a student or researcher to optimize workflow and efficiency, or as a way of stepping back and taking a break to gather one's thoughts. This information can be used to know what types of music to avoid during a particular type of activity to avoid slowing workflow. Knowledge of how music works can be used by business owners to influence consumer behavior, and inversely can be applied by everyone to avoid being tricked into making unnecessary purchases. One of my personal favorite uses of music, however, is to regulate emotion. I find that listening to music while I work is beneficial but switching the style up during a break and relaxing is even more beneficial. By compiling the information from multiple sources in an easy to digest way I have given the reader access to information that otherwise might be overwhelming. I encourage readers to slowly incorporate background music into their work to increase productivity and work satisfaction. There is a lot we still do not understand about music and doing your own research can help fill in the gaps in our collective knowledge. ❖

Photo by Charlotte May.

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The citation system used in this essay is MLA 8th.

AMARI KIERE CARSWELL

SPEED DEMONS

Speeding. We have all done it. Some of us have just been unlucky enough to have gotten caught. And we all know *that* is not fun. Most people speed because they want to arrive a few minutes early at their destination. Some speed because they are late and hope to either be on time or a little less late. Some people just speed because they, like Rickey Bobby, want to go fast. Police officers are tasked with upholding the law, which includes traffic laws. Speeding happens to be one of those laws. Every year, one in six drivers receives a ticket for speeding. In the year 2020 alone, there will be roughly 41 million tickets handed out. The amount of money spent on speeding tickets alone every year totals about eight billion dollars (Davis). That is a lot of money. Speeding is defined as driving faster than the posted speed limit. This seems easy to follow right?

Wrong! It is quite the opposite if you ask most road users. Why is speeding such a huge problem? Most people use a passed-down rule as a guide to speeding. You have probably heard you can go up to five miles per hour over the limit and still be safe from a police pull-over. This may be true in most instances. Some cops even say they won't pull someone over for under seven or even ten miles per hour in some cases. But you are still breaking the law even if such kind of speeding is widely considered to be okay. So, how do we get around this problem? Of course, you could drive the 35- or 50-miles-per-hour limit and avoid breaking the law altogether. Some people achieve this goal and adhere to the exact speed limit or maybe even stay under. Now, I know you can think of a time when you were behind someone who drove at the exact speed limit and not one mile over. I bet you wanted to run them off the road.

Many Americans think the speed limits should be changed. To change the speed limits in America, you would have to go through the U.S. Department of Transportation, more specifically, the Federal Highway Administration. But there is still the question of how we determine a safe speed that everyone can agree on? The speed demons in our society will more than likely tell you that 80+ miles per hour are fine, while conservative motorists will say that the current speed limit is best.

Well, speed limits in the early '70s were set by the country's shortage of gas. President Richard Nixon saw this as a problem and agreed to a national speed limit of 55 miles per hour. In

Photo by Aleksejs Bergmanis.

the '80s, when fuel became more readily available, the national speed limit was then changed to 65 miles per hour. Before 1995, the speed limit was governed by the federal government. But after a law was passed by Congress in 1995, the regulation of speed limits was handed back to individual states. After this, thirty-five states changed their speed limits to 70 or above ("The History of Speed Limits"). Today, cars are faster than ever, and people want to use their cars to their full potential. Many wonder, what's the point of buying a car with a top speed over 200 miles per hour when most roads restrict you to 70 miles per hour or less? This speed is still very low compared to the top speed of cars today. How do we allow people who want to drive fast to do it safely while people who don't want to drive fast share the same road?

We could look overseas for our answer. What do I mean by this? Well, in some parts of Europe there is no speed limit at all. I know that might sound made up or untrue, but I can assure you it is true. In the countries of Germany, Austria, and Switzerland, highways are called Autobahn. The Autobahn is 12,996 kilometers or 8,075 miles long ("Driving on the Autobahn"). There is no speed limit on this road; there is instead a "speed recommendation." The recommendation for speed is 130 kilometers per hour, or 80 miles per hour. When I say recommendation, I mean it, because if you were to drive at 80 miles per hour you would be passed as if you are standing still. Most people who use European highways drive much faster.

One reason for this is because of the way that they are taught to drive. In the United States, it is much easier to take a driving test and get a license, making American drivers much more distracted and relaxed behind the wheel. Drivers in Germany are much more aggressive and attentive behind the wheel. In the U.S., you can get a full driver's license at 16. In Germany, you can only operate a motorcycle at that age, then, at 17, a vehicle with an adult, and then, at 18, you can finally obtain a full driver's license to drive a vehicle on your own. That being said, driver education is taken much more seriously in Europe.

Another reason drivers feel more comfortable driving fast on the Autobahn is because drivers follow the rules of the road. In the U.S., rules like sticking to slow and fast lanes are seldom followed by drivers. But in Europe, on the contrary, as a whole, drivers follow the rules of the road. One rule the Autobahn uses well is slower vehicles have to keep to the right. Drivers in trucks, vans, and slow-moving cars keep to the right to allow faster drivers to pass safely and it is illegal to pass someone in the left lane when you're driving on the right ("Driving on the Autobahn").

These rules allow drivers on the Autobahn to drive faster than the recommended speed limit and to do it safely. The number of deaths on the Autobahn's sections with an enforced speed limit was higher than the sections without one by 26%. In 2017, 409 people died on the German Autobahn (Bennhold). In comparison, nearly 38,000 people die every year in the U.S. with much slower speeds on the highways. This statistic shows that proper education and cooperation of drivers in America will lead to fewer deaths and higher speeds. If the U.S. and other countries around the world set better standards for the safety of their highways, driving would be much safer. This could save over 38,000 lives a year.

Innovations are made every day to make vehicles safe—why not the method used by vehicles to travel? This is one way we can strive to make everyday life safer for all. ❖

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The citation system used in this essay is MLA 8th.

NAOMI SHANE PILAPIL

THE IMPORTANCE OF INTERPERSONAL SOCIAL INTERACTION

1. INTRODUCTION

Social interaction is part of basic human nature. It is a human necessity to practice socializing, and normally we start doing it when we are at in daycare and school. Technology has developed quickly, and I believe that there have been a lot of changes over the past ten years as we adapted to a new environment. It is undeniable that technology has helped us by making life so much easier. For example, communication could be difficult in the past. Sending a letter could take days and weeks, unlike today when an email will arrive in someone's inbox in just a second. I believe that in life, communication is essential to making a lasting connection with someone. It is so simple to communicate now and to even make a connection with a stranger without ever meeting in person. This indicates how powerful technology can be. However, every good thing comes with a downside. The abuse of mobile phones, using them too much, has caused a bad habit in many, leading to mental health issues that cause anxiety and depression.

The importance of interpersonal social interaction, especially at school, plays an important role. An active social life leads to "increased physical health, boosted immune system, a more positive outlook on life, improved mental sharpness, and longer, happier lives" ("Five Benefits"). This is a great benefit for everyone. It would help us to have a better life and improve our mental health. So, this evidence is valuable because it suggests that social interaction can be beneficial. In addition, "interacting with other people has proven to be quite effective in assisting the learner to organize their thoughts, reflect on their understanding, and find gaps in their reasoning" (Okita). This shows the importance of social interaction for school performance. It is great to practice it daily rather than keeping your own thoughts to yourself.

In this paper, I will discuss how restricting cell phones used in school can benefit social interaction. I will also explain different perspectives and opinions people have on this topic. This will include the development of mental health issues and cyberbullying. The purpose of the paper is to make people aware of the importance of interpersonal social interaction. This is an important topic to discuss for my generation. Growing up, I have seen the evolution of mobile phones and how they affect the people around me. I observed that phones have changed how we interact with and treat people. In my experience, mobile phones are a big distraction during social interactions, especially at school, that can become a habit that causes disconnection from each other.

2. BACKGROUND

Did you know that "most people check their phones 58 times a day? Thirty of those times are during work hours" (Zalani 5). As shown in **Fig. 1**, it's surprising to think how much time we dedicate to these technologies. Sometimes we forget to live in the present because we are more focused on our mobile phones despite the fact that mobile phones were introduced to enable better communication. It was a good thing for everyone who is living far away from their families, for example. In just one click, we can send text messages to see how other people are doing.

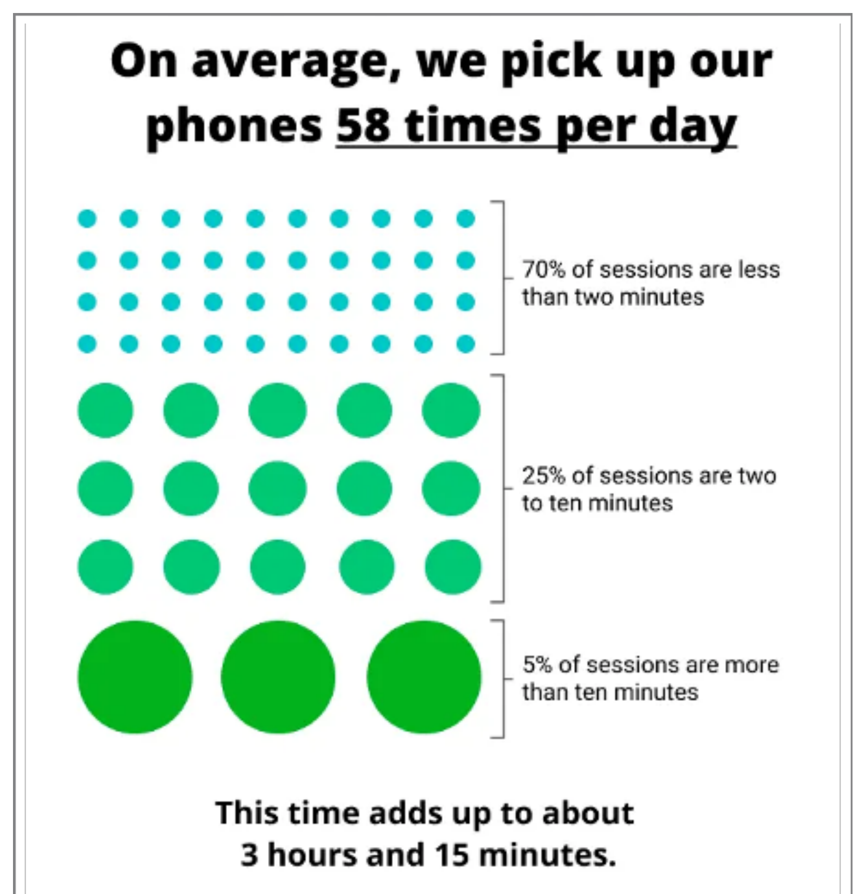
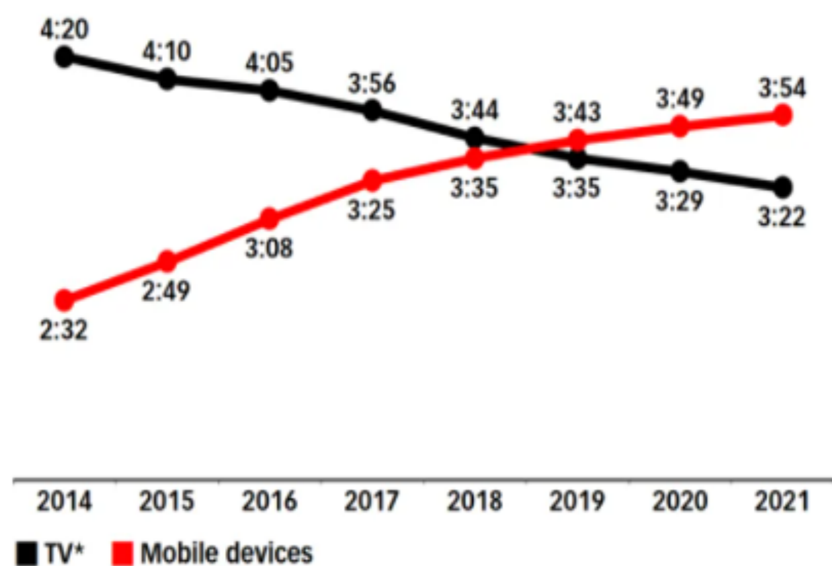


Fig. 1. Zalani, Rochi. "Screen Time Statistics 2021: Your Smartphone Is Hurting You." *EliteContentMarketer*, May 2020. This graph represents the average times people pick up their phones.

Fig. 2 shows that the time spent with mobile devices increases every year (Zalani 7). This is where the abuse of this technology starts. People will carry them everywhere they go even though it might be unnecessary. But nowadays we normalize it because our generation wanted mobile phones to be part of our lifestyles. For example, the first thing we pick up in the morning when we wake up is our phone to check our messages. Then the last thing we touch before going to bed is also our phone. It has reached the point where it has become a habit.

TV and Mobile Devices: Average Time Spent in the US, 2014-2021

hrs:mins per day among population



*Note: ages 18+; time spent with each medium includes all time spent with that medium, regardless of multitasking; for example, 1 hour of multitasking on desktop/laptop while watching TV is counted as 1 hour for TV and 1 hour for desktop/laptop; *excludes digital*
Source: eMarketer, April 2019

Fig. 2. Zalani, Rochi. "Screen Time Statistics 2021: Your Smartphone Is Hurting You." *EliteContentMarketer*, May 2020. This graph represents the average time spent in the U.S. from 2014-2021 on mobile phones and television.

As I mentioned, we often use our phones even when it's unnecessary. The graph below (**Fig. 3**), tells us the average time people spend on each app on mobile phones. We can see that phone use is very time-consuming for our daily lives, especially when considering that the "AMA found that even brief mental blocks can cause you to lose as much as 40% of your productive time" (Zalani 9). As a result, people are becoming less productive every year, although, the majority of us have normalized that already. So, the use of mobile phones ends up a part of our lifestyles now. With this information in mind, we can realize how we abuse mobile phones and how that abuse can affect us. Learning to limit phone use and giving importance to social interactions can improve our lives.

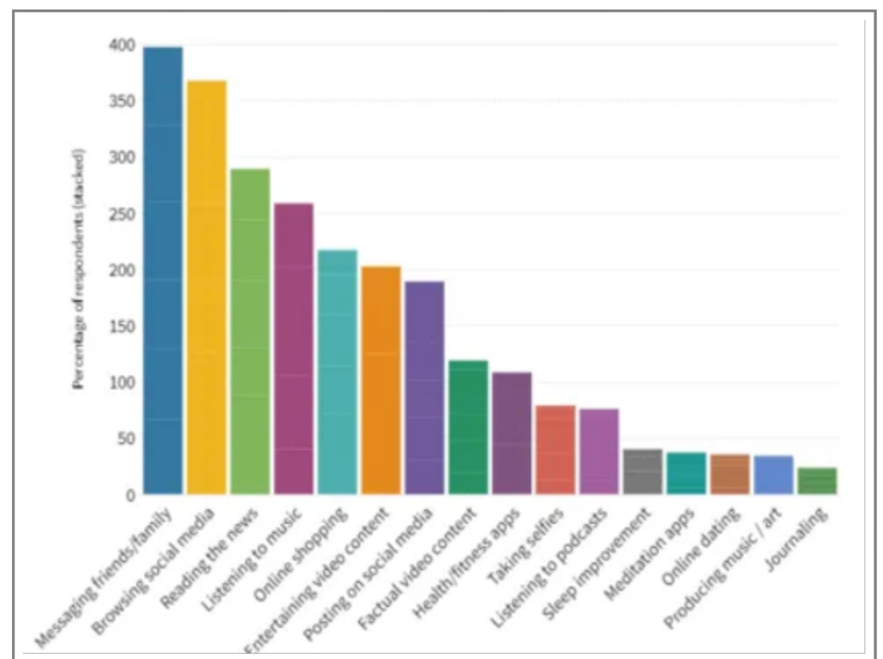


Fig. 3. Zalani, Rochi. "Screen Time Statistics 2021: Your Smartphone Is Hurting You." *EliteContentMarketer*, May 2020. This graph represents the time consumed with different mobile phone applications.

3. THE EFFECTS OF CYBERBULLYING THROUGH MOBILE PHONES

The negative effects of mobile phones are causing people to develop mental health issues and to create bad habits. Cyberbullying is also a good example of people relying too much on their phones. It is a common issue that we see on the internet and is defined as the use of electronic communication to bully a person, typically by sending messages of an intimidating or threatening nature. I consider this as one of the negative effects of mobile phones at school. Most students have been victims to cyberbullying, and that needs to stop. Victims are likely to stay silent after receiving threats and might not be able to ask for help. Therefore, it is a big issue that is made worse by our constant use of mobile phones.

According to Dennis Adams and Rebecca Angeles, "many will say, write, or show things that are too offensive, rude, or embarrassing to present in-person. Thoughts expressed on a mobile device are often those that would be put in a more civil way—or not expressed at all—in a face-to-face meeting" (Adams, and Angeles 36). This quotation gives us insight into how brutal cyberbullying can be. It is the problem where the cyberbully says mean things online and creates threats. The victim then will eventually feel intimidated and helpless. Why? Because when you post something on the internet it spreads quickly and it is hard to get rid of. It's like a virus passing from person to person. So, it is very hard to stop this case whenever it gets started.

Although technology helps create connection with each other easily, it can also

hurt someone easily. Just with a simple click of the hand, negativity and abuse can spread directly and without any hassle. The comments can be rude and offensive, and often people don't tend to think first before sending. The thing about cyberbullying is that the bully feels more confident because they can just easily lie about their own identity in social media applications. This causes the victim to start feeling helpless from embarrassment and false accusation.

4. THE RESULTS OF CYBERBULLYING THROUGH MOBILE PHONES

The results of mobile-phone cyberbullying can include mental health issues, such as anxiety attacks, low self-esteem, and depression. Mental health issues can be a serious problem for every individual. The tricky part about it is that not everyone can see or identify these issues. Eric Rossen and Katherine Cowan remind us that "every school has students who are struggling with mental health problems. Many face temporary challenges like conflicts with peers, divorce, deployment, or a death in the family [...] And still others are coping with emerging or chronic mental illnesses such as depression, generalized anxiety disorder, and emotional behaviour disorders." This passage makes it clear that students in every school are dealing with something difficult in their life. It is vital to understand each other by interacting and helping someone to open up. This will help them realize that they are not alone, that there are people who actually would like to help them. Schools may teach us academically, but it can also be a place where a student can seek comfort. That is why many schools promote programs to help their students' mental health. Because, in the end, school is temporary, but our mental health is for a lifetime. That is why it is important to see the importance of social interaction with each other at school.

Shaheen Shariff, in *Issues and Solutions for the School, the Classroom and the Home,* writes that "mental anguish from the social exclusion caused by physical and psychological bullying is sufficient to destroy the confidence of any adult, let alone a child, on whom it can have lifelong effects" (25). This sums up the effect of cyberbullying on the victim. It's not just making them feel intimidated, it can also traumatize a person for a lifetime, and nobody deserves that.

5. HOW TO PREVENT THE DEVELOPMENT OF MENTAL HEALTH ISSUES AT SCHOOL

The solutions that I propose include the restriction of mobile phones at school. This will help prevent distractions in learning and social interaction. This means that students can get to know their peers personally without the use of a mobile phones. Students can have more social interaction with each other. This creates a good bond and long-lasting connections. Therefore, by promoting mental health awareness at school and by having open therapy for all, students can help one another unite and feel less lonely. According to Rossen and Cowan, "schools are a vital part of the solution to meeting this need. In many communities, schools are the largest de facto provider of mental health services" (3). This passage suggests that schools are taking part of the responsibility for students' mental health. It is important for schools to take action because their students are their priority. Although their main duty is to teach, it is also vital to help students personally because many students spend more time at school than at home. School is where we grow and enhance our abilities and skills. Therefore, if we have to propose a solution for the students who need mental-health treatments, then the school would provide a helpful community.

According to McLoone et al., "within the spectrum of anxiety management programs available for administration in the school setting, different programs have been tailored to service different needs. For instance, some programs have been designed to provide a universal intervention for all children where the whole class is taught the requisite skills by their teacher, whereas other programs are designed for a selected group of high-risk students (i.e., targeted interventions) and are led by a school counsellor, psychologist, or specialist teacher" (12). This passage gives us an example of how a mental health program can be done, either grouped or individual, but both are very helpful. Treating anxiety or other mental health issues in school has a positive impact for students. It improves the students' ability to learn and succeed in life.

Therefore, by applying this solution through restricting the use of mobile phones we can change our bad habits and give more importance to social interaction. By treating mental health disorders such as anxiety, we will help students to get through the difficult times as fast as possible. The article "How Smartphones Are Killing Conversation," written

by Jill Suttie and Sherry Turkle, suggests that "conversation is the most human and humanizing thing that we do. It's where empathy is born, where intimacy is born—because of eye contact, because we can hear the tones of another person's voice, sense their body movements, sense their presence. It's where we learn about other people" (6). Social interaction is important. We can prevent the loss of all these skills by focusing on our presence during our conversations and knowing that we are all supposed to learn about people. It might be better to just forget technology once in a while, for example during dinner time with the family, making new friends at school, and learning new things.

6. CONCLUSION

Social interaction has always been part of human nature. It is where we make connections with someone and build relationships. However, the abuse of mobile phones has resulted in less social interaction. The research above contains the main insights into how mobile phones cause distractions, specifically for this generation. This paper discussed the major negative effects of mobile phones such as how they can change people and their habits. Mental health issues have been developed from abusing mobile phones. So, I proposed a solution to this problem that could help. Mobile phones are a big distraction during social interactions. Therefore, by restricting the use of mobile phones, we can bring back the attention to our social interactions. This will help us make better connections and have stronger relationships with people. Throughout this paper, I have pointed out the benefits of social interactions. I have also given enough evidence to support it from my scholarly sources. All of the issues I mentioned are problems that society faces collectively. We tend to create bad habits by abusing mobile phones, although the technology was introduced to make connecting to other people easier. As we know, mobile phones are a great way to communicate long-distance. So, by reminding people of the importance of social interactions and limiting the use of mobile phones during important events, people can build a better relationships with each other and improve their mental health. ❖

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The citation system used in this essay is MLA 8th.

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BIJAYA LAMICHHANE

VESTAL VIRGINS: THE PRICE OF CULTIVATING PURITY CULTURE IN MODERN-DAY AMERICA

INTRODUCTION

The advocacy for premarital abstinence in the United States is largely based on religious rhetoric that relies on teachings from Christian scripture. Purity teachings in this context include abstinence, modesty, purity pledges, and dating with the intention to marry. The American purity movement has always presented itself as a choice, and abstinence is neither politically nor religiously enforced. However, advocacy for abstinence takes many forms that remain influential in regulating women's sex and sexuality. The purity movement influences the public sphere in that it is backed by local churches, national organizations, as well as the government, especially on the state level. For example, the purity movement promotes Abstinence Only Until Marriage (AOUM) education instead of comprehensive sex education (Kay and Jackson 1). Public policies and federal funding that regulate sex education directly affect public health. It is important to deconstruct the effects of purity culture in America because it has far-reaching consequences in the fight for gender equality as the movement directly or indirectly upholds patriarchal values and institutions which often socially and economically benefit men who are at the top of the social hierarchy and who are responsible for constructing these ideals and setting these standards (Miller and Vance 8). The fourth-wave feminist movement in the wake of #MeToo has continued consequential discourse around the dangers of purity culture and its reactionary practices, especially in its engagement with survivors of sexual assault. Furthermore, reactions like #MeToo carry the conversations into the public health domain to address concerns about women's sexual and reproductive health and about how purity culture imperils policy proposals that are in favor of health care access for women and LGBTQ+ folks.

I believe the term "purity" in the context of sexuality is fundamentally wrong in itself. The term is profusely used within purity culture. For example, girls are asked to take "purity pledges" and attend "purity balls." It implies that individuals who practice chastity are somehow better than those who do not. Likewise, usage of the phrase "saving oneself" to signify abstinence until marriage conveys the superior moral practice of "saving" virtue rather than "wasting" or "losing" it. This overemphasizes sexuality which leads to higher levels of sex guilt for normal sexual behavior. It is almost as if the rhetoric around women's sexuality was purposely designed to guilt women into submissiveness. This linguistic style equates virginity with righteousness, virtue, and greater morality, and defines sexual behavior, even when it is consensual, as a shameful act that carries with it connotations of promiscuity, depravity, sin, and immorality. The problem with the purity movement arises when the rhetoric shifts from framing abstinence as a healthy choice to shaming individuals for their sexual orientation and other sexual preferences. These destructive ideas prevalent in the purity culture hold women accountable for men's dangerous

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sexual behavior like sexual coercion, objectification, the hyper-sexualization of women, and the demonization of female sexuality (Byers 5). In generally patriarchal societies, women often internalize the idea that their bodies are responsible for upholding sexual ideals and habits. Consequently, women are subjected to greater regulation of their bodily autonomy, sexual preferences, and unfortunately, sexual violence (Byers 5). Many ideas, laws, and policies, including dress code standards for school-aged girls, are premised on the practice of modesty and suppression of women's sexuality for the sake of men. This often leads to a culture of shaming or victim-blaming women for their choices, including clothing and voluntarily displaying their bodies and sexuality. When it comes to sexuality and sexual gratification, ideals that are normalized for men are often labeled as reputation-destroying for women (Byers 5). In this way, traditional patriarchal norms often erase women and minorities from important decision-making that touches their interests, protects them from harm and reduces their purpose to the reproductive function. Purity culture also marginalizes women and other sexual minorities as it limits their understanding of healthy sexual behavior from their partners and their reproductive health (Kay 12).

In this essay, I will delineate the effects of withholding information about contraception and healthy sexual practices, omitting information on affirmative consent, and consensual sexual habits on young American women in particular. I will argue that purity teachings instill sex guilt and other unhealthy sexual behaviors in women, along with dangerous sexual entitlement in men to trace the interplay between the purity myth and rape culture. To demonstrate how the purity movement advances institutional harm, I will source my evidence from current legislation and policies that affect women's sexual and reproductive health.

Women's integrity and dignity are often encapsulated by the abstract concept of virginity. This mentality fuels rape culture and the culture of victim-blaming where women and other sexual minorities are often blamed or blame themselves for being raped or assaulted (Suarez 11). These ideals are misogynistic, dangerous, ignore women's voices, and are destructive to their physical and mental well-being. This is also realized through internalized misogyny which often manifests itself in self-destructive behavior.

CONSOLIDATION OF THE PURITY MOVEMENT

American feminist writer Jessica Valenti attributes modern-day purity culture in America to the widespread cultural influence of evangelical Christianity (Valenti 22). The purity movement champions the sanctification of bodies through the prohibition of any sexual activity until marriage. Premarital sexual intercourse is often labeled as a sin. The purity movement consolidated itself in the late 19th century in the United Kingdom with the legislation of the Contagious Disease Acts that sought to eliminate rampant sex trade and prostitution to stop the spread of sexually transmitted diseases. Sex workers were heavily policed and unable to experience civil liberties as everyone else (Hall 39). In America, the purity movement solidified its base until the late 1950s and lost ground with the invention of birth control, the increasing advocacy of sexual liberation in the counterculture, and the rising cultural influence of second-and third-wave feminist movements. In response to the rapid paradigm shift that remodeled sexual ethics, leaders like Ronald Reagan began to advocate for the traditional nuclear family and greater regulations of available methods of birth control. Therefore, since the establishment of the sexual liberationist paradigm, the purity movement maintained a greater stronghold within American conservatism, making it religious as well as a political focus (Coste).

The implications of the purity movement are noticeable in politics. Purity focus is one of the main determinants of party ideology. It can be manifested through a lawmaker's stance as well as their comments on the preservation of tradition and sanctity of marriage. Whether it is a heterosexual lawmaker voting against gay marriage or giving their input on when or if abortion is permissible, purity rhetoric is always present in politics. That rhetoric is also prominent in the institutional intervention of sexual assault cases. It is not uncommon for police, judges, or lawyers to apply the narrative of an unblemished victim in cases of sexual assault or harassment. The same applies to schools, universities, or the workplace where administration often ignores victims of assault based on the model of the blameless victim. Policies can be unforgiving to vulnerable marginalized groups, specifically sex workers, transgender women, and those living in poverty.

With the support of conservative lawmakers who back abstinence-only education, purity teachings can expand into public schools where young minds are exposed and socialized into following unhealthy ideas about sex and sexuality. This is detrimental to the overall development of young children and affects people into adulthood primarily in the form of feeling guilt or shame when experiencing or wanting to express something as natural as their sexuality. The impact of purity thinking in legislation can advance to inaccessibility to reproductive health care, regulation of contraception, access to maternal health care, and unjust intervention that thwarts the overall advancement of women and other sexual minorities in the social hierarchy.

Therefore, to affirm that purity is solely based on religious doctrine would be to disregard its presence outside religion and its power to control and regulate women's bodies. Purity culture itself is politically reactionary. Its modern iteration consolidated because the Reagan generation reacted to demographic changes that threatened the majority status that granted them power (Coste). Over time, each generation in the U.S. has become less religious than the one before. Conservative lawmakers and religious leaders perceive this as a danger to traditional patriarchal values because the fact that the majority of Americans are no longer protestant Christians changes the power traditional institutions can yield. More and more people are becoming secular. However, this is neither reflected in the demographic makeup of Congress nor in the voting public (Taylor). Congress is designed to be a conservative institution that upholds tradition. Therefore, increasingly restrictive laws as, for example, the frantic limitations of abortion access across individual states during the past decade, a trend considered harmful by human rights activists and public health officials, are enacted by Congress to reestablish patriarchy and traditional values (Valenti 127). This also includes the increasing backlash to same-sex marriage and LGBTQ+ rights to preserve the sanctity of marriage i.e. heterosexual nuclear family values. In most states where women's reproductive rights are restricted, the legislative body comprises a majority of middle-aged and wealthy white men implementing their religiosity into law (Manning). There is often a large degree of separation between the demographic that is directly affected by these laws and the makers of such laws. It is not helpful that the voting demographic who consistently have a higher turnout rate is predominantly religious older white men. Purity culture is not representative of a majority of the U.S. population. Yet, its presence is prominent in everybody's life.

THE ABSTRACT CONCEPT OF VIRGINITY

Purity culture measures women's worth by the abstract concept of virginity. The problem with such a notion is that virginity is a social construct. In her book *Virgin*, Hanne Blank writes: "What we mean when we say 'virginity' is as ephemeral, as relative, and as socially determined as what we mean when we say 'freedom'" (5). By today's standards, virginity is used to distinguish morality, righteousness, and piety in women. Virginity is "lost" when an individual engages in sexual intercourse or when they get married. However, the concept of virginity is still ambiguous because it does not dictate whether or not sexual encounters that are not penetrative sex constitute losing "virginity." The term "born-again virgin" has been coined for individuals who have had sexual encounters in the past but have abstained until marriage after religious awakening. This usage suggests the artificiality and fungibility of the socially constructed concept. Therefore, equating morality and purity with a fairly metaphysical concept is harmful when applied to the universal law that includes diverse people, sexualities, and religions.

Evangelical Christianity overemphasizes the virginity and the sex life of young women. In doing so, it gives power to paternal figures who regulate women's bodies, whether at home, church, schools, or through legislation. The questionable custom of virginity pledges and purity balls by which young girls promise their fathers that they will preserve sex for marriage with their future heterosexual partners signify male ownership of women's bodies from childhood through adulthood. The importance of virginity is overstated from a very young age, way before young men and women possess even a remote understanding of sex and sexuality. Therefore, as critics of virginity pledges have pointed out, abstinence-only until marriage and purity teachings do not keep adolescents from having sex. Instead, they impede their understanding of safe sex and contraception. A 2001 study of virginity pledges and first intercourse found that virginity pledges substantially delayed first sexual encounters among adolescent participants. However, this trend was only significant for some numbers of pledgers. This phenomenon can be explained

by what the authors identify as an identity movement: "The pledge identity is induced and sustained through interacting with other pledgers in the community who distinguish themselves from non-pledgers by their public pledge and their commitment to the group" (Bearman and Brückner 870). Thus, the trend of the identity movement suggests that increased connectivity among pledgers is more valuable than religious teachings on abstinence and that they *need* a significant number of people who are not abstinent for their identity to work (Bearman and Brückner 869). Furthermore, the article also finds that a higher number of participants who broke the virginity pledge and engaged in intercourse neglected the use of contraception. I think these findings are important in demonstrating the drawbacks of abstinence-only education that preaches morality based on the idea of purity and is rooted in the identity movement. Since comprehensive sex education is necessary to develop healthy sexual behaviors, purity teachings negate efforts to minimize the consequences of early sexual activity like unwanted pregnancies, the transmission of sexually transmitted disease, abortion, and non-consensual sexual behavior. These consequences disproportionately impact women and other sexual minorities like the LGBTQ+ folks as well as survivors of sexual assault who have to physically and mentally experience the implications.

INEFFECTIVENESS OF ABSTINENCE-ONLY EDUCATION

Abstinence-Only Until Marriage (AOUM) programs are designed to mitigate sexual risk by delaying the initiation of sex or sexual activity. Federal funding of abstinence-only programs began in the early 1980s and remained consistent throughout the decades. In 2017 alone, Congress spent over $2 billion on the funding of AOUM programs (Santelli et al. 274). Proponents of the AOUM programs maintain that premarital sex is psychologically destructive for individuals. However, research has found no evidence to suggest psychological damage as a result of sexual intercourse between consenting adults. Furthermore, most abstinence-only education designs are primarily concerned with character and morality (Santelli et al. 274). Hence, they do not instruct adolescents and youths on crucial sexual health matters such as consensual sex, coercion, or sexual abuse that cause psychological trauma. It can be assumed

Photo by RODNAE Productions.

that endorsement for AOUM derives from the purity teachings that primarily functions to advance the evangelical movement. In 2013, 28% of American female students and 35% of male students received instruction on abstinence but no instruction about birth control methods (Santelli et. al 277).

Additionally, these programs also reinforce stereotypical gender norms in their lessons that supplement negative sexual health behaviors. AOUM programs are required to teach abstinence as a primary solution to sexual risk avoidance and may only discuss contraceptives in terms of their failure rates. This is a counterintuitive practice because sexually active youths are at higher risk of contracting sexually transmitted illness when information on the use of contraceptives is withheld or manipulated (277). An article published by the Society for Adolescent Health and Medicine argues that AOUM programs are "problematic from scientific and ethical viewpoints" (401). The proposition cited several studies that proved that the abstinence-only program failed to prove effective for several sexually transmitted disease prevention programs. Additionally, the paper also argues that these programs conflate "theoretical effectiveness of intentions to remain abstinent and the actual practice of abstinence" resulting in disparities between outcomes professed by proponents and the actual results (401). Another article on an updated review of U.S. policies and programs and their impact found that comprehensive sex education that critiqued gender norms and gender-based power imbalances were more likely to positively impact sexual and reproductive health (Santelli et al. 276). The ineffectiveness of abstinence teachings and their influence on creating gendered differences is well documented in scientific studies. Yet, abstinence-only education is heavily backed by churches and religious organizations.

Photo by fauxels.

SEXUALITY AND LAW: UNIVERSAL SEXUAL HEALTH PLANNING AND HARMS OF SEXUAL HIERARCHIES

The authors of a 2004 article that discusses sexuality and sexual health planning delineate the impact of sexual hierarchies in establishing effective sexual health policies. The article defines sexual hierarchy as the ranking of sexualities from most normative across regions to most stigmatized (Miller and Vance 7). Purity culture in America promotes heteronormative relationships in which couples abstain from sexual contact until marriage. This places traditional, heterosexual, married relationships at the top of the sexual hierarchy. The problem with the Christian sexual hierarchy arises when it ignores the reality of "non-normative" and complex sexualities in designing health programs or establishes coercive policies based on the difference that is deemed intolerable. In the article, the authors identify the greatest harm of sexual hierarchy in state regulation of diverse sexualities where sex law is unchanged but directly impacts different sexualities. Besides, the authors argue that there is no basis on which states regulate sexuality since law and that human rights, as a principle, should adopt one universal law that is neither vague nor undecided. Everyone should have equal access to sexual and reproductive health. Lack of access to sexual health care greatly affects women, low-income families, single mothers, POC, and LGBTQ+ folks. In this way, the purity movement eliminates women and minorities from the American progress narrative.

When it comes to laws relating to sexual assault and rape, purity culture often creates

laws favorable to the imaginary "blameless victim," a victim who is morally clean and sexually unblemished. This is a very harmful idea because it often makes intervention for sexually stigmatized groups, such as sex workers, sexually active women, and members of the LGBTQ+ community very difficult (Miller and Vance 9). The authors suggest the state adopt a proactive rights approach that conceptualizes sexuality across different genders and sexuality spectra and to relinquish the model of the blameless victim to make intervention all-inclusive. Stigmatizing complex sexualities is harmful to non-heterosexual identities and results in the creation of unjust policies and laws. This is also true for laws relating to sex education, the regulation of birth control, and reproductive rights. Purity culture promotes limited access to all things public health planners consider fundamental to reducing risk related to sexual behavior in adolescents. It is therefore evident that the movement does not intend to protect individuals from harm but rather to indoctrinate individuals to the purity propaganda that disparages women.

PURITY CULTURE AND REPRODUCTIVE RIGHTS

Today, abortion is one of the most divisive issues in American politics and among the most important deciding factor for voters during national and state elections. With the passing of supreme court justice Ruth Bader Ginsburg in October 2020, partisans started the single-issue fight on abortion and women's reproductive rights. Because abortion is anathema to many Catholics and evangelicals, women across the nation are anxious about the vacancy left by Justice Ginsburg's passing and the future of *Roe v. Wade*, the landmark supreme court case that legalized abortion in America (Schmidt). While some citizens are fearful of a *Handmaid's Tale*-like dystopian future, others are looking forward to the tenure of conservative judge Amy Coney Barrett who is steadfast in her devoutly Catholic beliefs which are reflected in her writings as a scholar. During her time as a law scholar at Notre Dame University, she published an article noting the dilemma Catholic judges faced when deciding on cases that are opposed by the Catholic church such as capital punishment (Coney Barrett and Garvey 303).

This is one of many examples that demonstrate difficulty in implementing the absolute separation of church and state. Although it is a constitutionally guaranteed right for citizens to expect the separation of church and state, there are religious obligations that prevent legal professionals and policymakers from making impartial judgments and policies. This conundrum is prevalent across many professions, and there are even exceptions in a place where professionals are allowed to withdraw themselves from any situation that directly conflicts with their morality (Green 86). While I think that it is necessary to honor everyone's religious beliefs regardless of their profession, it is also important to exclude religion from politics and jurisprudence. When it comes to women's reproductive rights, in particular, we see that there are a lot of gray areas in distancing politics from religion. "Conscience Clauses" allow health care providers to deny women access to health care, often framed in terms of reproductive care, based on their reservations about the patient (Valenti 126). Women's right to choose is systematically challenged at both state and federal levels. According to *The Guardian*, between January 2020 and May 2020, 378 abortion restrictions were introduced across the United States. Most of these abortion restrictions are placed at six weeks of pregnancy, typically even before women learn about their pregnancies. In response to states' response to limit abortion access, the U.N. Working Group on Discrimination against Women and Girls issued a statement expressing concerns that lawmakers are "placing women at risk, exacerbating systemic inequalities" in denying abortion care (Restrict Abortion Access). Despite facing backlash from the venerated intragovernmental organization, lawmakers remained steadfast in their decision to limit safe abortion access. Access to abortion and reproductive health care is a basic human right. It works to advance women's well-being and status. It provides women control over their bodily autonomy and, as a result, greater mobility. Therefore, it is unsurprising that proponents of purity culture want to regulate that power to maintain the status quo as is in the guise of adhering to religious principles.

PURITY CULTURE AND SEX GUILT IN WOMEN

There are gendered differences in the experience of sex guilt. A 2017 article studying sex guilt found that men experienced lower levels of sex guilt in comparison to women. Furthermore, the study also found that sex guilt is positively related to religiosity and religious behavior (Sommers 4). Sex guilt occurs when

engaging in sexual behavior is viewed as a violation of certain moral standards. Although men and women respond similarly to sexual stimuli, women reported experiencing higher guilt for responding sexually to those stimuli (Sommers 18). Traditionally patriarchal societies regard women as the guardians of morality. In purity culture, women internalize this role from an early age, generally before they have maneuvered through adolescence and formed their sexual identity. Failure to enact certain purity teachings that are upheld by religious institutions therefore produces higher levels of sex guilt in women. By the same token, women who experienced higher sex guilt are "more likely to embrace the importance of being a virgin" (Sommers 7). Across both sexes, people who experienced greater sex guilt were more likely to accept the myth that sex is dangerous and were less likely to make use of contraceptives or instruments for sexual stimulation (Sommers 6). There are many negative consequences of sex guilt, like avoidance of intimacy and lack of arousal, the perpetuation of the orgasm gap between men and women, ignorance about healthy sexual behavior, safe sex, and use of contraceptives, and, ultimately, coercive sexual behavior and rape culture. These consequences are manifested in varying degrees of psychological angst that harm women's overall well-being and impose a burdensome affective tax on women's everyday lives.

Women's representation in mainstream pornography, which is heavily consumed by men, is often degrading to women, and reinforces negative stereotypes about sexually active women. Jessica Valenti addresses this issue in *The Purity Myth* where she condemns the depiction of abuse to allure the male gaze (Valenti 86). Purity culture and porn culture strangely work in tandem to fit male ideals of sexually active women. While porn remains a taboo within purity culture, it views the popularization of porn as an effect of women's unrestricted sexuality. Many conservative organizations work to minimize the distribution of porn. However, that is not an effort to eliminate the poor depiction of women but rather to eliminate any depiction of female sexuality overall. While feminists credit unrealistic male ideas about women's sexuality for the increasing demand for explicitly degrading porn, conservatives credit immorality and sinful tendencies in women and the progressive culture. Because most mainstream porn is distributed for male consumption, the depiction of complex female sexuality is largely absent. In inspecting porn culture and the purity movement, it is obvious that both lack a comprehensive understanding of female sexuality. Purity culture ignores the concern that female sexuality is not accurately represented in mainstream porn. Yet, purity culture chastises women for the existence of porn and encourages them to be shameful about their bodies (Valenti 96). As a result, sex guilt and shame are reinforced among women while widely normalized behaviors for men like porn consumption and masturbation remain a taboo for women.

Progressive Christians have repeatedly argued that Bible verses are reimagined or misinterpreted to promote the evangelical purity myth. Purity culture endorses the limitation of expression of sexuality even within marriage. Katelyn Beaty, a writer for the *New York Times* and a former adherent of purity culture says: "I no longer subscribe to purity culture, largely because it never had anything to say to Christians past the age of 23" (Beaty). Many critics of purity culture have voiced their concern about the flawed design of purity teachings that shame premarital sex instead of emphasizing the role of sex within marriage. This does not only harm religious followers psychologically but also sets them at odds with their spirituality and beliefs. Studies found that purity teachings can strain the relationship between individuals and the church, leading to a "significant reduction of religious involvement" (Thornton 651). This is very detrimental to people who look for a religious guide to govern their lives. Many Christians, like Beaty, seek sexual ethics taught through their religion that will complement their faith as well as their spirituality. However, with purity culture, they are confronted with the fear of loss of eternity and as result, unavailing efforts to integrate sexuality and faith.

PURITY MYTH AND RAPE CULTURE

A study of the traditional sexual script (TSS), a cognitive framework that explains sexual behavior found that the TSS in many ways made sexual coercion permissible in men. TSS is learned through socialization that is largely influenced by traditional gender roles and purity culture (Byers 9). Although it has been updated many times, TSS utilizes the narrative that men have stronger sexual desires than women. Likewise, TSS devalues women for their sexual behavior, often characterizing them as

Photo by Ketut Subiyanto

promiscuous or unhinged for expressing their sexuality. However, the same sexual behavior is celebrated, rewarded, and championed in men and often seen as attractive. The culture of shaming women for their sexual choices and not holding men accountable for theirs has a significant effect on sex guilt that further feeds into rape culture. Women are conditioned to be reactive to sex whereas men are conditioned to be proactive. Within TSS, men are expected to be the initiators and to pursue sexual relationships. Reversely, women are expected to be reluctant to men's sexual advances because their self-worth depends on the rejection of sexual readiness and participation. However, it is also necessary that women take a passive stance and be submissive, which does not allow them to assertively reject unwanted sexual gestures. Women's success is measured by their ability to keep the romantic interest of the male pursuer aflame without giving in to sexual pressure. Purity culture promotes narrative such as "true love waits," indicating that a "truer" sexual relationship is maintained after marriage. Ironically, men's success is measured by their ability to make women "give in" to their sexual advances before marriage. Failure to do so threatens masculinity itself. In this way, TSS, embodied by the purity culture, makes sexual coercion strategies permissible for men and victim-blaming acceptable for women (Byers 10). Furthermore, purity culture teaches that anytime a woman lapses from the purity narrative, she is "asking for it." Whenever pleasure value is removed from sex for women, they are thrown into this loop of patriarchal norms designed to force them into submissiveness.

CONCLUSION

Purity culture is a model for the white protestant Christian family that fails to consider a large demographic who do not adhere to this religion. It perpetuates many harmful ideals that create gendered differences in the perception of sex and sexuality. This translates to the gendered application of laws and the naturalized gender hierarchy that feminists have tirelessly worked to dismantle. Because purity thinking is rooted in American culture, it is less identifiable as harmful or discriminatory, although it has vast implications for gender equality. Whether deliberately or not, purity culture limits sex education, restricts women's autonomy through the institutional regulation of their sexuality and their bodies. It promotes patriarchal traditions

and sexual scripts that instill sex guilt in women and sexually unhealthy and coercive tendencies in men that ultimately supplement rape culture and subjugate women in their roles. The framework of sexual ethics must be affirmative consent and consent must be integrated with maturity, self-esteem, and cognition of one's sexuality. Through a comprehensive understanding of sex and sexuality, society can remove differences in the experience of sexuality and its harmful implication on women as well as other sexual minorities. Abstinence teaching can be beneficial to mitigate the harms of sexual encounters when presented as a choice to people who have learned healthy sexual behavior. It should not, however, be applied as a universal law or teaching to control or manipulate diverse people, religions, and sexualities. It is always important to consider the rhetorical situation surrounding purity teachings: Who is the educator? What is the narrative that is promoted? Is it harmful to certain gender identities? If the answer to the previous two questions is yes, we must reconsider the ethics of purity culture and select for ourselves, a pragmatic model of sexual ethics to achieve a just, egalitarian society. ❖

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The citation system used in this essay is MLA 8th.

MARY CATHERINE DAVIS

GENERATIONAL ATTITUDES TOWARD DIGITAL FEMINISM: IS SOCIAL MEDIA THE PATH TO TRUE INTERSECTIONALITY?

INTRODUCTION

Modern feminism is a movement that has caused controversy since its inception. Now in its fourth wave, the feminist movement has become much larger than merely a 'women's movement.' The term "intersectionality" has become a growing part of the modern movement to include more than just white upper-class women. In examining the history of feminism and the differing generational perceptions that surround it, it has become clear that this movementmeans different things to different people.

The way in which the feminist movement is presented is the key to gaining support from every generation and group of people. This paper will explain the history of feminism in Western culture, its central goals, and how the most recent wave is presented and received by different observers and participants through social media. By examining how different generations view feminism using this lens, we can better frame the conversation to encourage participation in the feminist movement.

HISTORY OF THE FEMINIST MOVEMENT

Feminism is not a new movement or concept. Simply defined as "the theory of the political, economic, and social equality of the sexes," this definition is the short version of what most self-identifying feminists will claim as their goal (Merriam-Webster). The movement dates back to the mid-1800s when the first wave began. Spanning over three generations and lasting until the early 1900s, it is considered the start of modern feminism.

Some of the goals of first-wave feminists included attaining women's suffrage, getting more involved in politics, and gaining equal access to education, cultural, and career opportunities. Other topics of contention included the rights of married women, the double standards around sexuality, reproductive rights, equal pay, and the inconveniences of some gender roles. The biggest difference that is evident in first-wave feminism versus earlier movements or more recent waves is that women involved in first-wave feminism had the tendency to accept certain obstacles, such as social status and race, as "natural and inevitable" (LeGates 197).

Beginning in the 1960s, second-wave feminism continued to fight against gender stereotypes, especially in the beauty industry. This wave is famous for the media myth of bra-burning feminists, recognition for women after World War II protests against sex discrimination in the workplace, the peace movement, sexuality, and other issues (LeGates 327). Though this myth came about decades ago, it can still be cited as part of modern feminism's reputation by some observers.

Overall, this wave was full of many historical events, thus creating an environment full of new issues to protest and address for women. It is important to remember that this is different from first-wave feminism in that it focused more heavily on cultural issues rather than political ones. The first wave listed these representation issues as more secondary to voting rights, equal pay, and other political topics.

Third-wave feminism began in the mid-1990s and continued challenging and expandingon ideas from the previous wave. Social constructs of gender, sexuality, heteronormativity, and others began to be challenged. This wave saw women being empowered by traditionally feminine clothing and styles, including high heels and 'sexy' clothing. These items that had formerly been cited as oppressive were now worn with pride by protestors. Women began to reclaim slurs and insults to fight sexism.

The Internet came to help women cross gender boundaries online and find communities for themselves. Racial, sexuality, class, and other differences began to be celebrated by the movement and expanded to a more inclusive message (Rampton). This is where the concept of intersectionality began to form, though it is a more widespread concept in the current wave. This meant that working-class women, women of color, and those who did not identify as heterosexual were beginning to be recognized, though they had been participating in the movement from its inception. Feminism was

beginning to become a movement for all women.

The last and current fourth wave of feminism combines issues from the previous waves and takes them to mainstream media. Though this wave is also lumped as a continuation of third-wave feminism, it presents a plethora of new communications variables. With access to more technology and social media, early feminist ideas are getting public attention.

Ideas that were considered "extreme" are now common discussions. Issues that were once put on the back burner are now a bigger part of the agenda. These include discussion of homophobia, transphobia, the gender pay gap, and more. The fourth wave is more intersectional than ever before and focuses not only on women's issues but men's as well (Rampton). Fourth-wave feminists can also discuss toxic masculinity and the impact of gender roles on men's mental health in addition to more well-known feminist topics. The fourth wave is the most inclusive wave ever, though people have different ideas about what intersectionality means.

DEFINING INTERSECTIONALITY

The term "intersectionality" was originally coined in 1989 by Columbia law professor Kimberlé Crenshaw. She decided that this was the best way to describe the oppressive experience of being an African-American woman. In an interview with Columbia Law School in 2017, Dr. Crenshaw explained intersectionality as "a lens through which you can see where power comes and collides, where it interlocks and intersects" ("Kimberlé Crenshaw"). This concept aims to explain the experiences in which types of discrimination overlap.

Dr. Crenshaw's example here discusses the intersectionality of being Black and a woman, which is a topic that has been presented frequently over the last several years with the growth of movements such as Black Lives Matter and Time's Up. It can also be used to explain the experiences of members of the LGBTQ+ community, indigenous women, and other groups.

SURVEY METHODS

The survey conducted for this project was run through social media to promote participation. It was shared with students and staff and North Carolina Wesleyan College and on the personal social media accounts of the researcher. Platforms used to promote participation included Facebook, Twitter, Instagram, Snapchat, and word of mouth. The use of multiple social media platforms allowed for a more diverse participant pool in age, gender identity, and education level. Respondents participated on a completely voluntary basis.

Upon surveying the general public it has become apparent that intersectionality, though a large part of modern feminism, is still misunderstood by many people. To understand how the reputation of the feminist movement contributes to this lack of understanding, it is important to examine how different generations see themselves within the movement. The survey conducted for this research project collected data from twenty-three participants aged nineteen or older.

For the purposes of this survey, age groups were divided into six age classes in order to avoid error or bias in self-identification into a specific generation. These classes were "nineteen to twenty-nine," "thirty to thirty-nine", and continued in this interval until ages "seventy or older." Though respondents were not asked to self-identify into the generation they were born, this point is important to consider within this discussion. To create an idea of how these findings might apply to generational trends, we will consider the generations in this manner: Baby Boomers, born from 1946 to 1964; Generation X, born from 1965 to 1980; Generation Y, born from 1981 to 1996; and Generation Z, born from 1997 to the early 2010s (Fry).

PRIMARY RESEARCH ON FEMINIST PERSPECTIVES

Of the twenty-three participants, twelve self-identified as feminists and ten self-identified as non-feminists. The remaining participant said they supported women's rights but did not self-identify using the label of feminist. Those that self-identified as feminists responded with simple reasoning as to why they chose to use this label. These ranged from generic answers to naming specific issues within feminism. One participant simply stated that she believed that women should be treated equally to men, while another cited financial, social, healthcare-related, and political inequalities needing to be addressed as her explanation.These twelve self-identifying feminists consisted of eleven women and one man.

Though there were only five male participants in this survey, the remaining four did

not identity as feminists. These men gave varying reasons for avoidance of the label. One man simply stated that he was "not a woman," while another said that he did not consciously think that his actions or thinking related to the label. Another man said that gender equity has been reached in the western world, while the last male respondent said that feminism's reputation held him back.

The remaining respondent chose the phrase "I support women's rights" to answer the feminist identification question. This is interesting because this was a write-in response and showed that though this respondent has feminist beliefs, they do not like the label of "feminist."This woman explained that though she supports all women's' rights, she does not actively express her "feministic beliefs" to most people.

The other large trend regarding self-identification was that seven out of ten people identifying as feminists were aged nineteen to twenty-nine, whose age group made up 56.5 percent of those surveyed. The ten people who identified as non-feminists had only four people aged nineteen to twenty-nine, while the remaining six were aged thirty or older.

When it came to intersectionality, the results were just as intriguing. Sixteen out of twenty-three respondents, or 69.6 percent, did not consider themselves to be intersectional feminists. To avoid confusion on the term, two definitions of intersectionality were included with examples in the introduction to the survey. Regardless of the explanations provided, most of the people who did not self-identify as intersectional feminists simply did not understand the concept. Nine of these respondents were aged nineteen to twenty-nine. The remaining seven respondents were aged thirty or above, though the majority were above the age of forty (see **Fig. 1**).

The fact that the majority of respondents who identified as feminists were young people is consistent with existing research on generational attitudes toward feminism. A study conducted for the journal *Sex Roles* used 245 undergraduate college students, most of whom were women. These students ranged in age from eighteen to twenty-six and were linked to an older relative who also participated in the study. There were 106 older relatives, including grandparents and parents of the students. This study examined feminist attitudes between generations and the factor that affected these attitudes (Fitzpatrick et al.).

Many findings of the study aligned with the survey results for this project. In surveying college students and their older relatives, the study proved that women participated more in the women's movement, that each generation became more liberal as one moves from oldest to youngest, and that parents had tendencies to be more traditional than their children (Fitzpatrick et al.). This is consistent with my survey, which showed that a large portion of older participants did not consider themselves feminists.

Of the eight respondents aged forty or older, 62.5 percent claimed that they were not feminists (see **Fig. 2**). In people aged thirty-nine or younger, this number was only 31.3 percent (see **Fig. 3**). Additionally, the majority of those who self-identified as intersectional feminists fell below the age of forty, at 77.8 percent (see **Fig. 4**). Because intersectionality is considered a newer and more inclusive idea, it is seen as more liberal. This means that oldergenerations are more hesitant to accept the concept, as their values skew further right than their children's.

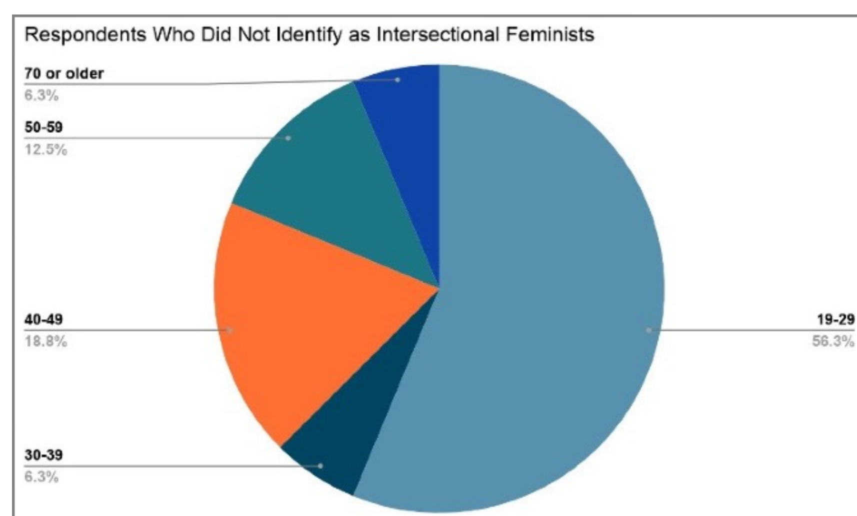

Fig. 1. Breakdown of respondents who did not identify as intersectional feminists.

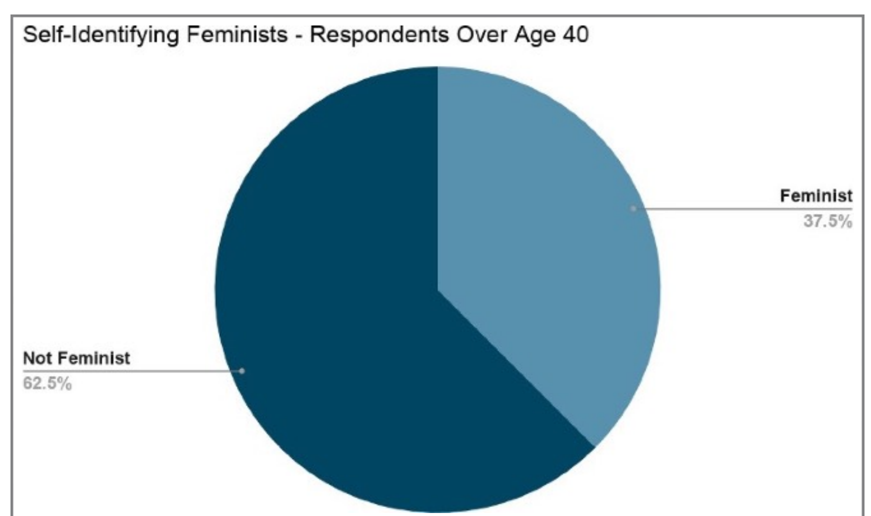

Fig. 2. Breakdown of respondents aged 40+ who self-identified as feminists.

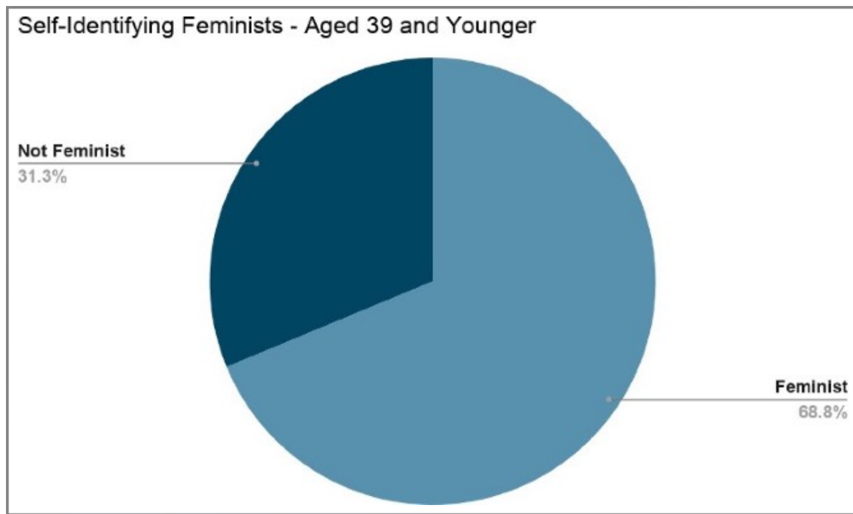

Fig. 3. Breakdown of respondents aged 39 and younger who self-identified as feminists.

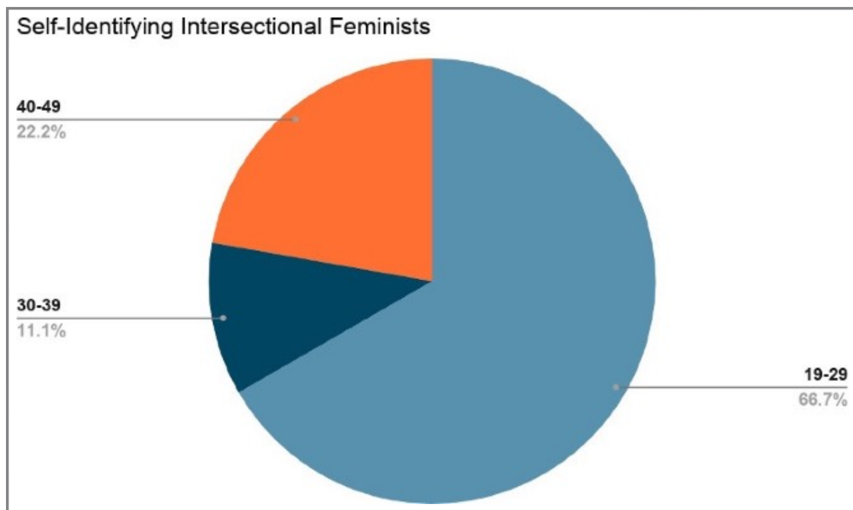

Fig. 4. Age breakdown of respondents who self-identified as intersectional feminists.

SOCIAL MEDIA AS THE NEW PUBLIC SPHERE

As we dive deeper into a technology-reliant world, the ways in which ideas like feminism and intersectionality are communicated might have some effect on older people's views. If we consider Habermas's traditional view of the public sphere and how it eventually widened (Downing 33), it is likely that older generations would receive a lot of their education on feminist issues from print media. Baby Boomers may appear removed from Habermas's time and his theory, but considering how technology has evolved creates a distinction between Baby Boomers and younger generations like Generation X and Z.

While older generations spent time reading headlines on newspapers and seeing limited news coverage on the feminist movement, younger generations are equipped with information at their fingertips. Reading online news articles from thousands of sources, seeing eye-witness coverage of events, and discussing politics with people across the globe creates an educational environment that has evolved from the days of print media. One of the biggest conduits through which this education takes place in this internet age is through social media.

Respondents were asked to express where they had learned about feminism. The majority of people referenced school with 69.6 percent, social media with 73.9 percent, and media, such as books or newspapers with 82.6 percent (see **Fig. 5**). This was eye-catching because some people directly referenced their school curriculum, with mentions of suffragettes or the bra-burning myth of the past. Others responded mentioning of Dr. Crenshaw's work or activists on social media. References to newer work came from younger respondents, while general history knowledge was touched on by the older audience.

The reason that these responses are essential for studying communications and the feminist movement is that so much of the feminist movement takes place through social media. There are organizations and protests that hold a physical space, but a lot of activists now

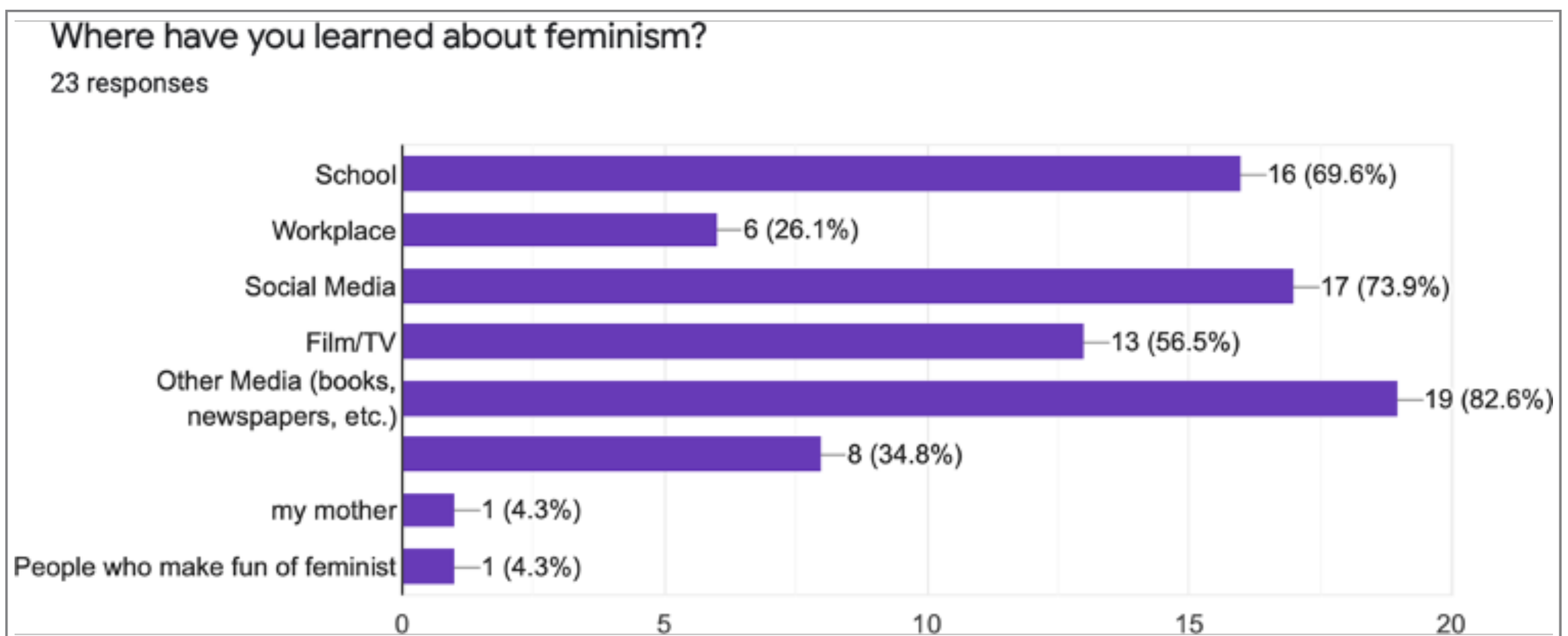

Fig. 5. Sources of knowledge about feminism among survey respondents.

educate their followers on feminist issues online. Physical events or organizations cannot contain the growing public sphere of feminism. It is barely contained by the Internet, which is an important sphere in the modern world. My survey showed that of the six respondents who had not learned about feminism through social media, 66.7 percent were over the age of forty. This suggests that older generations are learning about feminism in an environment that is different than those of their children and grandchildren.

GENERATIONAL ATTITUDES TOWARD TECHNOLOGY AND POLITICS

Though mine is a small sample, it corresponds with generational tendencies. Breaking down social media use, we know that Baby Boomers, who in my survey made up at most 8.7percent of respondents, rank lowest in nearly every category (Viens). The fact that Baby Boomers are less likely to use technology and social media, combined with the fact that younger generations tend to be more liberal (Fitzpatrick et al.), creates a communication problem.

Though Baby Boomers may not seem as open to as many ideas as their grandchildren, they are exposed to the details of those liberal ideas a lot less if they are not on social networking platforms. This creates a unique problem that can be traced back to the generational trends that were just discussed regarding general political beliefs. It all begins by recognizing that older generations are more conservative than their offspring (Fitzpatrick et al.).

As we move to younger generations, we will observe more liberal ideas and attitudes (Fitzpatrick et al.). Younger people, especially Generation Z, are more likely to use social media (Anderson et al.). Combining these facts with the fact that Democrats are more likely to participate in political activities on social media (Anderson et al.), we can assume that Baby Boomers are less exposed to discussions around feminist attitudes. This includes ideas that might be considered extreme by conservative audiences, such as intersectionality.

This means that the education that Baby Boomers are getting around feminist ideas is very different than what younger generations are being taught. This could be because younger generations have experience with social media for a larger portion of their lifetimes, but it also could be attributed to the social media platforms that are most frequently used by each generation.

Baby Boomers and Generation X are more likely to use Facebook, while Generations Y and Z are more likely to be found on Instagram or Twitter in addition to Facebook (Viens). If we can assume that these platforms (which cater to a higher number of younger people) are sharing more liberal ideas, then those that have older users will likely be filled with more traditional ones. This could deter older users from participating on these platforms at all, regardless of if they have a desire to learn about feminist ideas.

If we want older people to be exposed to the latest information in feminism's public sphere, we need to frame the conversation around feminism and intersectionality in a way that presents advantages to them. The biggest comment on feminism from respondents in my survey was that they felt like the word itself had a negative connotation. Most people said that they felt likefeminists were portrayed as man-hating, having a superiority complex, "bitchy," or true to the bra-burning myths of the second wave.

Most people who cited the extremist view of feminism did admit that this view was probably created by a small subset of people, media, men, or just reinforced by the patriarchal nature of our society. This could be viewed as "hostile sexism," which refers to a view that usually sees gender equality or feminism as "an attack on masculinity or traditional values" (Hack 61). This concept usually tries to put down the feminist movement as a whole. Instead of viewing feminism as a positive movement with a few extremist outliers, hostile sexists try to paint a picture that shows gender equality threatening our way of life in society.

This explains how some of the bra-burning myths of the past could play into anti-feminist thinking. Because my survey was conducted in a southern Christian community, this thought process could easily affect the views that older men and women have. We have established that older generations are more conservative, and conservative views are often paired with Christian values. These views are often driven by traditional gender norms, which might decrease the tendency of these groups to accept intersectionality or feminism in general. Many older people view the openness and intersectionality of feminism as an encouragement to live outside of traditional gender roles and norms.

Though many younger women might view this break from stereotyping as freeing, older women might feel as though their chosen lifestyle or career path are being insulted. Modern feminism encourages women to do what they choose, which often includes working, schooling, or pursuing goals regardless of gender norms. This also means that older men are seeing a view of independent young women who might appear threatening to the type of society they grew up in. Though older people might feel that their way of life is being threatened, they may also feel left out.

There has been substantial research done on ageism and how it is frequently put on the back burner as a feminist issue. This is important to remember when considering why older women might not feel included, as they make up the majority of the older population. Older women also face poverty, health issues, and the underpayment of their mostly female caregivers. Women are also expected to take on long-term care for family members more often and work in care-taking careers to make up for the gender pay gap. These older women, whether or not they know it, are being affected by ageism and sexism (Hooyan).

Reaching out to older populations about how they are affected by feminist issues is going to be vital in reaching true intersectionality and effective communication. The social media use of Baby Boomers is on the upward trend (Viens), so why not use that to our advantage? Feminist creators could dive into Facebook, work through programs catering to older citizens, or put out content that applies to older audiences. If older people are less likelyto branch out, meeting them where they are with issues they care about is a better way to go.

We can do this by listening to what older people have to say. Paying attention to those who are further discriminated against, like Black women, can also encourage intersectional issues within older communities. A study published for *Gender, Work & Organization* showed that Black women thought that part of the reason that progressing intersectional issues has become difficult is that Baby Boomers are reluctant to let young people lead (Love et al., 483). A Baby Boomer in the study cited that "petty reasons" were to blame for this reluctance, though Generation X and Baby Boomer do agree that Generation Y's leadership is "innovativeand inclusive" (Love et al. p. 483). This study also showed that 41.6 percent of the women in their study said they participated in community social justice work (Love et al., 483), so we can see that there is interest in feminist discussion.

Not only is this interest present, but it is also a different discussion from younger women in the African American community. Each generation has a different vantage point on political issues depending on their life experiences. This is consistent with standpoint theory. Baby Boomers grew up during the era of Jim Crow, their children experienced forced integration, and their grandchildren are now witnessing the United States in its most diverse form (Love et al. 484).

To understand each generation, we must think through how their perception is informed. Studies have shown that the developmental period in which social events like these take place greatly influences how impactful that event is within a person's life (Fitzpatrick et al.). Each generation has a different experience that informs how they see the world. If we fail to consider these perceptions, we will never appeal to a majority of older audiences.

This is an issue within the public sphere, as younger activists usually do not think they can properly interact with older audiences politically because of their lack of online presence and education with technology (Guillard 613). To make this problem worse, most older feminists do not see the feminist movement in the same way that younger audiences on digital platforms do. Older activists tend not to approve of the "perceived individualistic nature" of this modern public sphere (Rogan & Budgeon 10). They see a movement without the groups or meetings that made older waves of feminism successful (Rogan & Budgeon). Instead, younger modern feminists are having the majority of conversations on social media. This limits older generations from immersing themselves in issues experienced by younger feminists, while young feminists are hearing fewer first-person perspectives on the movement's past failures.

CONCLUSION

We can see that there is interest within older generations to understand feminist issues. Intersectionality can only foster this conversation; it cannot deter it. Using frame-bridging to connect feminism to issues like ageism, police brutality, and equal pay can only encourage more people to participate. This can be accomplished by creating an online presence within platforms that are familiar to older people, reinforcing the choice and

openness for women to identify with more traditional roles as well as more masculine ones, and presenting a collectivist mentality will allow older people to feel seen. By taking each generation's life experiences and perceptions into account, communicating intersectionality will become more common and even more inclusive than it is right now.

The relationship between older generations' social media habits might help explain their mindset toward feminism, which tends to be less positive. If we can create a space that combines education and technology, we are setting up our parents and grandparents for a more well-rounded understanding of modern feminist issues. An educated citizen is more aware of how issues affect those that are not like them, and that is what feminism aims to accomplish in its fight for equality and intersectionality. Creating an understanding of intersectionality's definition and significance within the general public will allow more people to feel empowered to get involved within the feminist movement. This includes reframing the conversation in digital feminist spaces to include older generations and people of all backgrounds. In creating this cohesive foundation, we will have the option to truly study what intersectionality means to people. ❖

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The citation system used in this essay is MLA 8th.

GRACE deMONTESQUIOU

A SOCIAL ROLLERCOASTER: POWER PLAYS, HIERARCHIES, AND LOVE IN *JANE EYRE*

HISTORICAL CONTEXT

Charlotte Brontë published *Jane Eyre* in 1847 in the United Kingdom, setting the novel in Victorian England. At this time, as now, society consisted of different social, economic spheres for people which defined their gender roles and employment opportunities. The hierarchy of social status defining social classes was, and is, based on economics. David Cody, in "Social Class," describes the Victorian social class hierarchy as follows: The upper class was the highest class in the hierarchy with the most political power. Below it was the middle class, which attempted to gain power so they could have political control. At the bottom of the hierarchy was the lower class, who had no power and "became increasingly hostile" to the upper classes (Cody par. 3). Although Cody asserts that these classes maintained some level of stability, Esther Godfrey, in "Jane Eyre, from Governess to Girl Bride," highlights that society, especially the middle class, had anxieties about "the threat of gender disruption" from below and perceived this disruption as potentially harmful to middle-class upward mobility (855). The Victorian social class status and gender of individuals affected interactions and relationships, and the tumultuous nature of these interactions permeates *Jane Eyre*.

Unlike women of the middle and upper classes, working-class women labored to support themselves. The working class did not enforce middle- and upper-class gender norms and differences, which disturbed members of the middle class (Godfrey 854-857). Godfrey finds that the "polarization of male and female realms within the middle class can be read as the result of a larger societal anxiety about gender identities that emerged from the instability of working-class gender roles" (854). In response to the anxiety inspired by the lack of polarized gender norms among the lower classes, middle class society pressured working-class people to follow their norms, including the strict division of labor and other behavioral norms; they enforced these rules via conduct books and other didactic novels that separated male and female spheres of influence between the public world and the privacy of the home (Godfrey 854-57). The middle class set out to define these roles to establish their own difference from the lower class and to move up the social ladder by proving they were not like the poor. As a result of this strict enforcement of gender roles, middle-class women's lives held little freedom or routes for personal and financial independence. Victorian social restrictions—encapsulated by the term "patriarchy"—controlled women's lives. Martha Vicinus notes in *Suffer and Be Still* that "a woman's expectations for any life outside the home were narrowed, and the ambitions of the young who did work and were independent were curtailed" (xiii). The novel *Jane Eyre* reflects this tension between gender, economics, and social class for middle-class women. If Jane, the protagonist, were to be an independent woman, she would be rejecting the norms of the middle and upper classes for women to be subjugated to men, and thus would move down in social status. As

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Jane is raised among a wealthy family, she wants to continue to be part of that social group, so she sought the possibility of independence amid these constraints.

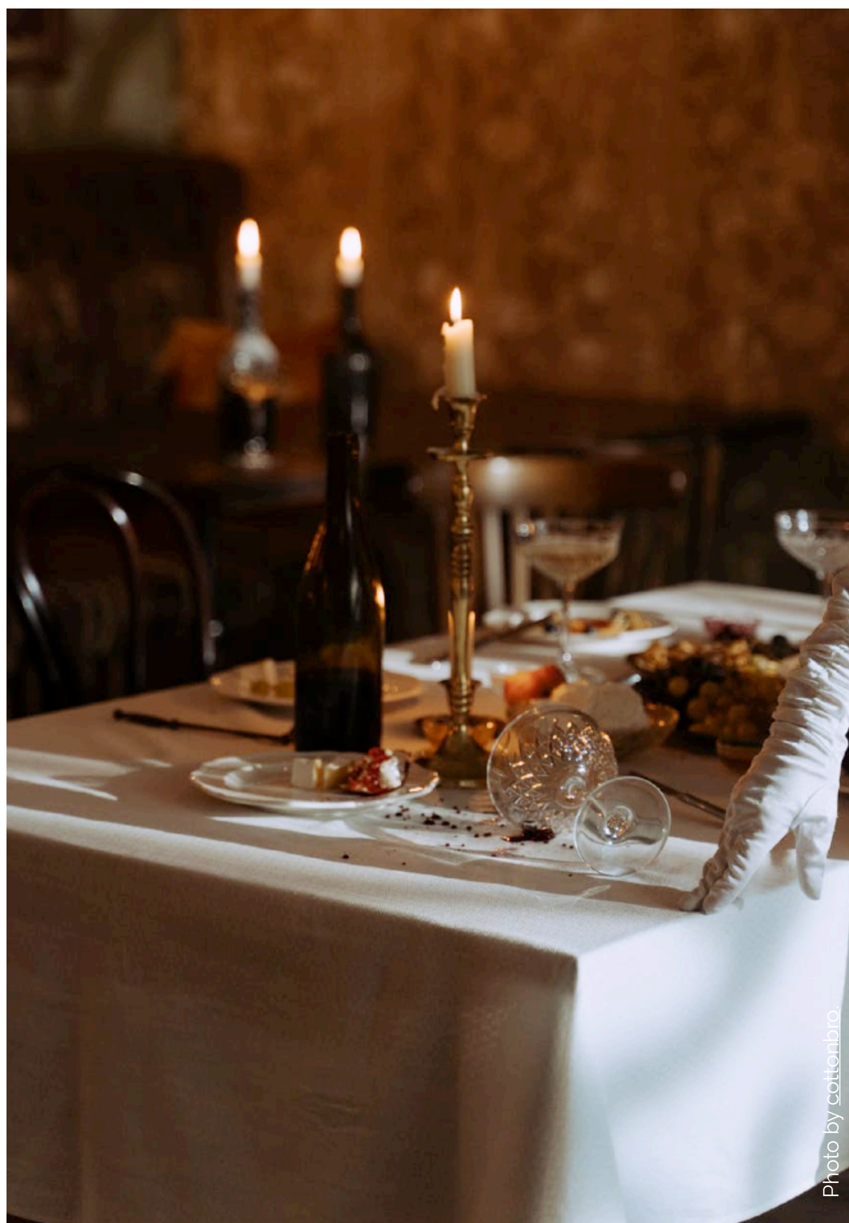
Why did Brontë include so many instances of class and gender struggle in *Jane Eyre*? As Brontë was part of the middle class, she was interested in social status. Lisa Sternlieb found in "*Jane Eyre*: 'Hazarding Confidences'" that "Brontë ... was carrying on a rigorous correspondence with her publisher ... in which she was more prone to discuss such issues as the status of women in society than the domestic concerns" (Sternlieb 453). Understanding Brontë's interest in class and gender helps readers understand the novel *Jane Eyre* since the actions of characters reflect their backgrounds and societal status. Jane's love interest, Edward Rochester, represents an upper-class gentleman for much of the novel, and other characters of low-, middle-, and upper-class behavior epitomizes Brontë's view of people of their status. The actions of each character in *Jane Eyre* show how Brontë views social classes and uses these characters to demonstrate her arguments on social classes and hierarchies.

Analyzing Jane's actions and thoughts reveals Brontë challenged the norm of women serving men, including husbands. Brontë also challenged the notion that people of different social and economic status cannot be attracted to and love each other, suggesting emotional equality was as important as other factors, and that social and economic status was insignificant compared to the relationships between people. Even as Jane and Rochester both love each other, their social class and gender roles make that love into an emotional battlefield, the two struggling for power to dictate what their relationship will be and how it will work. Brontë negotiates class difference through the romance plot, imagining that class struggle is fought out as a love story. Through these struggles, Brontë invites readers to question their expectations for romance and creates an unlikely happy ending. Early in the relationship, Rochester is portrayed as an abusive, manipulative liar, and all these factors play into Jane's moral reasonings for abandoning him although she loves him. Because of these struggles and Jane's writings reflecting poorly of Rochester, this overturns readers' romantic expectations, demonstrating that is was Brontë's goal to explore the tensions at play between gender roles and social class instead of giving readers the normal resolution expected from romance. In this paper, I will first discuss Victorian social classes and the ways characters' behavior in the novel contradicts readers' expectations, and I will analyze gender norms and societal expectations for governesses, contrasting the Victorian period expectations with the occurrences in *Jane Eyre*. Finally, I will analyze Jane and Rochester's feelings toward each other, and the ways their social and economic classes influenced Brontë's portrayal of their relationship.

VICTORIAN SOCIAL STRUCTURES

Brontë critiqued the existing Victorian hierarchy allowing men of upper classes to engage in immoral behavior. Men faced fewer societal constraints than women, but the upper classes were expected to maintain their wealth and reputation. For an upper-class man with an estate like Rochester, society expected that he would follow social rules for good behavior like refraining from scandalous extra-marital affairs. Of that period, in "Queensberry's Misrule," Amy Milne-Smith notes, "sensitivity to public scandal among the elites ... was born out of a fearful awareness of the new gentlemen of the middle class" (280). To maintain their status above the rest of society, the upper classes expected their members to be unimpeachable in their conduct so public scandals could not damage their reputation because any scandal brought them closer in status to those beneath them. Brontë's upper-class character Rochester has multiple affairs, raises an illegitimate child, and attempts bigamy. She thus shows the unethical and irreligious patterns of behavior from upper-class men. Upper-class readers would have been shocked by this depiction hurting their class's reputation, and this is seen in how contemporary critics characterized *Jane Eyre* as a novel which women must avoid (Blakemore par. 6). For readers of the middle class, this would have been an example to them that someone from the upper class could love someone from a lower class, impacting the way they view classes, relationships, and upward mobility. It could have also offended them that an immoral man pursued Jane, as can be seen in the fact that many contemporary critics called the novel anti-Christian (Blakemore par. 6). Few to no lower-class people would read *Jane Eyre* since it would require education and funds to buy it. So, the audience read an unexpected love affair between controversial partners and could have been influenced to change how they view upper-class men and lower-class women.

Brontë not only critiques hierarchies through upper class males' behavior since she uses scenes between upper- and middle-class characters to demonstrate flaws in a hierarchy based on economics rather than Christian values. The characters' behavior toward and treatment of Jane depends on their social status in relation to hers, and Brontë's portrayal of these behaviors is complex because Jane changes social positions multiple times. She first lives with her upper-class extended family, and then moves to a school, working as a governess, or teacher. She moves on to teach in an upper-class house before becoming a beggar on the street. After, she lives with an upper-middle-class family, working as a schoolmistress, and moves into the upper class when she comes into an inheritance, and finally chooses to give money away while maintaining her upper-class status. In the article, "Reflection on Feminism in Jane Eyre," Haiyan Gao addresses Jane's precarious class status: "she is always looked down upon by those potentates with money and power ... the rich can treat ... [people like Jane] at random and need not bother to give them any esteem" (927). The upper class's exploitative treatment of the lower-class is exemplified in the relationships between Rochester and his employees, as Jane is the only person he talks to due to her in-between social status as a governess (Godfrey 857).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Throughout the novel, upper-class characters mistreat middle and lower-class characters—in particular, Lady Ingram ridicules middle-class professions directly in front of Jane, a governess. Lady Ingram tells Blanche and Rochester, loud enough for Jane to hear, "'Don't mention governesses; the word makes me nervous. I have suffered a martyrdom from their incompetency and caprice'" (Brontë 160). Because Brontë adds this interaction, readers should see the flawed nature of upper-class characters as they immorally and emotionally abused those of lower social standing. By telling the story from the perspective of Jane, Brontë inclines readers to sympathize with the merited bad treatment Jane receives, supporting the idea of equality for women and the middle class. Brontë highlights the role of wealth in social status; while the Ingrams are privileged to have hired governesses and can decide to never hire another again, Jane must work to survive, and the act of working makes them disdain her. By speaking directly to her audience, Brontë ensures the reader will notice how different classes behave toward each other. As she critiques the behavior of people of the upper class, she is criticizing the way that the Victorian social hierarchy made a person's value equal to their social status, convincing the reader to blame that hierarchy. Because Brontë chose lowly and sympathetic Jane as the protagonist who speaks throughout directly to the reader, saying "dear reader," and treating the reader as a friend, she is making Jane valuable and meaningful to the reader to convince readers to see the failings of economic-based hierarchies. When Jane is in the middle class, readers can expect society to act kinder to her than when she was part of a lower class. Because in the end Jane manages to ascend to the elite, she naturalizes this class, and as she moves from one status to the next, people's way of treating her changes; Jane's mistreatments when she is in the lower class makes her react by breaking social norms, as discussed below.

DIFFERENT GENDER EXPECTATIONS

Brontë defies the Victorian gender norm that women must follow commands from men to create tension and power plays between Jane and male characters, particularly Rochester. Jane first goes against male authority as a child when she criticizes her male cousin; she says to

him, "'Wicked and cruel boy!'" (Brontë 13). As her cousin taunts her, she calls out his treatment of her, giving her a first taste of calling out male characters who deemed her subordinate. As a young girl, she fails to learn the proper societal norms and so is not afraid to bring attention to herself breaking gender norms. However, later, Jane learns to outwardly adhere to social norms since she follows the commands of her school's male supervisor, Brocklehurst, and her employer, Rochester. As Jane and Rochester's relationship begins, Jane obeys Rochester, like when he makes her come to him and talk. However, Jane becomes more comfortable calling out men's moral transgressions. She says to Rochester, "I am better than you—let me go!" because he tries to marry Blanche Ingram, a woman at whom he scoffs (Brontë 228). Because of Jane's low status, it would appear strange for upper-class readers that Jane thinks critically and looks out for herself and her best interests, and it would be strange for Jane to imagine a hierarchy of people based on moral behavior and actions, instead of the hierarchies of the day—class and gender. Brontë shows that women and lower-class people could think and act with their own agency, throwing out social hierarchies.

Jane works as a governess, or teacher, for an upper-class English gentleman. In this period, social norms would define the standards for the relationship between the "master," or employer, and governess. Violeta Craina in "What Jane Eyre Taught: The 'Autobiographer' in *Jane Eyre* and Women's Education" explains these norms, saying "the governess ... was supposed to report to ... [the master of the house] directly" and quotes Daniel Pool who notes that "the governess was a senior servant, but was considered a working-class servant, ... [and the master] had to see the governess every once in a while" (Craina 41). When Rochester first meets Jane, she only visits with and speaks to Rochester when he calls on her, but he starts calling on her to come talk to him more often, more than a master should. Craina emphasizes this was the same type of social controversy as a man betrothing a servant (41). As Rochester plans on marrying Jane, this controversy spreads around and damages Rochester's social reputation. This demonstrates that their social inequality creates consequences for Rochester and impacts their ability to be in a relationship. Masters did not befriend their workers, yet Rochester plans to marry his employee. When Mrs. Fairfax learned of that news, she says to

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Jane, "'I feel so astonished ... Equality of position and fortune is often advisable ... and there are twenty years of difference in your ages ... distrust yourself as well as him. Gentlemen in his station are not accustomed to marry their governesses'" (Brontë 237). Brontë uses Mrs. Fairfax as a spokesperson for how society compels people to marry others of the same social standing to prevent the classes from mixing. Jane responds by narrating she "was growing truly irritated" (238). As Jane cannot understand the point of marrying for reasons besides love, Brontë, eliciting that same anger in the reader, convinces the audience Jane should marry Rochester, using the romance arc of forbidden love to imagine the possibility of class mixing. Rochester, justifying why he will marry someone of a lower status, says to Jane, "'My bride is here ... because my equal is here, and my likeness ... I love as my own flesh'" (228-229). He ignores social status dictating people as equals, believing that because they have an equal amount of love for each other, that will be enough. Love beats class.

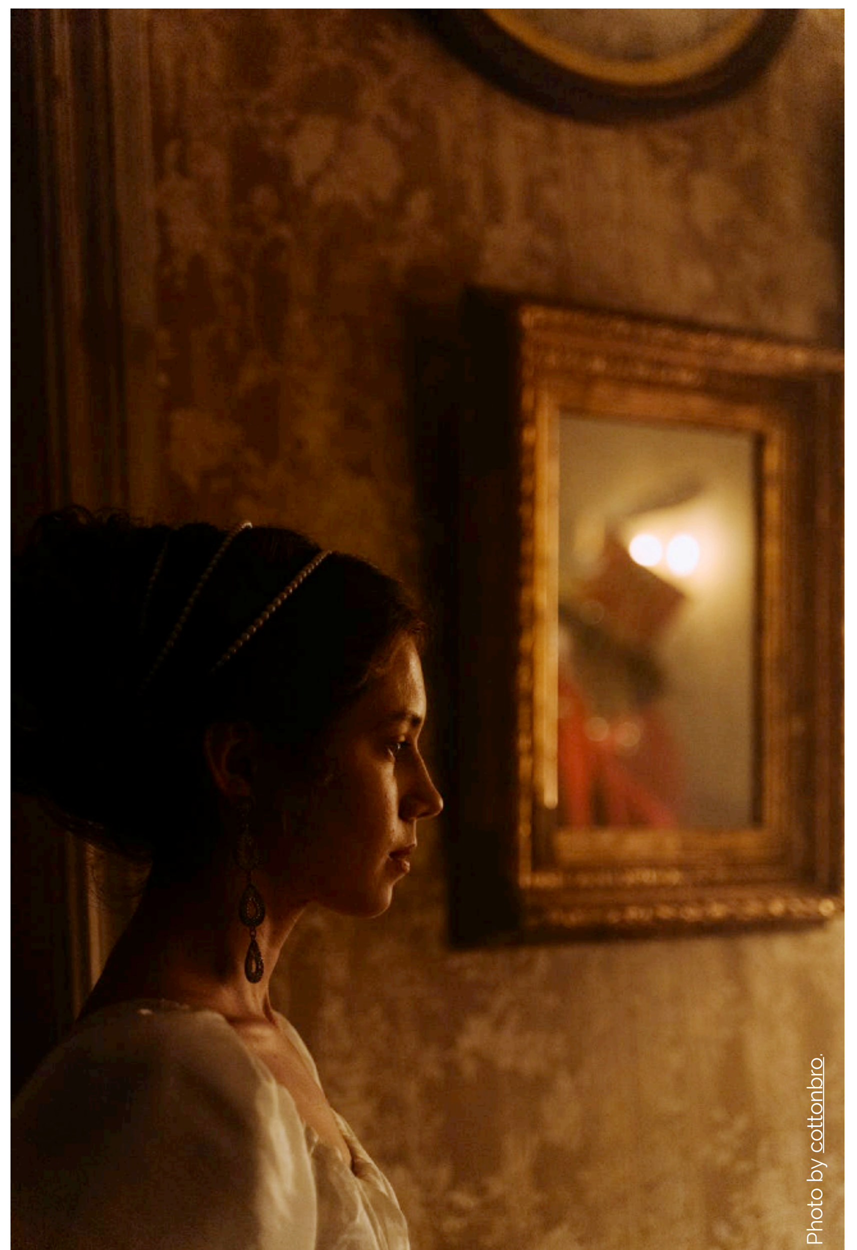
EMOTIONAL EQUALITY

Jane and Rochester are unequal in social status, yet each becomes attracted to the other. Rochester has low emotional maturity, but in the end, he is on the same emotional level as Jane. Rochester is an upper-class gentleman nearing forty who has travelled the world and is sexually and romantically experienced because of his past relationships. Godfrey contrasts Rochester with Jane, noting how Jane naively begins their employer/governess relationship: "[i]n addition to the sexual experiences ... in Rochester's secret marriage to Bertha, the presence of Adèle and Rochester's willingness to discuss his former sexual affairs with Jane place him in a masculine position of authority and dominance against her childlike innocence" (865). Even though Jane and Rochester see him as emotionally superior because of his relationships, age, and social standing, the reader and Jane eventually discover his character through his actions and determine he is immature in the emotional portions of relationships. For example, he expects Jane to be impressed by his theatrics, his attempts at making her jealous, and his lies.

Rochester's emotional immaturity manifests in the way that he controls Jane throughout their relationship. His other relationships with his mistresses were the model on which he bases his relationship with Jane. During the beginning of their relationship, Jane sees Rochester and herself are on different footings socially, but she wants him to see her as equal to him. Jane even narrates one instance where he says to her: "I don't wish to treat you like an inferior: that is ... I claim only such superiority as must result from twenty years' difference in age and a century's advance in experience" (Brontë 122). Rochester says she must talk to him now, showing Rochester's control. He constantly gives orders to Jane, which, while he is her employer, Jane's job is to teach Adele, not to converse alone with Rochester while he looks down on her. Also, he mentions his age differences and experiences to remind her of their differences and claim superiority as he says he is not superior. He manipulates the situation because he says he does not want to treat her as an inferior, yet he continuously insists on their differences. Brontë thus portrays a typical controlling upper-class gentleman.

Eventually, the power plays between Rochester and Jane result in a confrontation. Jane says he should not control her "merely because you are older than I, or because you have seen more of the world than I have; your claim to superiority depends on the use you have made of your time and experience" (Brontë 123). Jane feels he exalts his status based on his age and experience. Rochester responds by saying, "Humph! Promptly spoken. But I will not allow that ... Leaving superiority out of the question, then, you must still agree to receive my orders" (Brontë 123). Instead of listening to Jane's request and agreeing, he still believes he deserves the right to order her around, using whatever tone of voice he wants. Rochester is emotionally immature because, based on today's standards, if he loved Jane, he would ideally not talk to her that way. This conversation again reflects on Brontë's view of upper classes —even when the precarious class traveler, Jane, points out her discontent with inferior treatment, the upper-class employer, Rochester, does not care to change his behavior even after hearing how it hurt her. Brontë shows the upper class's shortcomings in the way they treat others and dismiss their reactions.

Another behavior that shows Rochester's emotional immaturity is when he deceives Jane by withholding information about his marriage



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and courting Blanche Ingram to evoke jealousy in Jane. Rochester's fake courting becomes known when telling Jane he would never marry Blanche and asking Jane, "'Were you jealous?'" (Brontë 236). He planned to incite in Jane envy of Ingram and to make Jane want to be with Rochester. This emotional abuse of Jane exemplifies how, at that time, Rochester was not fit to marry Jane since he could not respect his partner.

Rochester continues to give commands to Jane when he wants to give her upper-class garments to wear, but Jane rejects this since these clothes are inconsistent with her character and because she wants to be valued as a partner in their relationship, not as an object or doll. When Rochester says, "'You, Jane, I must have you for my own--entirely my own. Will you be mine? Say yes, quickly,'" he only considers his desire to make her his own (Brontë 229). Jane does not want to be owned, and when she agrees to be married after Rochester's first proposal, Jane ensures she is equal by not allowing Rochester to make her his mistress. Rochester treated his past mistresses to fancy things, so Jane keeps Rochester from giving her expensive clothing. She reminds Rochester that she is different from his past partners when she asks him, "Do you remember … the diamonds, the cashmeres you gave [Céline Varens]? I will not be your English Céline Varens. I shall continue to act as Adèle's governess: by that I shall earn my board and lodging … you shall give me nothing" (Brontë 242). Jane assumes that Rochester will expect favors for the gifts, but Jane does not want to be obligated to Rochester. As he tries to turn Jane into his doll to make her his sexual property, Jane denies his attempts, and so denies in their marriage she will be inferior to him in status. Because Jane will not bend to his sexual desires and emotional manipulations, she forces him to change his understanding of what a relationship is, particularly one based on love. By including these moments where Jane defies Rochester and sets the terms of their relationship, Brontë creates a vision of the ways the middle class and upper class can engage with each other on equal footing. By revealing the potential for Jane and Rochester to become emotional equals in marriage, Brontë suggests that Victorian women should have the right to define their selfhood and be unconstrained by the social and gender hierarchies defining their lives and their choices.

Although Jane begins as more emotionally mature than Rochester, her maturity continues to develop through the course of the decisions she makes regarding her relationship with Rochester. Prior to working for Rochester, Jane experienced all social hierarchies and avoided passionate emotional entanglements until her romance with Rochester. Sandra Gilbert argues that Jane and Rochester's "powerful passions" lack rationality (357). Jane becomes so irrational she does not consider waiting to marry or speaking with others about her decision to marry her emotionally manipulating, higher-status employer. Jane's emotional level becomes evident through her thinking and conversations with Rochester. Regarding women and their emotions, Jane says to herself, "Women are supposed to be very calm generally: but women feel just as men feel" (Brontë 101). This shows the distance between Victorian male and female emotional norms. Brontë reveals society is misguided when it believes that women are not people. Brontë demonstrates to her readers that women and men are on the same emotional and intellectual level. By stating women can feel emotions, she shows women are people. Women feel anger, such as the anger from men depriving women the right to be viewed as capable individuals who can think. Brontë demonstrates women can act upon their anger. Thus, they no longer need to confine themselves in their role of perfect homemakers; they can make mistakes and be as flawed as men since both are human and have a shared humanity.

Not only are women on the same emotional level as men, according to Brontë, but women can be equal regardless of social status. Jane embodies her emotional maturity and Brontë's outlook on equality through Jane's response to Rochester when she believes he is ignorant of her emotions; she says, "Do you think I am … a machine without feelings? … Because I am poor, obscure, plain, and little, I am soulless and heartless? You think wrong!—I have as much soul as you,—and full as much heart! It is … just as if we … stood at God's feet, equal,—as we are!" (Brontë 227). In this sentiment, Jane describes her feelings and forces Rochester to acknowledge them. She recognizes how their unequal social status affects their relationship, and, by stressing they are equal in spirits regardless of gender and social class, Jane argues that she is a person, that she wants to be recognized as an individual, and that Christian morals have more power than social and economic status to demonstrate she will be his equal no matter the societal hierarchies. Jane

uses tenets of her Christian faith to support her point about spiritual equality. Jane's passionate emotions empower her to go against patriarchal norms by speaking back to a man, and by including the way Jane talks back to her employer, Brontë contradicts readers' expectations as she refuses to follow social expectations of the period.

Though Jane was naïve when she did not consider the practicalities of Rochester's character and what it would mean to be in a relationship with him, Jane is emotionally mature in the end through her decisions to leave Thornfield. Gao discusses Jane's state of mind and feelings after learning Rochester was married: "She could not stand any compromise ... She wouldn't give up her independence and self-respect. So she chose to leave her beloved one and wanted to make a new life" (Gao 929). This shows her emotional maturity because she puts logic and morals above feelings. She is also mature when she rejects St. John's proposal. St. John wants a woman who could accompany him in his missionary travels, but he does not love Jane. Jane knows that which she acknowledges when she says to him "'Oh! I will give my heart to God ... *You* do not want it'" (Brontë 362). She recognizes he is only using her to further their goals, and Jane cannot marry someone who does not love her and who she does not love. According to Gao, Jane "insists that true love should be based on equality, mutual understanding and respect" (Gao 930). Jane reveals her preference toward this kind of relationship, saying, "were I a gentleman like him, I would take to my bosom only such a wife as I could love" (Brontë 169). Jane resists St. John's proposal because she knows he would treat her as if she were lower in status. This is seen in her thoughts that "He prizes me as a soldier would a good weapon; and that is all" (Brontë 361). Jane can only be with someone who is equal to her socially and emotionally.

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When Jane meets Rochester at Ferndean, his emotional level and maturity have finally developed to be equal to Jane's. He is chastened by pain, loss, and disability. Rochester is envious of St. John, but instead of trying to manipulate and control Jane, Rochester does not force Jane to stay with him. Instead, he tries to free her from the burden of his care, selflessly reminding Jane she would have to care for him. He asks her if she wants to marry "[a] poor blind man, whom you will have to lead about by the hand? ... A crippled man, twenty years older than you, whom you will have to wait on?" (Brontë 396). Prior to being maimed, Rochester treated Jane like a possession to be owned. In acknowledging the downsides of marrying him, Rochester reveals how these events changed his emotional maturity. He has finally realized he cannot possess a person and relies on Jane's free will to decide to marry him because he wants to put her happiness before his. In the end, Jane and Rochester are on equal emotional levels. In their marriage, each depends on the other for love. Jane even thinks "No woman was ever nearer to her mate than I am: ever more absolutely bone of his bone, and flesh of his flesh" (Brontë 401). As they had become one flesh, each is tied to each other for the rest of their lives. Jane has let go of her strong, independent self to marry the person she loves. Brontë shows that two people could equally love the other even if they are of different social and economic standing—at a cost to both. Public reception toward the novel confirms Brontë succeeded in fighting societal norms because of the outraged public who renounced the book (Blakemore par. 6).

JANE AND ROCHESTER, ECONOMIC AND SOCIAL EQUALS

In the end, Jane and Rochester are equal in their emotional feelings and social levels. Although Jane gains an inheritance that would move her into the upper class, she never claims that she belongs to this class and gives away the portion of her fortune (Bronte 344). Jane explains why she does not keep all the money and gives most to her cousins: "I am not brutally selfish, blindly unjust, or fiendishly ungrateful … It would … benefit me to have five thousand pounds; it would torment … me to have twenty thousand pounds; which, moreover, could never be mine in justice," and later explains she has craved a family and wants to be with them now (345-46). The inheritance moves Jane up the social ladder, but since she only keeps one-fourth of it, and because Jane is repelled at the thought of keeping all the money, she shows her ethics and morals, which demonstrates she values relationships over wealth and status. In so doing, Brontë effectively argues for the merits of romantic relationships built on equality.

As Rochester's scandal dissipates and he becomes part of the same class as Jane, Jane fulfills the gender role of caretaker, but also rejects the Victorian standard for female passivity by taking control of their relationship, and Jane and Rochester end up living like the upper classes but continue to practice middle-class morals and values. This portrayal of a poor woman raised in status and empowered to care for her husband while controlling the realities of her married relationships demonstrates the ways *Jane Eyre* plays with gender and social hierarchies to rehabilitate Victorian stereotypes of romance. Jane is neither passive nor dominating, and her ability to control her relationship with her husband is supported by her intense love for him and the feeling they share. Thus, even in its resolution, Jane continues to rebel against the society that attempted to keep her caged and remains determined to live her life on her terms. ❖

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MARIA LAURA PADRON

EFFECTS OF THE WRITTEN EMOTIONAL DISCLOSURE PARADIGM ON PTSD AND MDD SYMPTOMS

ABSTRACT

Almost 70% of the world population experiences at least one traumatic event at some point in life. Yet 45% refuse to seek psychological treatment. Alternative or complementary forms of treatment for people diagnosed with posttraumatic stress disorder (PTSD) or major depressive disorder (MDD) are urgently needed. Writing therapy is a convenient intervention that may benefit patients who refuse to receive traditional psychotherapy due to anxiety or fear of stigmatization. This paper will review literature that explores the effects of writing in different populations (e.g., children and adults) with PTSD or MDD. Pennebaker was the first researcher to test an expressive writing intervention. His findings shed light on this form of treatment and encouraged further researchers to test therapeutic writing in different formats, including Internet-based writing interventions. Positive and adverse effects of writing therapy will be explored to assess whether this may be a promising form of treatment for patients with either posttraumatic stress disorder (PTSD) or major depressive disorder (MDD).

INTRODUCTION

Alternative or complementary forms of treatment are needed for people who are either unable or unwilling to seek conventional therapy. Approximately 65% of the world population have at least one traumatic memory or experience at some point in life. Yet only 20% seek psychological treatment due to fear of negative judgment, stigmatization, and negative beliefs associated with mental health conditions or therapy. Moreover, challenges to build rapport and create a safe environment during therapy discourage patients from being open to discuss their emotional problems (Kuester, Niemeyer, & Knaevelsrud, 2016). Trauma-focused cognitive behavioral therapy (TF-CBT) has been a recommended form of treatment because it combines CBT mechanisms such as confrontation (i.e., imaginal or in-vivo exposure), habituation, and cognitive restructuring (Kuester et al., 2017; de Roos, van der Oord, Zijlstra, Lucassen, Perrin, Emmelkamp, & de Jongh, 2017). Even so, alternative forms of treatment are needed. Writing therapy is a cost-efficient and convenient form of therapy for those who do not participate in traditional psychotherapy either because they can't or they don't want to (Pascoe, 2017). The first psychologist to study the benefits of therapeutic writing was James W. Pennebaker; he called this intervention "written emotional disclosure," also known as "expressive writing." In this intervention, patients write for at least 20 minutes about stressful or traumatic experiences for 3 to 5 consecutive days (Sloan, Feinstein, & Marx, 2009). Since Pennebaker's initial study, subsequent research studies have examined the benefits of expressive writing in a wide variety of mental disorders among different populations. The vast majority of studies have focused on patients who have experienced aversive or significantly traumatic situations (Pascoe, 2017).

While both children and adults suffer from PTSD, approximately 16% of children and adolescents who are exposed to traumatic experiences develop PTSD (de Roos et al., 2017). Circumstances leading to a PTSD diagnosis in a pediatric population can vary from being exposed to peer violence or witnessing the arrest or death of a parent (e.g., suicide) to being involved in a traffic accident or a victim of childhood abuse (van der Oord, Lucassen, van Emmerik, & Emmelkamp, 2010). If untreated, PTSD can lead to development of comorbid disorders, functional impairments, and persistence of PTSD into adulthood (de Roos et al., 2017; van der Oord et al., 2010). Among adults, PTSD prevalence rates vary significantly across genders, with 11.7% for women and 4% for men. Lifetime PTSD prevalence rates can vary between 5% and 55% (Kuester et al., 2016). Among veterans who served in Iraq and Afghanistan, the estimated prevalence rate for PTSD is 22%. Upon return from duty, 17% Army soldiers and 14% Marine soldiers who were deployed to Iraq met criteria for PTSD (Krupnick, Green, Amdur, Alaoui, Belouali, Roberge, Cueva, Roberts, & Melnikoff, 2017). Moreover, 44% soldiers self-reported depression at clinical levels. Comorbidity between PTSD and major depressive disorder (MDD) is common; approximately half of the people diagnosed with PTSD also meet criteria for MDD (Flory &

Yehuda, 2015). In fact, nearly 20% are estimated to experience an episode of depression at some point in life, and between 75% and 80% will experience subsequent depressive episodes, even after recovery (Gortner, Rude, & Pennebaker, 2006). Not enough interventions are available for PTSD (Kuester et al., 2016) or are easily accessible for depression (Ruwaard, Schrieken, Schrijver, Broeksteeg, Dekker, Vermeulen, & Lange, 2009). Therefore, it is important to develop alternative forms of treatment to assist patients who suffer from PTSD, MDD, or both conditions. The following literature review will explore the efficacy of a written emotional disclosure intervention as an alternative or complementary intervention for both posttraumatic stress disorder (PTSD) and major depressive disorder (MDD). It will describe the theoretical components of Pennebaker's written emotional disclosure protocol and review research studies exploring the benefits of therapeutic writing in PTSD and MDD symptoms.

DSM-5 POSTTRAUMATIC STRESS DISORDER

Posttraumatic stress disorder can be found as a subcategory in the DSM-5 section for trauma- and stressor-related disorders (American Psychiatric Association, 2013). It is defined as a mental disorder in which individuals develop pervasive symptoms after being exposed to a traumatic event (e.g., death, serious injury, sexual violence). Generally, people diagnosed with PTSD experience intrusive and recurrent distressing thoughts about the event, as well as recurrent dreams that evoke negative emotions associated with the traumatic event. Avoidance of stimuli associated with the event is also among the diagnostic criteria for PTSD. In some cases, dissociative symptoms in the form of flashbacks, depersonalization, and derealization may be present. Negative implications for mood and cognition include, but are not limited to, inability to recall facts about the traumatic event, recurrent negative thoughts about oneself, irritability or aggressiveness, and hypervigilance. These criteria for PTSD apply to adults, adolescents, and children 6 years and older. For children 6 years and younger, similar criteria for PTSD apply, except for a few minor details. For instance, PTSD-related nightmares in adults often involve content directly related to the traumatic event, whereas in children these can involve frightening or upsetting content that is not directly related to the traumatic event. Also, self-destructive behavior is not among the diagnostic criteria for PTSD in children 6 years

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and younger. Finally, loss of verbal expression among children and pseudo-psychotic features (e.g., false auditory hallucinations) may be present as well.

DSM-5 MAJOR DEPRESSIVE DISORDER

Major depressive disorder is a common condition that can be found as a subcategory in the DSM-5 section for depressive disorders. It is a mental disorder in which individuals have episodes involving dramatic changes in their affective, cognitive, eating, and sleeping patterns for approximately two consecutive weeks (APA, 2013). To meet criteria for MDD, five or more symptoms must be present for two or more consecutive weeks. These include, but are not limited to, depressed mood most of the day, nearly every day, loss of interest or pleasure in daily routine activities, decreased or increased appetite and significant weight loss or gain as a result, insomnia or hypersomnia, and feelings of worthlessness. Fatigue, lack of concentration, and suicidal ideation must be present as well for a complete MDD diagnosis. Also, symptoms must not be attributed to alternative conditions such as substance abuse or medical conditions. Subtypes of MDD exist depending on the presence of single or recurrent episodes, severity of symptoms, and the presence of psychotic features (e.g., hallucinations).

WRITTEN EMOTIONAL DISCLOSURE PARADIGM

Pennebaker hypothesized that people who have experienced trauma often choose not to share their experiences, even though they want to. Individuals may hold back when attempting to seek comfort in others because they fear others might adopt a judgmental stance or react negatively towards them. In other words, people would rather inhibit their emotions if that means they will avoid negative responses from others. This emotional inhibition, according to Pennebaker, results in chronic levels of stress that affect people's mental and physical health, putting them at risk of developing psychological disorders. Based on this notion, Pennebaker developed the written emotional disclosure (WED), also known as expressive writing (EW) protocol, to investigate whether disclosing previous trauma through writing would produce emotional and physiological benefits in traumatized individuals (Pascoe, 2017).

Emotional processing allows people to embrace aversive emotional stimuli in order to let new experiences through. It involves three fundamental processes: arousal of negative feelings, alteration of cognitions, and transformation of negative feelings into positive ones. Pennebaker's written emotional disclosure paradigm is an effective intervention that allows people who have been exposed to stressful or traumatic events process emotions in a healthy way (Murray & Segal, 1994). To test his hypothesis, Pennebaker and Beall (1986) conducted a study to examine whether writing about traumatic events would have both long-term and short-term positive outcomes in emotional and physical health and well being. A total of 46 undergraduates from an introductory psychology course were recruited to participate in the study as part of the course requirements. On the first day of the experiment, participants were randomly assigned to one of two conditions. Participants in both groups were asked to write on four consecutive nights. However, while those in the experimental condition wrote about a stressful or traumatic event that had occurred at some point in their lives, those in the control group wrote about trivial topics. Because the purpose of the study was to assess the effects of written emotional expression rather than vocalized emotional expression, participants in the experimental group were instructed to write and not to discuss their writing with others. Upon completion of the study, health center records and self-reports were collected to determine positive outcomes associated with the intervention. Writing about traumatic events had a positive effect on students, and fewer appointments were made in the health center after the experiment. Short-term increases in physiological arousal and long-term decreases in stress were observed in students as a result of the writing intervention. The results of the study were supportive of Pennebaker's hypothesis.

To further study any positive effects of the written emotional disclosure paradigm on physiological health, Pennebaker and colleagues replicated the results of his initial experiment and found positive outcomes in the immune system (Murray & Segal, 1994). Pennebaker, Kiecolt-Glaser, & Glaser (1988) conducted a research study to assess the effects of a writing intervention on immunological functioning in individuals who have experienced traumatic events. A total of 50 students enrolled in undergraduate psychology courses participated in the study to fulfill an extra-credit class opportunity. Participants were

randomly and equally (in terms of gender) assigned to one of two conditions. They were told they would have to write about a specific topic for four consecutive days. While participants in the trauma condition had to write about the most traumatic and upsetting experience of their lives, participants in the control condition were given the instruction to write about a pre-assigned topic that would not involve feelings or emotions in any way (e.g., time management, social calendar, garment descriptions). At the end of the study, the health center provided data regarding the amount of times participants visited the health center, five weeks prior and during the six-week period of the experiment. Writing about traumatic events had a positive outcome in both the immune and the autonomic nervous system of participants. Improvements on participants' level of distress, which resulted in fewer visits to the health center, were also evidenced. The results of the study supported Pennebaker's idea that inhibiting negative emotions results in clinical levels of distress, and consequently in physical illness.

PREVIOUS RESEARCH ON WRITTEN EMOTIONAL DISCLOSURE

Posttraumatic Stress Disorder

Studies on Pennebaker's written emotional disclosure paradigm have explored two writing formats. The first format consists of short writing assignments in which participants describe their deepest thoughts and feelings about traumatic events, and no feedback is given to them by therapists. In contrast, the second format consists of longer writing assignments of a structured nature (Truijens & van Emmerik, 2014). The use of structured writing to treat grief and posttraumatic stress symptoms has been tested by some researchers. For instance, Lange and colleagues developed an Internet-based writing program called Interapy that consists of structured writing assignments focused on stressful or traumatic experiences (Lange, Rietdijk, Hudcovicova, van de Ven, Schrieken, & Emmelkamp, 2003). Similar to Pennebaker's written emotional disclosure protocol, Interapy involves patients writing for a specific period of time. However, in this intervention patients write for 45 min for five consecutive weeks. Interapy is an innovative form of therapy that integrates research on Pennebaker's expressive writing and cognitive behavioral therapy (CBT; Pascoe, 2017). According to Lange et al. (2003), two essential mechanisms to overcome posttraumatic stress are habituation to aversive stimuli and cognitive reappraisal of the traumatic memories or experiences. The Interapy writing protocol involves self-confrontation about the traumatic event, which eventually leads patients to become habituated to the aversive stimuli, and achieve cognitive reappraisal. Additionally, it involves social sharing. The treatment protocol involves three phases in total. In the first phase, self-confrontation, patients write about previous traumatic events using first person and present tense, providing as many details as possible. They must include all sensory perceptions (e.g., visual, olfactory, auditory) experienced at the time of the traumatic event. In the second phase, cognitive reappraisal, they challenge automatic thoughts associated with the traumatic event and gain a new perspective of said event. This is done with the help of a therapist; the main goal is to help patients regain a sense of control over their lives. In the third and final phase, social sharing, patients learn the benefits of sharing their traumatic experiences with others. In this last phase, patients achieve emotional disclosure as they write a letter to themselves or to a significant other.

The first controlled study on Interapy conducted by Lange involved college students. Lange and colleagues (2001) tested whether the Interapy treatment would help participants with posttraumatic stress and grief. A small group of students were recruited to participate in exchange for course credits. Since the researchers wanted to focus on PTSD-related symptoms solely, participants with other psychological disorders or conditions (e.g., substance abuse, use of antipsychotic medication, psychotic disorders, or major depressive disorder) were excluded from the study. Individuals who were eligible to participate were randomly assigned to either an experimental or a control condition. Both groups received the treatment. However, the control group began treatment as soon as the experimental group finished it. In other words, a waitlist control group was compared to an experimental group. Participants used a normal web browser to communicate with their therapists and complete the writing assignments. For five consecutive weeks, participants were assigned ten sessions (two sessions per week) in which they had to write for 45 minutes. During each phase of the Interapy treatment, they received feedback from their therapists on writing assignments and further instructions to proceed with the experiment.

During the first phase, participants wrote about their most intimate fears and most traumatic experiences, describing as many details as possible. During the second phase, cognitive reappraisal, they adopted new perspectives of the event and regained a sense of control. Finally, the last phase, sharing and farewell ritual, had participants write a letter to either themselves or to a significant other. Upon completion of the experiment, the researchers found that those in the experimental group had significant improvements on PTSD-related and grief symptoms compared to those in the waitlist control group. These results were supportive of Lange's notion that Internet-based treatments can be effective to help patients with PTSD and other psychological conditions (Lange, van de Ven, Schrieken, & Emmelkamp, 2001).

Following the first controlled study, Lange et al. (2003) conducted a second controlled randomized trial to further explore the benefits of the Interapy writing protocol among people experiencing posttraumatic stress symptoms. As in the initial study, participants were assigned to one of two conditions (experimental and waitlist control). Treatment for the experimental condition started immediately after recruitment, while treatment for the control condition started after the experimental group had concluded all treatment procedures. Participants wrote for five consecutive weeks; they completed two 45-min sessions per week. Between each phase of the Interapy writing protocol, they received feedback by therapists about their writing assignments. Once again, the researchers found that participants in the experimental group had better outcomes when compared to the control group. Their posttraumatic stress symptoms improved significantly more than those of participants in the waitlist group. Lange's success in demonstrating the effects of an online writing intervention encouraged other researchers to replicate his results and test his hypothesis. For instance, Knaevelsrud and Maercker (2007) conducted a research study to evaluate the efficacy of the Interapy writing protocol using a German-speaking population in order to generalize Lange's results. Additionally, the strength of the online therapeutic alliance was measured. Participants were randomly assigned to either an experimental group or a waitlist group. Participants in the waitlist group began treatment after the experimental group completed the post-assessment. The treatment

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had a five-week duration period. The results of the study showed significant improvements in the severity of PTSD symptoms and related psychopathological symptoms for the treatment group. Patients in the treatment group also showed significant decrease in comorbid depressive and anxiety symptoms as compared to those in the control group. As for the therapeutic alliance, the online intervention allowed for a positive and stable therapeutic alliance to be established. There were significant improvements in the quality of the online patient-therapist relationship at the end of the intervention. Van Emmerik and colleagues (2008) conducted a study to test a writing intervention in participants with posttraumatic stress disorder (PTSD) and acute stress disorder (ASD). Structured writing therapy (SWT), adapted from Lange's Interapy protocol, was compared to CBT and to a waitlist control condition. Unlike previous studies, the control condition did not receive any treatment. CBT included psychoeducation, imaginal and in vivo exposure, and cognitive restructuring. SWT consisted of three phases as described by Lange. The first phase was self-confrontation, the second one was cognitive reappraisal, and the third one was the sharing and farewell ritual phase. Participants were randomly assigned to either one of two experimental conditions (CBT or SWT), or to the waitlist control condition. Both CBT and SWT consisted of weekly sessions lasting less than 120 min approximately. Though participants in both experimental groups showed improvements in their diagnostic status and lower levels of depression and state anxiety, treatment was not associated with trait anxiety or disassociation improvement. Also, CBT and SWT showed no significant differences in terms of efficacy (van Emmerik, Kamphuis, & Emmelkamp, 2008).

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Most research studies assessing PTSD symptoms have focused on the adult population. Only a few have investigated prevalence rates and treatment interventions for PTSD among children and adolescents. Some researchers who have focused on the pediatric population use cognitive behavioral writing therapy (CBWT), a brief version of Interapy adapted for children. Van de Oor and colleagues (2010) conducted the first research study on the efficacy of CBWT in children and adolescents with PTSD stemming from single and recurrent traumas. Children received five treatment sessions (once every two weeks). PTSD symptoms were assessed prior to

and after receiving treatment. Follow-up was conducted six months after post-assessment. It was found among the results of the study that children had significant reductions of all PTSD symptoms upon completion of the experiment; effects were maintained for approximately six months (van der Oord, Lucassen, van Emmerik, & Emmelkamp, 2010). In a similar study, de Roos et al. (2017) explored the effects of CBWT in a pediatric sample. CBWT was compared with another common intervention for PTSD, eye movement desensitization and reprocessing therapy (EMDR), and a wait-list (WL) condition. Participants were randomly assigned to one of three conditions, CBWT, EMDR, or WL. Participants in the WL group began treatment six weeks later, and treatment would be either CBWT or EMDR. To determine this, those in WL were randomly assigned a second time to either one of the two treatment conditions. After the experiment was completed, no significant differences between CBWT and EMDR were found. Both treatments were well tolerated by participants and were effective in reducing PTSD symptoms compared to the WL condition. Moreover, participants in the CBWT and EMDR groups no longer met criteria for PTSD at the end of the experiment. These effects remained stable for 3 to 12 months.

While many researchers have focused on online writing interventions for PTSD, others have used Pennebaker's written emotional disclosure (WED) protocol, which does not involve the use of computers. Sloan, Marx, and Greenberg (2011) conducted a study on undergraduate students with PTSD diagnosis using Pennebaker's WED procedure as treatment. Students who participated in the study received credit in their introductory psychology research course. The research study followed the same standard protocol implemented by Pennebaker. Participants were randomly assigned to one of two conditions, WED or control writing. Both groups were instructed to write for 20 minutes for three consecutive days. However, those assigned to the WED condition had to write about the most traumatic experience of their lives, describing as much as possible their feelings and emotions. Those in the control writing condition had to write about time management, without describing any emotions. Contrary to Pennebaker's results, the researchers found no significant differences between the WED and the control writing group regarding PTSD diagnosis. In other words, there were no reductions of PTSD symptoms among participants assigned to either condition. Although the results of the study showed no positive effects of WED, a subsequent study showed otherwise. Using a modified protocol referred to as written exposure therapy (WET), Sloan and colleagues (2012) further explored the efficacy of therapeutic writing in adults with current PTSD diagnosis as a result of a motor vehicle accident. Instead of using a control condition, the researchers decided to use a waitlist (WL) condition. Participants were randomly assigned to either WET or WL. In this modified writing protocol, sessions had a duration of 30 instead of 20 minutes like in the first study. At the end of the study, the researchers found that participants in the WET group showed significant reductions in PTSD symptoms compared to participants in the WL group (Sloan, Marx, Bovin, Feinstein, & Gallagher, 2012). Similar results were obtained in another study conducted by Sloan and colleagues (2013) to evaluate the efficacy of WET in veterans diagnosed with PTSD. In this study, participants wrote about their most traumatic experiences while including details about their thoughts and feelings at the time of the traumatic event. At the end of treatment, participants showed significant improvements in the severity of PTSD symptoms. Some of them even did no longer meet criteria for PTSD. These findings suggest that WET may not only work with civilians, but also with veteran soldiers who are severely traumatized upon returning from war (Sloan, Lee, Litwack, Sawyer, & Marx, 2013).

Major Depressive Disorder

Numerous studies have evaluated the benefits of written emotional disclosure (WED) in patients with PTSD, but only a few have focused on major depressive disorder (MDD) or depressive symptoms. According to Gortner, Rude, and Pennebaker (2006), depressed people tend to avoid or suppress negative thoughts, but they also engage in rumination, which is the repetitive focus on negative cognitions and behaviors that lead to depressive symptoms in the first place. One intervention identified as potentially effective to promote cognitive processing is Pennebaker's expressive writing paradigm. Sloan and colleagues (2008) conducted a study to assess whether ruminations would have an effect on expressive writing. College students in their freshmen year (who were experiencing anxiety and depressive symptoms as a result of college transitioning) were randomly assigned to

one of two conditions, expressive writing or control writing. As in Pennebaker's initial study, participants in the expressive writing group wrote about the most stressful or traumatic experience of their lives. In contrast, participants in the control writing group wrote about time management, without describing any emotions or feelings. All participants, regardless of the condition they were assigned to, wrote for 20 min on three consecutive days. At the end of the study, participants returned 2, 4, and 6 months later for follow-up assessments. The researchers found that rumination did have an effect on expressive writing. Fewer depression symptoms were reported by students who scored high in rumination and were assigned to the expressive writing condition. Students in the control writing condition, however, showed no positive effects in terms of alleviation of depressive symptoms (Sloan, Marx, Epstein, & Dobbs, 2008).

These results demonstrate that expressive writing can help depressed individuals with ruminations that contribute to their state of depression. Supportive evidence of these findings can be found in similar studies. Gortner et al. (2006) conducted a study to evaluate benefits of expressive writing in ruminating thoughts and depressive symptoms among college students. An additional feature of the experiment was a "booster" writing session that the researchers predicted would enhance the benefits of the intervention. Participants who reported previous severe and current normal levels of depression were chosen and randomly assigned to either an emotionally expressive or a control condition. All participants wrote for 30 min for three consecutive days. In line with previous studies, the emotionally expressive group wrote about overwhelmingly upsetting thoughts, whereas the control group wrote about daily planning. As for the "booster" writing session, half of the participants in each condition (i.e., treatment and control condition) were randomly selected to receive an additional writing session five weeks after the initial writing intervention. Participants received the same instructions as in their last conditions. That is, those assigned to the treatment condition before were asked again to write about distressing thoughts and emotions, while those in the control condition were asked again to write about daily planning. As predicted, participants in the treatment condition exhibited significantly lower levels of depression at the end of the experiment. However, the "booster" writing session did not enhance the benefits of the intervention.

Gortner and colleagues hypothesized that expressive writing would allow individuals with depression to implicitly accept and process difficult emotions. The results of their study encouraged other researchers to further explore the benefits of this intervention, but using a different approach. For instance, Baum and Rude (2013) hypothesized that individuals with depression would benefit more from expressive writing if they explicitly suppressed negative thoughts associated with their stressful or traumatic experiences. They conducted a study to test their hypothesis. College students experiencing low initial depression were recruited and randomly assigned to one of three conditions, traditional expressive writing (EW), expressive writing augmented by emotion-acceptance instructions (EWEA), or control writing. Both the EW and the control writing condition followed standard procedures as described in previous studies by Pennebaker and colleagues. Instead, the EWEA condition followed standard EW instructions plus additional instructions adapted from some mindfulness and self-compassion interventions to increase self-awareness in participants. Moreover, participants in the EWEA condition were provided with phrases that encouraged them to embrace their inner thoughts and distressing emotions, and take a more compassionate stance toward themselves in their writing. Toward the end of the experiment, the researchers found that participants with low to mild initial depression benefited more from the EWEA condition, while those with very low initial depression benefited more from the EW condition. A surprising discovery of the study was that the EW condition had adverse effects in participants with high initial depression as compared to those in the control condition.

While these results showed adverse outcomes for individuals with severe initial levels of depression, a study conducted by Krpan and colleagues showed different results for people diagnosed with major depressive disorder (MDD). Participants with current MDD diagnosis were recruited and randomly assigned to either an expressive writing (EW) condition or a control writing (CW) condition. Procedures were the same as those outlined by Pennebaker and colleagues in their initial study. Participants engaged in 20-min writing sessions for three consecutive days. Those in the EW group wrote about their deepest thoughts and emotions

associated with the most stressful or traumatic event in their lives, while those in the CW group wrote about time management. At the end of the intervention, people with MDD showed a significant improvement in terms of depressive symptoms. These effects were sustained for a 4-month period (Krpan, Kross, Berman, Deldin, Askren, & Jonides, 2013).

Another study revealed that expressive writing was associated with sudden gains, large and stable reductions in symptoms between treatment sessions, in individuals at risk of depression due to a history of childhood abuse. Lorenz, Pulverman, and Meston (2013) conducted a study to assess whether expressive writing would produce sudden gains in a sample of women who were victims of childhood sexual abuse and were at high risk of depression as a result. Those eligible for the study were randomly assigned to either a treatment (expressive writing) or a control writing condition. Participants engaged in 30-min writing sessions, having no more than one session per week (5 sessions total). By the end of the study, women in the treatment condition (who wrote deeply about distressing thoughts and emotions) showed large gains or improvements in depression compared to women in the control condition (who merely wrote about their daily needs). These results tentatively suggest that expressive writing can enhance sudden gains in people at risk of depression.

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EVALUATION OF PREVIOUS STUDIES ON WED

Strengths

Pivotal studies. While Pennebaker was the first to conduct a study on writing therapy, some researchers who replicated his results used a specific feature or method that makes them distinctive from previous studies. For instance, de Roos et al. (2017) conducted the first study with three conditions to demonstrate the efficacy of two interventions (EMDR and CBWT) as compared to a waitlist condition in a pediatric sample with PTSD symptoms. It is also the first study to use computers to implement a CBWT intervention in children and adolescents. Lange and colleagues (2003) conducted the first randomized controlled trial to evaluate the benefits of an Internet-based writing intervention in a non-student sample suffering

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research studies stem from Pennebaker's initial study on expressive writing, the researchers adapted the intervention in order to differentiate it from Pennebaker's expressive writing intervention. This is especially important because not everyone will respond to one specific form of treatment.

Convenient procedure. The Interapy protocol, based on Pennebaker's expressive writing protocol, has been described as an easily accessible treatment. Because it is based on the Internet, it has the advantage of reaching populations that live in remote areas, that are physically disabled with restricted mobility, or that are reluctant to see a therapist due to anxiety or fear of stigmatization. Another advantage of Interapy is that therapists do not have to react immediately to the patient's concerns, thereby allowing themselves to formulate an appropriate feedback response. Moreover, its treatment protocol is convenient in that it is highly structured, with ten sessions that follow a specific order.

from PTSD symptoms. Knaevelsrud and Maercker (2007) replicated Lange's results and were the first researchers to implement Interapy in a German-speaking sample, thereby increasing the generalizability of Lange's findings at a cross-cultural dimension. Gortner et al. (2006) were the first researchers to take a new step and conduct a study to explore the expressive writing intervention in participants with a different diagnosis (other than PTSD). They used a sample of formerly depressed participants and tested whether expressive writing would lower their rumination and depressive symptoms. While the researchers obtained mixed results, Krpan and colleagues (2013) were the first researchers to conduct a study that demonstrates the efficacy of expressive writing among people with major depressive disorder (MDD). While most of these

Participants are given detailed instructions about how to access the Interapy platform and what the procedure will be through psychoeducation. Additionally, they receive extensive feedback from highly qualified therapists (Lange et al., 2003). For their study, van der Oord and colleagues adapted Lange's Interapy protocol into cognitive behavioral writing therapy (CBWT), a child-friendly version of the adult Internet-based intervention. CBWT consists of procedures that are appealing and motivating to children and adolescents because they get to use a computer, which enhances emotional engagement. Another advantage of this intervention is that the treatment length is shorter than other treatments. While most writing interventions consist of 10 to 18 sessions, the researchers implemented five writing

sessions for this particular intervention (van der Oord et al., 2010). Writing therapy, whether implemented in a traditional setting or online, is a cost-effective and easily accessible treatment. People who are unable or unwilling to receive traditional psychotherapy may be more comfortable writing about their experiences rather than sharing them out loud with a total stranger (Pascoe, 2017).

Long-term benefits. Participants in most research studies involving expressive writing have had the advantage of experiencing few short-term adverse effects (if any) and long-term benefits. Since Pennebaker's study, which demonstrated positive outcomes for all participants in the experimental group, several studies have resulted in long-term physiological, emotional, and psychological health improvements in most individuals. Lange and colleagues (2001) did an experiment to test the Internet-based writing intervention, Interapy. Participants had to complete an evaluation questionnaire six weeks after treatment was administered. Responses of the questionnaire showed that 95% of participants found the writing intervention to be very helpful to overcome traumatic experiences. More than 80% of participants showed significant clinical improvements in PTSD symptoms. Van der Oord et al. (2010) also did an experiment to test an Internet-based writing intervention, cognitive behavioral writing therapy (CBWT), which was adapted from Interapy to be administered in children and adolescents. One of the greatest strengths of this intervention, as mentioned by the researchers, is that it involves a written narrative of the traumatic event, allowing for a storyline to be constructed. Participants not only write down a storyline of the traumatic event, but also their adaptive thoughts (as this is part of the restructuring phase). The advantage of this is that the exposure and restructuring can be reread for as long as the participant deems it necessary for a proper recovery. They can also share their writing with any significant other they find themselves comfortable with. The expressive writing protocol, in its traditional form, has also shown positive outcomes for most participants. Sloan and colleagues (2013) tested an expressive writing intervention they called written exposure therapy (WET) to differentiate it from Pennebaker's WED protocol. Veterans who participated in the study reported high satisfaction levels with regards to the treatment. In a similar study, Gortner et al. (2006) tested an expressive writing intervention in patients with depressive symptoms. In a follow-up questionnaire, most participants gave positive feedback regarding directions of the study to write about their emotions. Some participants commented that writing about their thoughts really helped them to let go negative feelings and emotions that they tend to keep inside.

High external validity. The Interapy protocol conducted by Lange has proven to be a widely accepted form of treatment. In other words, it has shown to have high external validity. Based on a theoretical model, the protocol consists of 10 writing sessions following a specific order. While most face-to-face writing interventions are simpler and shorter, writing sessions may have a disorganized order and less precise feedback. Most participants who have tried the Interapy protocol have shared that they feel more comfortable with this online writing format. They have reported that it is more appealing to them because they feel more appreciated. The Interapy protocol provides patients with extensive feedback from therapists in addition to the writing sessions. This suggests that a strong therapeutic alliance, or therapeutic relationship, can be built online with the Interapy protocol (Lange, 2001). The high external validity of the Interapy protocol is also supported by the fact that many of the therapists who participated in Lange's studies were graduate and postgraduate clinical psychology students. They received extensive training to use writing assignments to treat PTSD and other grief-related conditions. Additionally, they were monitored while administering the treatment (i.e., giving instructions) and providing feedback (Lange, 2003). In a study conducted by Graf, Gaudiano, and Geller (2008), the high external validity was also supported by the inclusion of well-trained mental health professionals with different theoretical orientations in the study. Graf and colleagues aimed to investigate whether Pennebaker's WED protocol would benefit patients receiving outpatient psychotherapy. The intervention was adapted to be implemented as a homework intervention. Participants were randomly assigned to either a WED or a writing control group. Participants in both groups wrote for 20 min for two consecutive weeks. However, those in the WED condition wrote about their most stressful and upsetting experiences, while those in the writing control condition wrote about time management. The researchers found that those who were assigned to WED showed significant reductions in anxiety and depressive symptoms,

as well as greater overall progress in psychotherapy. The study was successful to demonstrate the efficacy of WED in populations enrolled in outpatient psychotherapy, and the external validity of the study was established.

Psychometric measures. To assess PTSD and MDD symptoms, most research studies used the Clinician-Administered PTSD Scale (CAPS), the Structured Clinical Interview for DSM-IV Axis I Disorders with Psychotic Screen (SCID; Sloan et al., 2013), and the Beck Depression Inventory (BDI; Gortner et al., 2006). The CAPS is a widely used instrument to assess PTSD diagnosis and symptom severity. More specifically, it assesses the 17 PTSD core symptoms as defined by the DSM-IV, and it allows the interviewer to rate on a 5-point scale the frequency and intensity of each symptom, the impact that such symptoms have had on the interviewee's social and occupational functioning, and the overall severity of each symptom. The global validity of ratings obtained is also assessed. The CAPS has a sensitivity of .81, a specificity of .95, and a test-retest reliability between .90 and .96, (Sloan et al., 2013; Sloan et al., 2012) making it a great instrument to measure PTSD symptoms. A child-version of the CAPS, the Clinician Administered PTSD Scale–Child and Adolescent Version (CAPS-CA) was used by de Roos et al. (2017) to assess PTSD symptoms in a pediatric sample. They and other researchers, van der Oord et al. (2010), also used the Children's Responses to Trauma Inventory (CRTI) and the Post Traumatic Cognitions Inventory–Child Version (PTCI-C). Both instruments have been widely used to assess trauma-related symptoms and cognitions. The CRTI is a self-report measure for PTSD and other post-traumatic reactions in children. It has shown excellent internal consistency (.90) and adequate discriminant and convergent validity. As for the PTCI-C, this has shown good internal consistency as well (.93). It is used to assess trauma-related cognitions (van der Oord, 2010). The SCID has also been widely used to assess PTSD symptoms and the presence of psychotic symptoms. This is a semi-structured interview used to assess major Axis I disorders and psychotic symptoms (Sloan et al., 2013; Sloan et al., 2012). According to Shankman and colleagues (2018), the SCID has demonstrated excellent internal consistency (.80) and test-retest reliability (Shankman, Funkhouser, Klein, Davila, Lerner, & Hee, 2018). The BDI is a widely used measure for depressive symptoms (Lorenz et al., 2013). It is a 21-item self-report measure that assesses affective, cognitive, motivational, and physiological symptoms of depression (Sloan et al., 2011). Overall, the BDI has shown high internal consistency (.81), concurrent validity (.60), temporal stability (.83), as well as construct validity in that it actually measures symptoms considered to be indicative of depression (Gortner et al., 2006).

Limitations

Small sample size. Many research studies involving expressive writing consist of a small sample. This is an important factor because it limits the generalizability of the results. In Pennebaker and Beall (1986), the total sample size was 46 college students. Subjects with debilitating undisclosed past trauma were not selected to participate in the experiment. Lange et al. (2001) also used a small sample for their study. From 500 potential participants, 41 were selected to be part of the study. Strict exclusion criteria might explain the size of the sample. Exclusion criteria for the study was substance abuse, severe major depression, psychological dissociation, psychotic disorder or use of antipsychotic medication, and current involvement with other psychological treatment. In Sloan et al. (2011), the sample size used was similar to that of Lange and colleagues; a total of 42 participants completed the study. The researchers attempted to recruit approximately 20 participants for each condition in the study. Subsequent studies by Sloan and colleagues showed no improvements in terms of sample size. One study used 7 male veterans to assess the benefits of expressive writing in the severity of their PTSD symptoms. Because of this, results of this study should be carefully reviewed and interpreted (Sloan et al., 2013). Another study used a sample size similar to previous research studies. A total of 46 adults with a PTSD diagnosis were included in the study. While 145 people applied to participate in the study, 68 did not qualify. Of 77 individuals who were contacted for an initial assessment, 10 did not show up. The remaining 67 were evaluated, and only 46 met the inclusion criteria (Sloan et al., 2012). The vast majority of research studies assessing this form of treatment have strict exclusion criteria, resulting in the disqualification of a great number of potential participants from the study. Consequently, the researchers end up with a significantly small sample, thereby limiting the generalizability of their findings.

High drop-out rates. Some studies, especially those assessing an online intervention, resulted

in high drop-out rates. In Lange (2001), six potential participants refused to complete the screening procedure due to fear of reviving the past or not having enough time to complete the study. Five participants who began the study dropped out, some of them because they had no quiet place to write and others because they could not limit themselves to write about only one trauma. One participant quit because he improved significantly during the first part of the experiment, and he no longer needed further treatment. Moreover, in Lange et al. (2003), the drop-out rate was even higher. Of 44 participants who dropped out, 18 reported having some technical issues with either the network or the computer, 13 preferred face-to-face treatment, and 13 other felt that writing about their traumatic or stressful experiences would be too much to handle. Van Emmerik et al. (2008) assessed an intervention adapted from Interapy, CBWT. The study resulted in high drop-out rates as well. Of 125 participants, only 85 completed the posttest phase and 66 completed the follow-up. Another study that resulted in a significant drop-out rate was conducted by Baum and Rude (2013), who tested an expressive writing intervention in participants with low initial depression. The drop-out rate was 26%, which seemed significant because it resulted in a trend for minority groups and males to be less represented in the study, thereby compromising the generalizability of the results. Drop-out rates in most studies tend to be the result of a lack of confidence in the treatment, or in the case of Internet-based studies, technical issues. It is critical for other researchers to interpret these results very cautiously.

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Absence of a control group. Many researchers investigating Internet-based writing interventions compared the treatment condition with a waitlist condition instead of a control condition. For instance, to test Interapy, Lange et al. (2001) compared a treatment condition (Interapy) with a waitlist (WL) condition. Van Emmerik et al. (2008) compared a structured writing therapy intervention, adapted from the Interapy protocol, to a waitlist condition. Both groups received treatment; however, those in the waitlist group initiated treatment right after the experimental group terminated it. The researchers acknowledged that Interapy has only been compared to waitlist conditions in people who have not been formally diagnosed with acute stress disorder (ASD) or posttraumatic stress disorder (PTSD). In their research study, Knaevelsrud and Maercker (2007) compared the treatment group with a waitlist group when replicating findings of Lange and colleagues. Additionally, they

recognized that not including a placebo control group would result in higher effect sizes, since both conditions received the treatment. In an attempt to explain this methodological decision, the researchers argued that it would have been unethical to deny treatment to people who had already been assigned to the waitlist group. In the absence of a placebo control group, it is not possible to conclude that the treatment was actually efficacious. In other words, it is not possible to attribute the long-term benefits shown by participants to the treatment itself. Further studies should include a placebo control condition to be compared with the treatment condition, thereby increasing confidence in the treatment's efficacy.

CONCLUSIONS

Writing therapy has been identified as a promising alternative or complementary form of treatment for people who struggle with PTSD and MDD. Different symptoms characterize these two conditions. However, what they have in common is that patients experience great levels of distress. It is very common for people who go through stressful or traumatic events to suppress their feelings. In many cases, they do not know how to cope or talk to someone about their negative experiences. Discussing their experiences with a total stranger or even significant others may seem like an overwhelming task for them. Some might not even be able to articulate what they have gone through. Expressive writing allows patients to express their feelings and emotions in a positive way. It is a cost-effective and easily accessible treatment in which patients can actually let go of those negative feelings and emotions without feeling as if they are being judged. Many patients who do not seek psychological treatment fear the stigma associated with their psychological conditions. Pennebaker's expressive writing intervention has been adapted by some researchers (e.g., Lange, de Roos, van der Oord) to suit needs of patients who avoid traditional treatment due to fear of stigmatization or anxiety. These newly adapted interventions are conducted online so that patients living in remote areas can receive treatment, as well as those who refuse to seek face-to-face therapy.

Although Pennebaker's expressive writing (EW) protocol has demonstrated positive results for participants with PTSD and MDD, Interapy seems to be a more suitable form of treatment for participants with PTSD. There is strong evidence from research studies that suggests people with PTSD experience long-term benefits from this particular intervention adapted by Lange and colleagues. Interapy integrates elements of Pennebaker's expressive writing therapy with elements of cognitive behavioral therapy (CBT), such as exposure and cognitive restructuring. Since people diagnosed PTSD may experience negative cognitions associated with the traumatic event, modifying those cognitions is an essential aspect of the recovery process. Through self-confrontation and cognitive reappraisal, the Interapy protocol helps patients to habituate to the aversive stimuli and challenge automatic thoughts and regain control over their own lives. Additionally, Interapy has been adapted for pediatric populations. Evidence of this can be found in some research studies (e.g., de Roos and van der Oord) that were successful in demonstrating the efficacy of CBWT, adapted from the Interapy protocol administered in adults. It seems reasonable to conclude that Pennebaker's expressive writing seems like a promising alternative (or complementary to CBT) to help patients with either PTSD or MDD. However, Lange's Interapy protocol seems more beneficial to help people with PTSD due to its integrative approach and highly structured nature.

A relevant aspect seen in the research discussed in this paper is that Internet-based writing interventions have been used more frequently in participants diagnosed with PTSD. Not many research studies are available that demonstrate the efficacy of online interventions such as Interapy or CBWT in patients with MDD. Further research studies should definitely explore the benefits of Internet-based writing interventions in patients with this condition. It should be also emphasized that so far, there are no studies available that compare traditional writing interventions with Internet-based writing interventions. It could be potentially useful to compare Pennebaker's expressive writing protocol with Lange's Interapy protocol to see which intervention results in long-term benefits for patients with PTSD or MDD. Another important consideration for further research is to include more studies that focus on children and adolescents. Not enough studies are available that explore the benefits of Pennebaker's expressive writing protocol in pediatric populations. Writing therapy has the advantage of being a versatile form of treatment. Further research studies should be focused on adapting

this form of treatment to suit the needs of both adult and pediatric populations. ❖

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The citation system used in this essay is APA 7th.

ANGELA GROENEVELD

COGNITIVE BEHAVIORAL THERAPY TREATMENT FOR IRRITABLE BOWEL SYNDROME: A SYSTEMATIC REVIEW

ABSTRACT

Irritable Bowel Syndrome (IBS) is a physical disorder and is a chronic condition with symptoms like cramping, abdominal pain, and more (Mayo Clinic Staff, 2021). Of all people with IBS, only a small number have severe signs and symptoms, but about 10-15% of the worldwide population is estimated to have IBS (Canavan et al, 2014; Facts About IBS, 2021). The aim of this literature review is to discuss the relationship between IBS and psychological factors to understand how IBS symptoms can be treated by cognitive behavioral therapy (CBT) and then to evaluate the effectiveness of CBT treatment for IBS. The findings of this literature review were that CBT treatment is effective for IBS patients, but the relationship is still very unclear as different studies have come to different conclusions as to why CBT works for IBS patients. This literature review suggests that there needs to be more research on how CBT treatment reduces the IBS patient's symptom severity. It would be beneficial for IBS treatment to conduct a study that would evaluate all the pathways described in the existing studies.

INTRODUCTION

Irritable Bowel Syndrome (IBS) is a physical disorder and a chronic condition with symptoms like cramping and abdominal pain (Mayo Clinic Staff, 2021). Of all people with IBS, only a small number experience severe symptoms. About 10-15% of the worldwide population is estimated to have IBS (Canavan et al, 2014; *Facts About IBS*, 2021). The exact cause of IBS is unknown (Greene & Blanchard, 1994) but there are some factors that play a role in IBS: muscle contractions in the intestine, nervous system abnormalities, severe infection, early life stress, and changes in gut microbes (Mayo Clinic Staff, 2021). The exact cause of IBS is unknown because there are no structural or other physiological abnormalities found in IBS patients. Usual treatment for IBS is gastrointestinal (GI) symptom monitoring and routine medical care, but it has been shown that different psychological treatments for IBS have been superior to usual medical treatment (Greene & Blanchard, 1994). Psychotherapy has been included in the therapeutic approaches in various ways such as hypnotherapy, relaxation training, biofeedback, and assertiveness training (Greene & Blanchard, 1994). The set of procedures that falls under cognitive therapy is included in most studies mentioned in Greene & Blanchard (1994) that were found superior to usual treatment of symptom monitoring and medical care.

This literature review will explore what IBS is and discuss its relationship to psychological factors to understand how IBS symptoms can be treated by cognitive behavioral therapy (CBT). Several research studies will be discussed to look at the efficacy of psychological treatment for IBS patients. Moreover, studies explaining the relationship between IBS symptoms and CBT will be discussed. Lastly, comorbidity will also be a topic of interest.

IRRITABLE BOWEL SYNDROME

The three types of IBS are: irritable bowel syndrome-diarrhea (IBS-D), irritable bowel syndrome-constipation (IBS-C), irritable bowel syndrome-mixed (IBS-M) (Kinsinger, 2017). Traditionally, symptoms are not caused by abnormalities in structures or biochemicals. This is because it is considered a "functional" condition and not "organic", like Crohn's disease, where an abnormality in physiology can be found (Kinsinger, 2017). Important to understand is that IBS is a chronic disease and therefore cannot be treated to be cured. Therefore, the treatment that IBS patients receive is purely for symptoms and not for the disease itself; this is also the way that medical treatment is set up (Ljotsson, Andreewitch, Hedman, Ruck, Andersson, Lindefors, 2010). IBS has a major influence on once's quality of life and therefore the aim should be to relieve IBS symptoms. Moreover, most patients are used to being dismissed by their health care providers and told that the symptoms are psychosomatic (Kinsinger, 2017). Psychosomatic disorders are disorders that involve both the body and the mind (Willacy, 2020). Stress, for example, can increase the IBS symptoms in a patient (Kinsinger, 2017).

PSYCHOLOGICAL ASPECTS OF IBS

Psychological factors like stress can influence the gut directly and via this mediator contributes to IBS symptoms. This is sometimes discussed as the brain-gut axis (Windgassen, Moss-Morris, Chilcot, Sibelli, Goldsmith, Chalder, 2017). The communication between the brain and the gut is bidirectional and very complex. Stress can influence the perception of visceral pain and directly influence motility of the gut (Kinsinger, 2017; Posserud et al, 2004). Moreover, research has found multiple processing mechanisms, psychological and central, that contribute to the dysregulation of the brain-gut axis. Some of these are visceral hypersensitivity, visceral anxiety, and central processing deficits, where "visceral" refers to internal and instinctual (Kinsinger, 2017).

Visceral hypersensitivity is the first feature of IBS and probably the most important; it is defined by an increased tendency to perceive pain with normal bowel functioning. IBS patients have a lower pain tolerance for rectal balloon distention than people without IBS. The second feature is visceral pain sensitivity which is the abnormal pain processing that occurs in the central nervous system. Patients with IBS seem to show a greater activation of emotional arousal networks in response to visceral activation than healthy people. Moreover, in healthy people pain is downregulated by the brain, but in IBS patients these controls do not downregulate the pain. The last feature of IBS related to psychological components is visceral anxiety and catastrophizing. IBS patients also tend to fear bowel symptoms and places where the symptoms may occur (Kinsinger, 2017). Given all the psychological factors that contribute to IBS symptoms (Kinsinger, 2017; Wingassen, 2017), it is understandable that there are psychological treatments available for IBS patients and that these interventions are currently researched. Just as the mind can influence the body negatively, it can also influence the body in a positive manner, and one of the ways this has been used to treat IBS is cognitive behavioral therapy.

COGNITIVE-BEHAVIORAL THERAPY

Cognitive behavioral therapy is a psychotherapeutic treatment type that aims to help people identify and change destructive or disturbing thought patterns which are negatively influencing behavior and emotions (Cherry, 2020). Using CBT, the negative thoughts are identified, then challenged and replaced with thoughts that are more positive and helpful to the patient (Cherry, 2020). CBT interventions are used to systematically teach patients with IBS the needed cognitive and behavioral skills to manage stress, anxiety, and the symptoms of IBS better (Jones, Koloski, Boyce & Talley, 2011). Learning these skills can help IBS patients to reduce the fear associated with these symptoms, stress, and anxiety. This helps the patients manage the emotional consequences of IBS, resulting in a positive cycle of both behavioral and cognitive changes resulting in better physical functioning, psychological functioning, and reduction in symptom severity of IBS (Jones et al, 2011). There are certain techniques that are used in the CBT treatment for IBS patients: psychoeducation, relaxation strategies, cognitive restructuring, problem-solving skills, and exposure techniques (Kinsinger, 2017).

COMPONENTS OF COGNITIVE-BEHAVIORAL THERAPY FOR IRRITABLE BOWEL SYNDROME

The first component of CBT that is often used for IBS patients in their treatment is psychoeducation, the education of IBS patients about their illness. This is considered a key component of the treatment and aims to dispel

Photo by Sora Shimazaki.

myths about IBS and explain the very important brain-gut axis. By understanding the illness better, the patient will have improved insight into the role of stress and other lifestyle factors. The patient will also be more likely to believe in the CBT treatment and will give more support to it which benefits the treatment (Kinsinger, 2017).

The second component encompasses relaxation strategies; they are used for IBS patients to teach them skills so that they can regulate the autonomic arousal that they experience. Autonomic arousal is the arousal of the autonomic nervous system. It can also be used to increase the awareness of a patient's physical tension which may be contributing to the IBS symptoms (Kinsinger, 2017).

Cognitive restructuring is the third component and addresses the anxiety related to the symptoms of IBS and the hypervigilance experienced by the patient. The connection between the distorted thoughts and stress to the digestive symptoms is first explained to the patient to increase their awareness of this relationship. To do this, the therapist will provide an example of catastrophizing and will explain the consequences of this distorted thought on the symptoms of the patient. The patient will also use a worksheet to track thoughts that are associated with the illness and stressful events. Then the cognitive restructuring helps to generate more balanced and accurate perspectives in the patient's mind (Kinsinger, 2017).

Problem-solving skills training is another CBT component included in the treatment for IBS patients to encourage a more flexible use of coping strategies for uncontrollable stressors. The aim is to identify these uncontrollable stressors and to implement emotion-focused coping strategies rather than solution-focused approach, given the fact that the illness is chronic (Kinsinger, 2017).

Lastly, exposure techniques are most important to tackle the avoidance of the patient. Part of the visceral anxiety is the avoidance of public places or other places where the patient may experience the IBS symptoms. This avoidance contributes to the symptom severity and can also maintain the visceral anxiety, resulting in a downward spiral of visceral anxiety and avoidance maintaining one another. Some examples of the avoidance are restricted eating to control symptoms or relying unnecessarily on medication during travels. These behaviors of the patient can be addressed by CBT treatment through exposure techniques and behavior experiments. Exposure techniques involve facing the situations that the patient is avoiding in a graduated fashion using an exposure hierarchy. Behavioral experiments are useful to address safety behaviors. Here, the patient would track their behavior and therefore know more about the time they can go without responding to bowel movement, for example (Kinsinger, 2017).

RELATIONSHIP BETWEEN COGNITIVE-BEHAVIORAL THERAPY AND IRRITABLE BOWEL SYNDROME

Although many studies have proven CBT effective for IBS symptom treatment, many are still unsure how CBT is effective for IBS treatment. The first attempt to explain the relationship between CBT and IBS was done by Lackner and colleagues (Lackner, Jaccard, Krasner, Katz, Gudleski & Blanchard, 2007); they aimed to study whether psychological treatments work for IBS by alleviating the comorbid psychological distress which is responsible for the worsening of IBS symptoms and therefore quality of life. The second hypothesis that they aimed to study was that the distress was not a cause but rather a consequence of IBS which will lessen with improvement of symptoms (Lackner et al, 2007).

They conducted a study with 970 participants, but only 147 participants completed the assessment before the treatment and the treatment itself. The participants either received 10, weekly, 90-minute CBT sessions in a group (with about 3 to 6 people), PE/support, or they were assigned to a waitlist group. This waitlist group had a pretreatment baseline period of four weeks. The CBT group focused on the components of CBT that work for IBS like the problem-solving skills and identifying and challenging thinking patterns that are biased or negatively skewed. The PE/support group aimed to disseminate the information about IBS, support the sharing of experiences to other members, and encourage emotional expression. They specifically did not get into the components of CBT. The waitlist group did not get CBT treatment until 10 weeks later when they had monitored their symptoms and did the assessment at follow-up (Lackner et al, 2007). Lackner and colleagues (2007) found that cognitive-behavioral therapy directly affects IBS symptom severity with or without the effects on the distress. These improvements in IBS symptoms were found to be associated with quality-of-life improvements and this may lower

the distress in an individual with IBS (Lackner et al, 2007).

PATHWAYS BETWEEN IRRITABLE BOWEL SYNDROME AND COGNITIVE-BEHAVIORAL THERAPY

More studies have researched the relationship between CBT and IBS symptom reduction and improvement of quality of life (Chilcot & Moss-Morris, 2013; Jones et al, 2011; Kinsinger, 2017). According to Windgassen and colleagues (2019), psychological treatments like CBT must target specific IBS factors for the symptoms to be improved (Windgassen, Moss-Morris, Goldsmith & Chalder, 2019). Different studies with CBT treatment for IBS patients have been conducted to find pathways that explain the relationship between CBT treatment and symptom severity in IBS patients; some of the pathways found were mood, perception of the illness, stress, and processing mechanisms.

Mood. The relationship between the IBS symptoms and mental treatment can also be explained by mood (Jones et al, 2011). Jones and colleagues (2011) did a study with 105 participants and assigned them to three different conditions. The first condition received medical care like usual for IBS; they went to see a gastroenterologist and discussed symptoms, diets, and received written information on this to take home. The second condition received clinical care as usual, but the participants also met with a psychologist for 8 weeks, 30 minutes each session, for relaxation training; the sessions were face-to-face. The third condition was the CBT treatment condition; this condition received both the relaxation training and the routine clinical care. The intervention consisted of 60-minute sessions for 8 weeks and they consisted of face-to-face meetings with a clinical psychologist. The difference between the CBT condition and the relaxation training condition was that participants in the CBT condition followed a program that included realistic symptom appraisal, coping strategies, problem solving, and cognitive restructuring. The relaxation training condition and the medical care condition were grouped together as a non-CBT group for the purpose of comparing the symptom response between CBT treatment and non-CBT treatment. Although Jones and colleagues (2011) could not find a direct relationship between CBT treatment and IBS symptoms, the hypothesis of indirect effects operating through emotion was developed. They found that both anxiety and depression changes influenced the change of the bowel symptom scores (Jones et al, 2011).

Perception of the Illness. Another mediator is the positive change of perception of the illness, which has been shown by studies to reduce the symptom severity in IBS patients (Chilcot & Moss-Morris, 2013). Chilcot and Moss-Morris (2013) did a study with 64 participants to compare treatment as usual (TAU) and CBT treatment for IBS patients. The treatment as usual included an IBS fact sheet about IBS diagnosis. The CBT condition also included this fact sheet but got a self-management intervention based on CBT with a self-help manual to be completed over a 7-8 week period and an hour session with a psychologist. The CBT group showed less catastrophizing, fear avoidance, and damaging beliefs compared to the patients that were in the TAU group. Also, the CBT group reported more positive illness perceptions and the TAU did not. Therefore, the TAU group started to see the symptoms as related to not only physical, but also psychological causes. Depression and anxiety symptoms did not differ at the end of treatment and therefore Chilcot and Moss-Morris concluded that, given the significant changes in illness perceptions, illness perception rather than mood that help improve symptom severity (Chilcot & Moss-Morris, 2013).

Stress. CBT has been known to help with stress management. Posserud and colleagues (2004) studied the visceral response in IBS patients when they were exposed to mental stress to establish the relationship between stress and IBS symptoms. They studied 18 IBS patients and 22 control subjects who went through acute mental stress by completing stressful tests (like the Stroop test), rectal distentions tested with balloon distentions, and they did not receive any medical treatment 48 prior to the study. Their findings concluded that acute mental stress modulated the rectal perception in both the IBS patients and healthy controls. The balloon distentions were higher in the healthy controls. The thresholds for IBS patients did not change during stress, but they did after stress. Therefore, the IBS patients showed a different visceral perception to the acute mental stress compared to healthy controls. They also found changes in the neuroendocrine stress response for IBS patients (Posserud, Agerforz, Ekman, Bjornsson, Abrahamsson, Simren, 2004).

Processing Mechanisms. Lastly, a meta-analysis by Tillish and colleagues (2011) was conducted to identify the brain regions activated

during the rectal distention in patients with IBS. This analysis was done with images from neuroimaging studies that employed these rectal distentions in their study. The study found that IBS patients have a greater engagement in regions associated with endogenous pain and emotional arousal. The results from their study support the role of dysregulation in the central nervous system for IBS patients (Tillsih, Mayer, Labus, 2011). The differences in regulation of pain contribute to the severity of symptoms in IBS patients (Kinsinger, 2017).

CO-MORBIDITY FOR IRRITABLE BOWEL SYNDROME PATIENTS WITH ANXIETY

Another field to be explored is co-morbidity; comorbidity refers to an individual with more than one disorder present at the same time. For example, comorbidity would be an individual that has both IBS and social anxiety disorder (Cuncic, 2020). Kenwright and colleagues conducted a research on individuals with anxiety disorders and co-morbid IBS. The research was done to test whether individuals with comorbid anxiety disorders would experience a reduction in IBS symptoms after CBT treatment for their anxiety disorder. About half of the patients with

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the anxiety disorders had bowel control anxiety (BCA); 40 out of 104 patients that completed the treatment for anxiety disorders (Kenwright, McDonald, Talbot & Janjua, 2017).

Bowel control anxiety is an anxiety disorder in which the individual suffers from a fear of losing control over their bowel; it also includes a fear of being incontinent when not alone (Kenwright et al, 2017). It was found that all patients remained symptomatic at the follow-up 6 months later due to the chronic nature of the condition but seemed to show a significant reduction of symptom severity. The patients with BCA showed more of a reduction in symptom severity than IBS patients with another anxiety disorder (Kenwright et al, 2017). This was very interesting to find, given the research done by Lackner et al. (2007) which had suggested that the improvements of symptoms were not moderated by the mental well-being of patients with IBS.

Payne and Blanchard (1995) studied the effect of cognitive therapy compared to a support group and self-help for the treatment of IBS. Besides their findings for the IBS symptoms, they also looked at depression and anxiety symptoms, but they saw these more as symptoms from IBS rather than looking at comorbidity with IBS. No other studies discussing IBS and depression comorbidity were found within the range of this literature review's limits.

CONCLUSIONS

Many studies have shown that CBT treatment for IBS is indeed effective for symptom reduction (Chilcot & Moss-Morris, 2013; Jones et al, 2011; Kenwright et al, 2017; Lackner et al, 2007; Payne & Blanchard, 1995; Windgassen et al, 2017). Although the relationship explaining why CBT works to reduce symptom severity in IBS patients is still unclear, many have tried to explain it through various pathways: mood, stress, processing mechanisms, and perception of the illness. All these pathways seem to show a relationship, but some studies contradict another. For example, Jones and colleagues (2011) explained the relationship through the mood of the patient, but Chilcot and Moss-Morris then claimed that this relationship was working through the perception of the illness and not mood. The research on this relationship is very disorganized and a comparison would be beneficial to the clinical psychology community to show what pathways are effective and to further explain the relationship between CBT

treatment and reduction of symptom severity. Explaining this relationship would benefit not only clinical psychologists but also IBS patients, because treatment for IBS could be improved and more effective when it is clear why CBT works.

Moreover, the comorbidity between IBS and anxiety and depression should be further researched for better treatment options. Anxiety is studied somewhat because of the visceral anxiety of ISB (Kinsinger, 2017), which is the anxiety of bowel symptoms and the anxiety of being out in places where bowel symptoms could occur. Something that was studied by Kenwright and colleagues is bowel control anxiety (Kenwright et al, 2017). It is interesting to explore more how these two are related. But there are more disorders like major depressive disorder to be studied with IBS. No studies were found with IBS and somatic symptom disorder, which would also be very interesting to study. Knowing the relationship between these disorders and IBS will also help with IBS treatment. For example, anxiety leads to more distress which leads to the worsening of symptoms. Here, you can treat the anxiety, lessen the distress, and reduce symptoms. ❖

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The citation system used in this essay is APA 7th.

REBECCA MITCHELL

THE IMPACT OF HUMAN-ANIMAL CO-SLEEPING ON HUMAN SLEEP QUALITY

ABSTRACT

The warm and cozy feeling that people get when snuggling with their pet before they close their eyes tends to outweigh any negative consequence of human-animal co-sleeping. Many people are unaware of the frequent disturbances that occur due to co-sleeping. Yet, this does not negate the fact that disturbances are increased while co-sleeping compared to sleeping alone due to pets having different circadian rhythms than their owners and respond more to stimuli while sleeping compared to their owners. In fact, those who co-sleep with their pet endure more sleep disturbances than those who do not. However, if most people do not wake up exhausted from a lack of rest the night before, pets may not have as much of a negative impact on sleep quality as actigraphy results show. More studies must be conducted in order to truly assess the impact of human-animal co-sleeping on human sleep quality.

THE IMPACT OF HUMAN-ANIMAL CO-SLEEPING ON HUMAN SLEEP QUALITY

Although commonly hypothesized to have restorative effects, the exact function of sleep is unknown. More studies must be conducted in order to assess the role that sleep plays in daily functioning. However, symptoms of the lack of sleep have been determined, including irritability, slow reaction time, and poor decision making (Dement & Vaughan, 1999). Due to the negative effects of inadequate sleep, it is important to determine the causes of one's inability to sleep and poor sleep quality overall in order to find solutions to correct sleeping patterns and promote better sleep.

One factor known to cause sleep disruptions is co-sleeping. Co-sleeping is defined as sleeping in the same bed or bedroom as someone else. It has both benefits and drawbacks for the sleep quality of both parties involved. Many studies have been conducted on the short- and long-term effects of human-

Photo by Adrianna Calvo

human co-sleeping, including spouse-spouse and parent-child. The topic of study, however, is human-animal co-sleeping.

Many people love their pets as much as they love their family. In fact, 63% of people in the United States consider their pets extended family members (Hoffman et al., 2020). From eating at the dinner table to listening to their owners' wildest dreams, pets take part in almost all aspects of their owners' lives. This includes sleeping, as the CDC states that 50% of pet owners sleep in the same bedroom as their pets (Krans, 2018).

Interestingly, there may be a historical link to human-animal co-sleeping that dates back thousands of years. Once domesticated, dogs have served as protectors, as their bark can deter potential threats. Sleeping with a pet provides psychological comfort and security, as pets can alert their owners of danger. Dogs also can keep their human counterparts warm during cold nights by cuddling (Hoffman et al., 2020). Another factor possibly contributing to the comfort experienced by people who co-sleep with their dogs is that dogs may be able to adapt to their owner's sleep schedule better than another person, such as a spouse (Cassata, 2019). It can be assumed that this is due to the fact that dogs must rely on their owner's daily schedule to meet their feeding and voiding needs, while spouses and older children do not.

Many are curious about the effect of human-animal co-sleeping on human sleep quality. This is because "a pet in the sleep environment creates the potential for disruptions that compromise sleep quality" (Krahn et al., 2015, p. 1663). This is reinforced by the fact that, no matter what stage of sleep dogs are in, they remain responsive to stimuli both inside and outside of the house. If a dog is concerned by an unusual loud sound or another dog's bark, the dog may respond by barking (Smith et al., 2014). If the stimulus does not wake the person, the dog's response to it may, thus serving as a disruption of sleep.

In many cases, however, it is reported that sleep quality is improved when sleeping with a pet, based on self-report surveys. In one study of about 1,000 women, it was commonly reported that human sleep quality is enhanced when sleeping with a pet, particularly a dog (Cassata, 2019). In another study, it was found that sleeping with dogs in the bedroom, but not in the bed, provided a better reported quality of sleep than sleeping with dogs in the bed (Pietrangelo, 2020). An interesting finding as well

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is that cats are also common sleep partners as they give emotional and physical security to their owners (Krans, 2020). Overall, pets provide a sense of peace because they help relieve anxiety and stress before the night's end.

Although pets have been shown to be psychologically beneficial to a person's sleep, in any co-sleeping environment, sleep disturbances may arise which can potentially affect daily functioning. One main cause of sleep disturbances in pet owners is human-animal co-sleeping, especially due to varying sleep patterns between pets and their owners. For example, people who have birds as pets have an increased risk of experiencing sleep disruptions if co-sleeping with a bird in the room compared to co-sleeping with a dog or cat. This is due to birds having a different circadian rhythm from people. Birds may squawk or chirp at an earlier time in the morning than is normal for a person to be awake. Also, due to cats being nocturnal, they tend to move around frequently throughout the night which could be a source of disruption for the human sleeper (Krahn et al., 2015).

The sleep-wake cycle of humans is monophasic, meaning that people normally go

to sleep one time per day and consistently sleep throughout the night (Smith et al., 2018). Even though it is monophasic, people have five to six 90-minute sleep cycles with brief periods of arousal in each cycle throughout the night (Barrett & McNamara, 2012). On the other hand, the sleep-wake cycle of dogs is polyphasic, meaning that dogs wake up multiple times throughout the night and sleep multiple times throughout the day. Also, dogs naturally sleep for shorter periods of time. They are normally asleep for about 21 minutes at a time with a 5-minute period of wakefulness before falling back asleep. This pattern usually occurs about 20 times throughout the night (Smith et al., 2018). With this difference in sleep-wake cycles between dogs and their owners, it can be assumed that human-dog co-sleeping can disturb the person sleeping, especially due to the many periods of 5-minute wakefulness that the dog experiences throughout the night (Smith et al., 2018).

Several studies have been conducted to assess the effect of human-animal co-sleeping on human sleep quality. Many rely on self-report data from surveys, questionnaires, and interviews. One such study was performed by Krahn et al. in which 150 participants, 58% male and 42% female, completed a questionnaire and were interviewed about their sleep quality when co-sleeping with their pet. According to the questionnaire responses, 56% of the participants co-slept with their pet. Sleep disruptions were reported by 20% of the pet owners, and the disruptions reported were due to the pet snoring, wandering, having to go outside to void, having seizures, whimpering, and squawking. On the other hand, 41% of respondents reported that co-sleeping with their pet was either beneficial or did not result in disruption of sleep (Krahn et al., 2015). From this study, it is hard to conclude whether the disruptions were detrimental to the participants' overall sleep quality because participants were not asked about their alertness upon awakening or throughout the day.

In a survey conducted by the Mayo Clinic, 300 people with sleep disorders were asked to assess their disruptions during sleep. The results showed that 53% of the people who participated in the survey were disrupted by their pet while sleeping (Smith et al., 2014). However, these results may not be attributed to human-animal co-sleeping because the sleep disturbances could have been caused by the sleep disorder itself, not necessarily their pet.

Photo by Lisa.

In the results of a self-report survey conducted by Smith et al. in 2012, it was found that, out of 1,018 respondents, there was not a significant difference in the amount of sleep gained between respondents who co-slept with their pet 24 hours prior to taking the survey and those who did not. However, there was a significant difference in the amount of time it took to fall asleep. It was found that those who co-slept with their pet took, on average, 4.07 minutes longer to fall asleep. In this study, there were more reports of tiredness upon awakening in those who co-slept with their pets compared to those who did not. However, the increased feeling of tiredness upon awakening did not play a determining role in daytime sleepiness (Smith et al., 2014). This suggests that co-sleeping with a pet may not have an effect on overall sleep quality in regard to the restorative effects of sleep, as those who co-slept with their pet and those who did not co-sleep with their pet reported similar levels of daytime sleepiness.

Human-animal co-sleeping may have no effect on the sleep quality of adolescents. In two studies, adolescent sleep quality was analyzed. In the first study, 265 adolescents were asked to complete a survey about their sleep quality (208 co-slept with their pet, 57 did not). The researchers used the survey results to compare the self-report sleep scores of adolescents who co-slept with their pet and adolescents who did not. It was found that there were no differences in the self-reported sleep qualities between the adolescents who reported co-sleeping with their pet and the adolescents who reported not co-sleeping with their pet (Rosano et al., 2021). The nonsignificant results of this study could be attributed to the unequal number of participants in the two conditions. It may not be reasonable to generalize the results of this study to all adolescents, since 22% of the participants were in one condition and 78% were in the other.

In the second study, an adolescent who slept with their pet in bed every day of the week was matched with an adolescent who slept with their pet in bed for only four days of the week yet in the room for the other three days. Using actigraphy, it was found that there were no significant differences in the amount of sleep disturbances among the two adolescents. These two studies showed that sleep quality was not affected by co-sleeping with a pet (Rosano et al., 2021). More studies need to be conducted with adolescents, as these studies included a limited number of participants.

Many self-report studies have been conducted to assess sleep quality when co-sleeping with animals. However, there are not many quantitative studies on the effects of human-animal co-sleeping on human sleep quality. The first study to use quantitative measures as well as self-report measures was conducted by Patel et al. in 2015. In this study, 40 participants, with only one dog and no known sleep disorders, wore an Actiwatch 2 activity monitor on their wrist for seven days. They also kept a sleep diary in which they logged bed times, presence or absence of sleep aides, sleep quality, position of the dog on the bed or in the bedroom, and interactions with their dog. A Fitbark dog activity monitor was placed on their dog's collar for that week as well. These accelerometers monitored movement so the researchers could assess and compare the movements of both the humans and the dogs while sleeping (Patel et al., 2017)

It was found that the owners had a higher sleep efficiency when the dog was in the room but not on the bed. It was also found that owners were less tired upon awakening when the dog was in the room but not on the bed. It is important to note, however, that this study solely involved adults, and most of them were women. Also, with a sample size of 40 and no control, the results cannot be generalized to everyone (Patel et al., 2017). Although the results cannot be generalized, the fact that better sleep quality was reported when the pet was not in the bed should be considered as more research may be able to support this finding. With more data, researchers could suggest that pet owners who enjoy co-sleeping with their pet sleep with their pet just in the bedroom rather than in the bed to improve sleep efficiency.

Another study was conducted in which five women, ages 21-69, were asked to complete a self-report survey on their quality of sleep and wakefulness after co-sleeping with their pet every day for one week. Four out of five of the women reported sleeping with their dog because it provided a sense of safety and security as well as comfort. Each woman stated that sleep disturbances were caused by their dog, although the time that they went to bed, their ability to fall asleep as well as their sleep quality was not affected, according to their subjective reports. Sleep disturbances were reported to be a result of the pet barking, scratching at the door to leave the room, or intentionally waking the owner to void or to be fed (Smith et al., 2018).

In the study, sleep efficiency was calculated by (time asleep/[total time awake + time asleep]). It was found that the dogs were active for 17.46% of the night and, when the dogs were active, the sleep efficiency of humans dropped from 93% to 81%. There was variability in the reported quality of sleep and daytime sleepiness among the women, but these results cannot be solely attributed to dog disturbances since one woman was a shift worker, and three out of five of the participants were found to normally have a lower quality of sleep compared to the general population. There was not a strong correlation between the number of sleep disturbances and the quality of sleep of the owners which suggests that sleep quality may not be as detrimental to sleep quality as objective results show (Smith et al., 2018). It is important to note that because this study was conducted with only five participants, its results cannot be generalized.

In a 2020 study, sleep patterns of 12 women and their dogs were assessed using actigraphy. Every participant, including the dogs, wore an accelerometer for 14 days. This allowed the researchers to detect small movements when the participants were sleeping and make assessments of sleep efficiency. The women were asked to complete a survey every morning upon awakening, with questions such as 'How many times did you wake up, not counting your final awakening?' The women seldom reported sleep disruptions, yet the accelerometers showed different results. It was found that 50% of human movements occurred at the same time as their dog, even though only 18% of dog movements occurred at the same time as their owner. This showed that the dogs had a more significant influence on their owner's movements while sleeping than the owners had on their dogs' movements. It was also found that human movements due to dog disturbances lasted for 26 seconds longer on average than the movements caused by disturbances unrelated to their dog, which led to the idea that co-sleep disturbances had a greater effect on the women than disturbances caused by other factors (Hoffman et al., 2020). The reason for the longer disturbances is unknown, but it is a topic of study that will likely be explored in the future.

According to the results of previous studies, a conclusive argument for the effect of human-animal co-sleeping on human sleep quality cannot be made. This is due to the conflicting results of subjective and objective data. However, it was found that pets do cause disruptions that disturb human sleep throughout the night due to their responses to stimuli and different circadian rhythms compared to their owners. More studies must be conducted to determine whether the disruptions are significant enough to attribute to a detriment in human sleep quality. There are studies that show that a pet sleeping in the bedroom causes fewer human sleep disruptions than a pet sleeping on the bed, suggesting that this form of human-animal co-sleeping may be a better solution for resolving human-animal co-sleeping disturbances. ❖

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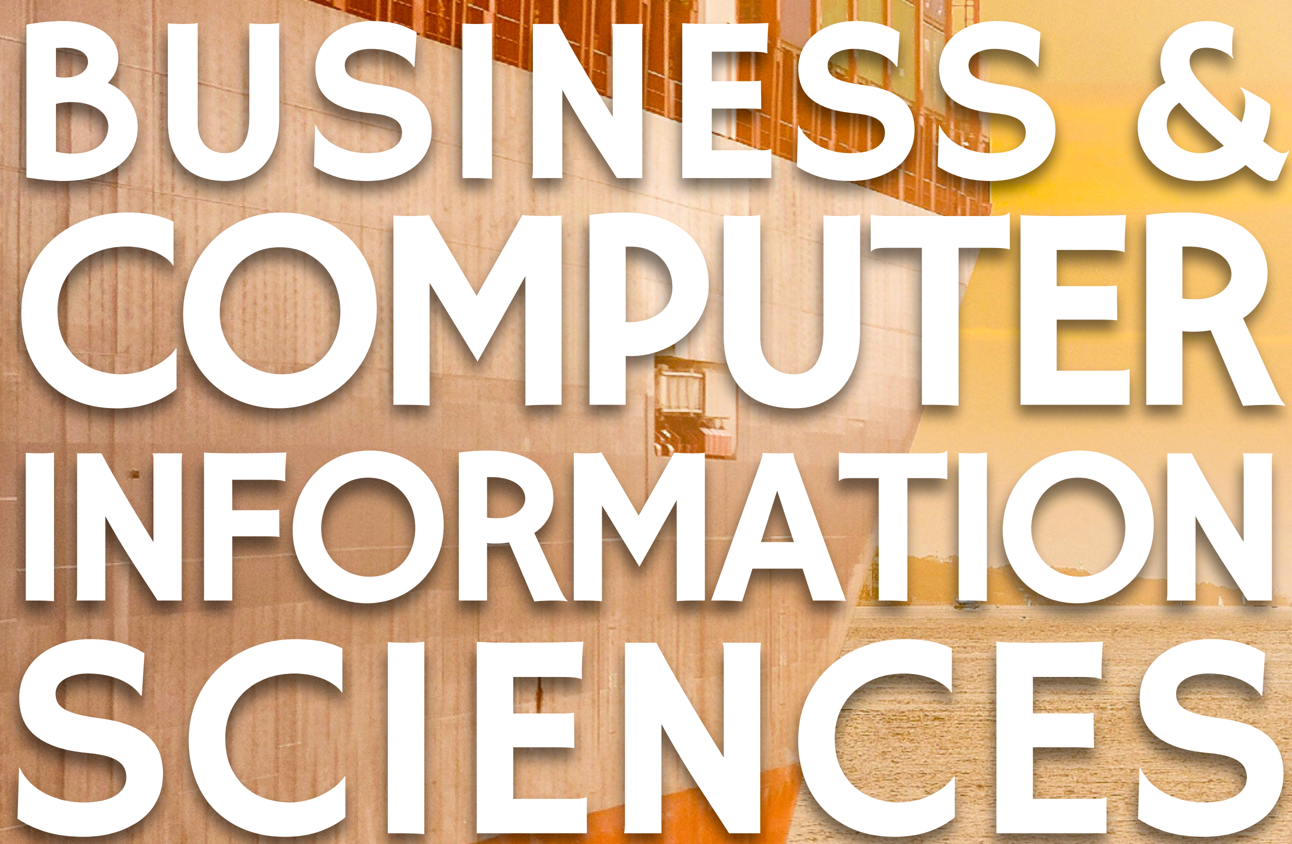

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MARY CATHERINE DAVIS

GENDER SEGMENTATION IN MARKETING AND HOW IT AFFECTS CONSUMERS

INTRODUCTION/BACKGROUND

Gender segmentation is a largely accepted part of marketing. Scholars have proved through decades of research that nearly every marketing campaign uses gender segmentation (Epure & Vasilescu, 2014). Because children are exposed to media at such a young age, this approach to marketing segmentation reaches society during their developmental years through adulthood. Though many studies have been done on how sexism, patriarchal society, and gender stereotypes have been portrayed throughout modern advertising, they do not discuss the effects of these campaigns on young people. This creates a gap in research between psychology and marketing researchers.

Psychologists have studied the effects of gender norms and stereotypes on children as well as adults, exploring the role of nature versus nurture in raising children. Because children are in the midst of a huge developmental stage of life, they are generally considered more impressionable. This becomes apparent from the moment they are born. Newborns are given a label immediately upon their arrival, receiving either "male" or "female" on their birth certificate. This usually corresponds with their chromosomal makeup, termed "biological sex" (Rose, 2018). Throughout the first years of their lives, children begin to distinguish between females and males. Visual cues provide them with hints of these differences. Babies observe characteristics such as length of hair, vocal pitch, or style of dress to make these determinations. From these observations, patterns begin to form. Babies experience more anxiety around male strangers, and, by age one and a half, females can match faces to gender labels such as "lady" or "man" (Unger, 2001). These patterns are reinforced as we get older by the media we consume and the stereotypes that society pushes on us. We are conditioned to believe that men and women are inherently very different when in reality there are very few differences between us.

Physically, men and women have minimal differences aside from our biological makeup. Generally, men can throw farther, are more physically aggressive, tend to masturbate more, and have more sex-positive attitudes when it comes to uncommitted relationships than their female peers (American Psychological Association, 2005). Although biology plays a small part in these differences, saying that societal expectations and stereotypes do not affect them would not be a sound argument. This translates to psychological differences as well, which have shown to be minimal.

Though society leads people to believe that men and women have different cognitive abilities, personality traits, and leadership potentials, this is not supported by research. Research shows that men and women are actually more similar than most people believe. Depending on what the study aims to prove, it may lend itself to bias. Studies that are designed to exterminate gender norms will show that stereotypes and how they are exhibited in daily life have a strong influence on how people act. A different study in which participants were told they would be not identified by their gender showed that no participant adhered to gender stereotypes regarding the stereotypical male trait of aggressiveness. This study showed that women were more likely to be aggressive, while men were observed to be more reserved (American Psychological Association, 2005). This disproves the myth that men are inherently more aggressive, which can be a toxic concept.

Other myths relating to personality traits contribute to bias when searching for employment and in educational settings, which has been proven to lower young girls' self-confidence and performance in school. Myths in communication styles lead to damaging adult relationships, creating barriers between men and women during conflict. Because men are assumed to be assertive and logical while women are assumed to be emotional and irrational, there is a halt in communication. Though these assumed differences affect us every day, many of them have been disproven. Other differences, like physical ones, have not been proven to be negative in any way (American Psychological Association, 2005). Because marketers rely on generalizations to appeal to a target market, this is where we reach our research question.

We have established that people are greatly affected psychologically by gender stereotypes. Now we will explore how these stereotypes, applied within marketing and advertising campaigns, affect consumers throughout their lifetime. How does gender segmentation truly affect people? Do people feel accurately represented in modern marketing materials? How much damage is caused by the media we create as marketers and consume as consumers?

RESEARCH OBJECTIVES

During this study, we will explore how gender segmentation in marketing affects consumers. The first hypothesis listed has been previously explored, but we consider these questions to also prove our other hypotheses. This research is important because of the increasing amount of media we consume in our lifetime. A lot of marketing is viewed daily, and seeing similar messages repeatedly may affect how we think.

In order to explore how this related to gender segmentation in marketing, I have chosen the following three hypotheses for my research study:

H1: Gender segmentation in marketing reinforces sexist stereotypes.

H2: Gender segmentation in marketing negatively impacts the mental well-being of consumers.

H3: Gender segmentation does not allow for an accurate representation of modern society.

RESEARCH DESIGN

I will be using questionnaires to collect my research data. Questions include the topics of general age and gender demographics, the accuracy of marketing campaigns, and how gender segmentation affects consumers' mental health. I plan to analyze the relationships between gender segmented marketing campaigns and the mental health of consumers. This can also be analyzed against how consumers feel gender is portrayed in marketing. This will be done by comparing the various factors I have explored with my survey to academic research. These factors include the perception of sexist stereotypes, perception of mental health impact, and perception of accuracy of representation.

SAMPLE DESCRIBED AND PLANNED

In conducting my research, I shared my questionnaire with people in the Wesleyan community as well as the general public. I chose to share with the public to gather a wider pool of responses and hopefully create a more diverse group of respondents. My questionnaire includes questions about how gender segmentation in marketing materials affects self-esteem, mental health, and self-perception. It also asks those surveyed if they find marketing materials to be an accurate representation of modern men and women. This is the link to my questionnaire.

DATA COLLECTED

Thus far, I have collected 94 responses. This is the breakdown of the data I have collected through my questionnaire.

Age range	Frequency	Percentage
18 or younger	3	3.2%
19-29	62	66%
30-39	7	7.4%
40-49	12	12.8%
50-59	8	8.5%
60-69	1	1.1%
70 or older	1	1.1%

Fig. 1. Age of study participants.

Biological Sex	Frequency	Percentage
Female	77	81.9%
Male	17	18.1%

Fig. 2. Biological sex of study participants.

Gender Identity	Frequency	Percentage
Cis Male	17	18.1%
Cis Female	76	80.9%
Transgender Male	1	1.1%

Fig. 3. Gender identities of study participants. These were the gender identities that were self-identified. All other identities received no data.

Bias (Overall)	Frequency	Percentage
Mostly Positive	24	25.5%
Mostly Negative	34	36.2%
Neither more positive or negative	36	38.3%

Fig. 4. Overall portrayal of women.

Bias (Overall)	Frequency	Percentage
Mostly Positive	61	64.9%
Mostly Negative	7	7.4%
Neither more positive or negative	26	27.7%

Fig. 5. Overall portrayal of men.

Perceived Impact	Frequency	Percentage
Negative	32	34%
Positive	4	4.3%
No Impact	58	61.7%

Fig. 6. Perceived impact of gender-segmented materials on self-esteem (when watching advertisements featuring actors of their own gender identity).

Response	Frequency	Percentage
Strongly Disagree	7	7.4%
Disagree	17	18.1%
Neutral	22	23.4%
Agree	33	35.1%
Strongly Agree	15	16%

Fig. 7. Likert Scale - I feel that marketing/advertising campaigns have impacted how I think about gender stereotypes/gender norms.

Response	Frequency	Percentage
Strongly Disagree	24	25.5%
Disagree	32	34%
Neutral	16	17%
Agree	14	14.9%
Strongly Agree	8	8.5%

Fig. 8. Likert Scale - I feel that gender segmentation in marketing/advertising campaigns have made me feel insecure about my interests.

Response	Frequency	Percentage
Strongly Disagree	43	45.7%
Disagree	39	41.5%
Neutral	6	6.4%
Agree	6	6.4%
Strongly Agree	0	0%

Fig. 9. Likert Scale - I feel that gender segmentation in marketing/advertising campaigns has made me feel insecure about my gender identity.

Response	Frequency	Percentage
Strongly Disagree	21	22.3%
Disagree	47	50%
Neutral	14	14.9%
Agree	12	12.8%
Strongly Agree	0	0%

Fig. 10. Likert Scale - Women are portrayed accurately in marketing campaigns and advertising most of the time.

Response	Frequency	Percentage
Strongly Disagree	12	12.8%
Disagree	32	34%
Neutral	28	29.8%
Agree	19	20.2%
Strongly Agree	3	3.2%

Fig 11. Likert Scale - Men are portrayed accurately in marketing campaigns and advertising most of the time.

Response	Frequency	Percentage
Strongly Disagree	22	23.4%
Disagree	42	44.7%
Neutral	28	29.8%
Agree	2	2.1%
Strongly Agree	0	0%

Fig 12. Likert Scale - I feel that marketing materials/advertising has contributed to the strengthening of my mental health.

Response	Frequency	Percentage
Strongly Disagree	5	5.3%
Disagree	29	30.9%
Neutral	24	25.5%
Agree	29	30.9%
Strongly Agree	7	7.4%

Fig, 13. Likert Scale - I feel that marketing materials/advertising has contributed to the worsening of my mental health.

Response	Frequency	Percentage
Strongly Disagree	1	1.1%
Disagree	15	16%
Neutral	8	8.5%
Agree	42	44.7%
Strongly Agree	28	29.8%

Fig 14. Likert Scale - I feel that marketing materials reinforce sexist stereotypes.

Response	Frequency	Percentage
Strongly Disagree	12	12.8%
Disagree	23	24.5%
Neutral	7	7.4%
Agree	33	35.2%
Strongly Agree	19	20.2%

Fig. 15. Likert Scale - Gender segmentation in marketing campaigns/advertising (in print, digital internet, or any other platform) has made me feel insecure about my body.

Response	Frequency	Percentage
Strongly Disagree	22	23.4%
Disagree	42	44.7%
Neutral	12	12.8%
Agree	13	13.8%
Strongly Agree	5	5.3%

Fig. 16. Likert Scale - Gender segmentation in marketing campaigns/advertising has made me feel as though I do not fit in with peers who share the same gender identity as I do.

Response	Frequency	Percentage
Strongly Disagree	7	7.4%
Disagree	26	27.7%
Neutral	19	20.2%
Agree	40	42.6%
Strongly Agree	2	2.1%

Fig. 17. Likert Scale - Gender segmentation in marketing campaigns/advertising exploits men's bodies.

Response	Frequency	Percentage
Strongly Disagree	1	1.1%
Disagree	7	7.4%
Neutral	8	8.5%
Agree	40	42.6%
Strongly Agree	38	40.4%

Fig. 18. Likert Scale - Gender segmentation in marketing campaigns/advertising exploits women's bodies.

ANALYSIS OF DATA

After reading secondary research sources, I created my three hypotheses. **H1** states that gender segmentation in marketing reinforces sexist stereotypes. In testing this hypothesis with my questionnaire, I based this hypothesis on the research that gender segmentation is present in nearly every marketing campaign (Epure & Vasilescu, 2014). The dependent variable was the presence of gender segmentation which is assumed to be constant to respondents due to the phrasing of the questionnaire and this research.

My primary research revealed that 74.5% of respondents agreed or strongly agreed with the statement reinforced sexist stereotypes. This equates to 42 respondents who agreed with this statement and 28 who strongly agreed, thus validating my first hypothesis.

H2 states that gender segmentation in marketing negatively impacts the mental well-being of consumers. This hypothesis was based on secondary research stating that gender roles being forced upon children can cause serious implications on their mental and physical health (Levine, 2017). It is assumed that because we are exposed to marketing materials from an early age through adulthood and most of those materials contain gender segmented marketing strategies, that the same implications could be caused to the consumption of marketing materials.

Several questions asked respondents directly and indirectly whether or not gender segmented materials have affected their mental health. These questions include questions regarding self-esteem and overall mental health. 38.3% of respondents either agreed or strongly agreed that gender segmented marketing materials worsened their mental health, while only 2.1% thought that the materials strengthened it.

Additionally, 55.3% of respondents agreed or strongly agreed that materials made them feel insecure about their bodies. 6.4% of respondents said that materials made them feel insecure about their gender identity, and 23.4% said they felt insecure about their interests.

The data regarding the overall effect on self-esteem showed that 34% of respondents felt their self-esteem was negatively impacted after watching advertisements featuring people of their gender identity. 61.7% of people felt no impact on their self-esteem, while only 4.3% felt positively impacted. This data shows that there may be some truth to my second hypothesis.

H3 states that gender segmentation does not allow for an accurate representation of modern society. This was formed due to secondary research suggesting that women feel misrepresented in advertising or that advertisers do not understand them (Ellwood & Shekar, 2008). I included questions within my research questionnaire asking how men and women are portrayed overall in gender segmented marketing materials.

A mere 12.8% of respondents thought that women were portrayed accurately in marketing materials overall, while 23.4% thought men were portrayed accurately. 72.3% of those surveyed said they disagreed or strongly disagreed with the statement that women are portrayed accurately, while 46.8% said the same of men portrayed in marketing materials.

These findings support my hypothesis that gender segmented marketing materials do not allow for an accurate representation of society.

It is important to remember that 80.9% of respondents to my questionnaire were cis-women, which would account for the stronger feelings on a lot of these topics. Some questions regarding men had a higher occurrence of neutral answers, which does not allow for a demonstration of strong opinions regarding the question one way or the other.

CONCLUSIONS

From my primary research, it is obvious that gender segmentation in marketing materials has effects on consumers' mental health, reinforces sexist stereotypes, and does not accurately represent society. All three of these conclusions have been drawn from the statistics cited above and are supported by scholarly research.

The idea that sexist stereotypes have disappeared completely is an idea so absurd that the United Kingdom instituted a ban on advertisements containing harmful gender stereotypes in 2019. The UK's Advertising Standards Authority cited their 2017 study that showed how these stereotypes "can contribute

to inequality in society" (Perrigo, 2019). Internet advertisements are no exception as they "may act as agents that reinforce and reshape societal norms and beliefs regarding gender equity and depiction on sexuality" (Plakoyiannaki, Mathioudaki, Dimitratos, & Zotos, 2008).

Comparisons have been made between advertisements from 1958, 1970, and 1972 that showed that sexist stereotypes existed throughout those years. The study proved that there were differences in the portrayal of employment status, occupational roles, nature of buying, and networking roles between men and women (Belkaoui & Belkaoui, 1976). A 2011 study by the *International Journal of Advertising* found that advertising on German television still utilized traditional stereotypes, including occupational ones. They also found that public and private channels both present these stereotypes in some form, even though they are not an accurate representation of society (Steinghagen, Eisend, & Knoll, 2011). Gender stereotypes have been proven to be deeply ingrained in consumers' minds, even as children through the media and their environment, as referenced in my introduction.

More recent studies on children have shown that gender stereotypes being forced on adolescents can have negative long-term effects on mental health, physical health, and behaviors as they age.

The "Global Early Adolescent Study" examined children from 15 different countries and also interviewed their parents. Scholars found not only are sexist stereotypes being circulated in nearly every area of life but that children recognize the effect they have on their daily lives. Children recognize stereotypes that categorize traits by gender, that predator-victim culture exists, and that they must act certain days in order to prevent violence (Levine, 2017).

Influences on children's daily routines are not the only things being affected by gender norms. Pushing traditional stereotypes on girls can lead to a higher risk of sexually transmitted infections, pregnancy, school dropouts, child marriage, depression, and exposure to violence. These stereotypes increase the likelihood that boys become participants or victims of physical violence, start abusing drugs and alcohol, commit suicide, die as a result of accidental injury, and suffer a shorter life span than women in adulthood (Levine, 2017). Other consequences include the objectification of stereotyping of women and internalization of sexism (Swim & Hyers, 2009). Children are more likely to feel pressure, stress, and stigma due to these gender norms, which increases their risk of depression (Levine, 2017).

This sets a precedent for adulthood, which leaves children all over the world vulnerable to mental health issues. Psychologists even cite evidence that setting expectations for traditional masculinity for men makes them less likely to get help for mental health issues, causing worse outcomes. (Powell & Hamilton, 2016). As discussed in my analysis, 38.3% of respondents thought that gender segmented marketing campaigns have a negative impact on their mental health. Combining the research showing that sexist gender stereotypes are still present and that they affect development, it only makes sense that we as a society continue to be negatively affected by them.

These stereotypes not only create negative consequences for us, but they do not truly represent us, as the majority of survey respondents agreed. Specifically, women feel misrepresented. One 2006 study collected data that 50% of women felt that advertisers had old-fashioned views of them, while a whopping 91% went as far as to say that advertisers do not understand them at all (Ellwood & Shekar, 2008). Most advertisers want to make you feel like they understand you, which is part of their brand campaigns.

A 2010 study asked female shoppers to answer self-perception questions, walk around the mall with Victoria's Secret bags during their spree for an hour, and come back to answer questions again. Women in the study who carried a branded bag versus a plain shopping bag identified more with the brand's personality traits, such as "glamourous, good-looking, and feminine" (Kimmel, 2018). A similar study was done with MIT pens and plain plastic pens, citing that those who used MIT pens self-identified with traits that are associated with the school (Kimmel, 2018). This shows that marketers can purposefully design campaigns that influence how we perceive ourselves, rather than trying to identify with our current perceptions. ❖

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The citation system used in this essay is APA 7th.

MADISON GILL
TECHNOLOGY AND INSURANCE IN THE U.S. HEALTHCARE SYSTEM

ABSTRACT

Technology in healthcare has come a long way since health insurance was introduced. Technology, combined with health care policies and insurance, has made gaining medical attention for Americans and immigrants to the United States very difficult. Technology makes a doctor's job easier, but makes the patient's job of paying the doctor trickier. Some employers may give their employees a benefits package that covers their insurance; others, however, must find their own insurance because their place of work does not provide one. Perhaps they may be unemployed, though, or on disability. In this case, they would be on their own and would most likely have to pay out-of-pocket for a doctor's visit. The cost of health care continues to rise because of technology upgrades and other such developments.

INTRODUCTION

In the first chapter of the textbook, *Essentials of the U.S. Health Care Systems*, by Leiyu Shi and Douglas A. Singh, the authors address the characteristics of the U.S. health care system. While there are ten different characteristics that the authors discuss, this essay will elaborate on how the U.S. health care system uses technology, identify the expenses and "unequal access" of health care, as well as come to the conclusion that"access to health care services selectively based on insurance coverage" (Shi, L. & Singh, D.A, 2017, p. 9).

TECHNOLOGY IN HEALTHCARE

As technology advances all around the world, the health care system seems to have no other option but to adapt. Because of this, patients often associate better care with more updated technology and machinery. Therefore, doctors and other health care providers find it necessary to keep their practices updated with the newest technology (Shi, L. & Singh, D.A, 2017, p. 10). Physicians and other health care providers may also feel the need to keep up to date on the most upgraded technology because if they do not, then they could face legal repercussions (Shi, L. & Singh, D.A, 2017, p. 11).

While the new technology has allowed the U.S. health care system to advance, there are also negative aspects to be considered in this situation. As if health care were not already more expensive than it should be, keeping the technology up to date adds an extra expense that health care consumers should not be held responsible for. In addition to this, there has been such a great emphasis on technology and making sure that everyone knows how to work the latest systems that "primary care and public health" are put on the back burner and not given enough attention (Shi, L. & Singh, D.A, 2017, p. 11). If there were more emphasis on patient care and public health, then the U.S. health care system would be able to "produce population-level outcomes" that would be "more cost effective" (Shi, L. & Singh, D.A, 2017, p. 11).

Shi and Singh observe that "The United States spends more than any other developed

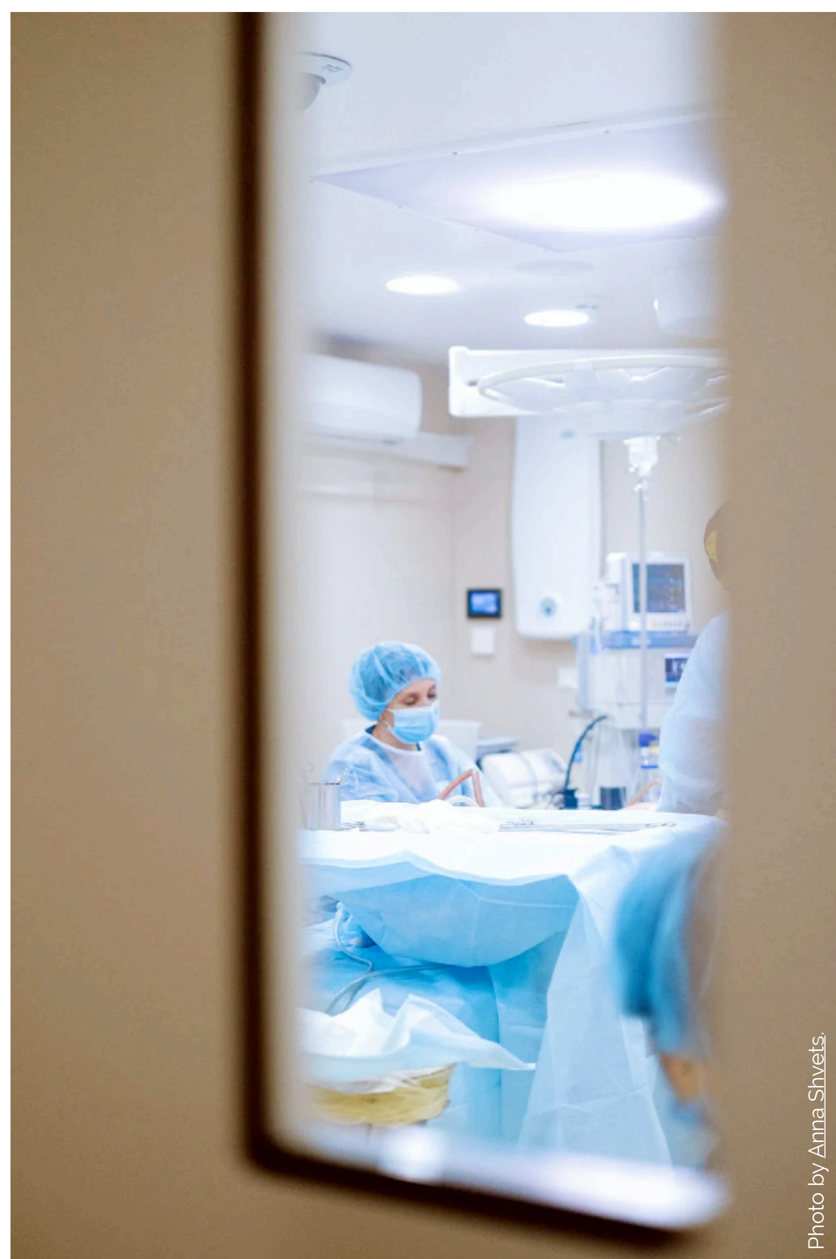

Photo by Anna Shvets.

country on medical services" (Shi, L. & Singh, D.A, 2017, p. 11). Yet, somehow, "poor Americans have worse access to care than do wealthy Americans, partly because many remain uninsured despite coverage expansions since 2010 due to the Affordable Care Act" (Dickman, S. L., 2017). This "access refers to the ability of an individual to obtain health care services when needed" (Shi, L. & Singh, D.A, 2017, p. 11). Access is only offered to a handful of people: those who "have health insurance through their employers," those who "are covered under a government-sponsored health care program," those who can pay out of pocket for every appointment, those who can pay out of pocket for their own health care insurance, and those who "can obtain services through safety net providers" (Shi, L. & Singh, D.A, 2017, p. 11). For many, this means that if they do not have health insurance; they cannot afford to receive medical care because if the patient does not have insurance, they must pay 100% out of pocket for their appointments. Those patients who do not have health care insurance or cannot afford it generally try to avoid physicians unless an issue develops and, by that time, they can go to the emergency room and be treated without having to pay (Shi, L. & Singh, D.A, 2017, p. 11). Because of this lack of access due to health care policies, "the United States lags behind other developed nations in measures of population health" (Shi, L. & Singh, D.A, 2017, p. 13). While this is the characteristic of high costs, unequal access, and average in outcome, it is very closely related to the U.S. health care characteristic of the access to health care services based on insurance coverage.

In 1986, the Emergency Medical Treatment and Labor Act of 1986 was passed. This act states that those that cannot afford health care insurance or even afford to be treated in a health care setting, such as an emergency room, must be able to be treated without being forced to pay the medical bill (Shi, L. & Singh, D.A, 2017, p. 18). The results of this fall back onto those who can pay for treatment and insurance. This is called "cost shifting" (Shi, L. & Singh, D.A, 2017, p. 18). These people include, but are not limited to, "privately insured individuals, employers, and the government" (Shi, L. & Singh, D.A, 2017, p. 13).

In recent years especially, family insurance has been affected and shifted so that children can be treated. But "these policies have differentially affected coverage patterns for children (versus parents) and for low-income (versus high-income) families" (Devoe, et al., 2014). While it can appear that only families are struggling, health policy, which "provides the context and framework within which health care and public health systems operate," does not cater fully to the homeless, those who live in a low-income household, or those who have significant health issues. Such people also constantly struggle to see a doctor and receive the treatment needed (Heiman, et al., 2016).

CONCLUSION

The U.S. health care system characteristics that were mentioned may be easy to recognize, and they all circle back around to the lack of care and expenses of health care. Without insurance, it is difficult to receive care that does not exhaust all the funds in one's bank account. But at the same time, physicians and health care facilities use that money so that patients who do have insurance and easy access to care can continue to receive the best and latest care possible. Some topics that should be explored are these: How can health care providers make their practices more cost-efficient while keeping their care-quality high? How can physicians and other health care providers stay up to date with their technology without allowing it to change the prices of health care recipient's insurance and providers visits? And, how can those who do not have health care benefits or low coverage still be able to see a physician without having to stress over paying for the visit? ❖

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The citation system used in this essay is APA 7th.

KATARYNA WALLACE

THE COST OF HEALTHCARE AND HOW IT AFFECTS THE ELDERLY

INTRODUCTION

The cost of healthcare has risen significantly over the past years. This increase in price has greatly impacted retirees. When a person turns 65 and can retire, the only income they have coming in is their Social Security. Therefore, if they cannot afford insurance, or if they must pay a copay, they will pay for their medical expenses out of their fixed income. In a recent study, 22% of seniors spent over $2,000 on out-of-pocket costs during the 2017 year, which was the second highest percentage of out-of-pocket medical expenses for the elderly in the world. American medicine is the most expensive health care system in the world (Reinberg, 2017). For example, one 20mg Xarelto costs $15.38 in the U.S., but, as of 2017, it costs $6.19 in Canada and $3.83 in India (Belk & Belk, 2020). The cost of drugs in America is also an issue for the elderly. In America, after you turn 65, you can qualify for Medicare, but Medicare does not help lower the cost of the medical needs of all individuals. The rising cost of healthcare causes many problems for the elderly and leads many to go without their daily medicine.

WHY IS HEALTHCARE SO EXPENSIVE?

The cost of healthcare changes with the rate of change in the economy. Lately, more people are eligible for government benefits, which causes many more people to be seen by medical care providers, and increases demand for medical supplies, workers, and coverage. Therefore, prices on drugs, care, and the pay of workers increase. This has caused the cost of healthcare to increase overall. However, for pharmaceutical companies, the price of drugs is not entirely impacted by the economic change, and there are a few theories as to why medical care is so expensive in the U.S. In a 2011 research project, researchers found that the Pfizer drug company gained $67 billion in revenue for that year, and just over $9 billion was used for research and development. Most pharmaceutical companies claim that the monies gained from the purchase of drugs goes to the research and development of other drugs. However, the study discovered that the Pfizer drug company spent almost $20 billion on marketing, which still left the company with a net income of $10 billion (Belk & Belk, 2020). This was shocking to discover. Could the reason why medicine is so expensive in America be because of greedy pharmaceutical companies? Could healthcare cost so much because people working in the healthcare field join this field because of the money and not with the overall care and wellness of the patients in mind? Pharmaceutical companies are not governed by the government, which means they can set their own prices for medicine without any government interference.

However, there is another theory on why medicine is so expensive in the United States. A study showed that Australia pays less than America on drugs, and the researchers wanted to figure out how. They discovered that Australia purchases their drugs in bulk, whiles the United States purchases drugs by bottle, which causes Australia to spend less for drugs than the United States. Could the inflated cost of medicine in the United States be caused by the way America purchases medicine?

LONG-TERM CARE COSTS AND HOW IT AFFECTS THE ELDERLY

Hospital stays are a common issue for elderly people. Medicare has a coverage option for this problem, but there are loopholes. For example, if a Medicare-insured individual must stay in a hospital for more than 60 days, that person must pay half of the expenses for the time past 60 days. If they must stay 90 days, they are required to pay the full expenses for the time after the 90 days. Therefore, if a Medicare Part A-insured individual stays at a hospital longer than 90 days, the cost will be over $10,000 for only 5 days, which is even expensive for anytime over 60 days. That price does not include the cost of any procedures, food, and any other fees the hospital could add.

A hospital stay pales in comparison to hospice and long-term care. The cost for a patient to stay at a nursing home is $89,000-$100,000 per year, and that does not include food and other fees. A home health aide costs at least $19 an hour for 40 hours a week. Medicare does not cover nursing home care or home health care. Therefore, this type of care is paid fully by the patient or the patients' family.

Research has found that Medicare offers things like feeding tubes, gall bladder surgery, and joint surgery to elderly people, often without looking at the current issues a patient has. For example, it could cover feeding tube surgery for an Alzheimer's patient, which could be a safety hazard, but it does not cover the long-term care that the patient will need to protect them from injury or complications (Gross, 2011). This is a major issue for elderly people who need close care and cannot afford this care because of the cost. Therefore, many elderly people are depleting retirement funds to cover their nursing home stays, or their family is paying these excessive prices. While working in a nursing home as a Certified Nurse's Assistant, I heard many families complain about the cost of letting their parents stay there while they could not afford to quit their job to take care of their parent full-time. Many people would pull their family member from the nursing home after they could not afford to keep them there anymore.

PRESCRIPTION DRUG COST AND HOW IT AFFECTS THE ELDERLY

Prescription drug cost is the biggest issue for elderly people, and the breakdown of the Medicare Part D coverage causes more harm than good. The price of drugs is extremely high in the United States and is far cheaper in other countries. For example, one 20mg Paxil costs $6.83 in the U.S., $2.93 in Canada, and $0.98 in the UK and Australia (Belk & Belk, 2020). This has caused many people to import their drugs from other countries to avoid the high price in America. People over 65 can qualify for Medicare Part D, but this coverage sometimes causes more harm than good. According to the Medicare website, the Part D plan is broken down by how much you spend on care per cycle. Therefore, until meeting a $415 deductible, a patient must pay 100% of the cost of a drug. This can cause a huge issue for people who use medication like Paxil. After meeting this deductible, the patient pays 25% co-pay, which is often helpful. However, there comes a time when the patient reaches what is referred to as the "donut hole," which causes the

Photo by Muskan Anand.

patient to pay 25% of brand name drugs and 51% of generic drugs. This causes problems for people (Medicare.gov, 2020). While working as a Pharmacy Technician at CVS, I learned that people taking Synthroid could not switch from brand to generic without consulting a doctor first, and they must be monitored if they do switch, and most drugs could be substituted for generic if we were to run out of a brand name drug and vice versa. Therefore, if a patient had reached the donut hole, and they were taking Synthroid, they could not switch to Levothyroxine, generic Synthroid, and then back again to pay a cheaper cost, which made them pay 51% copay for a generic drug. At CVS, many elderly patients would not get their medications because they could not afford the copay. I have witnessed elderly people, who were on Medicare, not receive medications, like blood pressure medication, because they could not afford the copay, and not always because they had reached the "donut hole." My grandmother, for example, pays for a supplemental plan, but still says that her prescriptions cost too much. Sometimes she does not even purchase them because she cannot afford them, and she has blood pressure, asthma, and heart failure issues. As a pharmacy technician, I can attest to the fact that elderly people would bring in coupon cards to lower the cost of their prescription, which would not work because often the best price is with insurance. Many elderly people would discuss how they have had to get a job again to afford their medications, and those who have not reached retirement age have claimed that they will continue to work because of fear that they could not afford their prescriptions. What can be done to save elderly people money on their prescriptions? Is there any way to lower the cost of prescription drugs? Can the cost of healthcare and prescription drugs affect the retirees of the future?

HOW THE RISING COST OF HEALTHCARE COULD AFFECT FUTURE RETIREES

People may think that the rising cost of healthcare will not affect the generations growing up today and will not affect retirement plans they may have. However, this idea is extremely wrong. Many employers have decided to cancel their retirement plans to be able to afford health insurance for their current workers, which causes retirement plans to be completely shut down from many businesses. This could cause saving for retirement difficult to do through your employment place. Companies are also cutting coverage for retirees. Therefore, if a company has retirement plans that offer insurance through the company during retirement, the coverage that could have been offered will be either cut, meaning that it would not cover as much, or it will be completely removed from the plan. Many companies are already dropping retirement plans that offer coverage because they cannot afford the coverage for their current employees and will not be able to afford coverage for retirees. This causes many retirees to find their own insurance and to rely completely on Medicare (Paavola, 2019).

CONCLUSION

In Conclusion, the rising cost of healthcare has caused many issues for the elderly. It causes them to pay more out-of-pocket costs for hospitalization and long-term care. It also causes retirees to pay more for prescription drugs, even with insurance coverage. The rising cost of healthcare is currently affecting the upcoming retirees and will completely deplete retiree plans in the future. The rising cost of healthcare will continue to cause issues for the elderly and the future elderly as well. ❖

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The citation system used in this essay is APA 7th.

NATURAL SCIENCES & MATHEMATICS

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MARIA ANGELICA PADRON

T-CELL DEATH MECHANISMS IN X-LINKED RETINITIS PIGMENTOSA WITH MUTATIONS IN THE RPGR GENE

ABSTRACT

Retinitis pigmentosa is a degenerative genetic disease affecting people of all ages. Among the three types of retinitis pigmentosa, the x-linked form is the most aggressive one. It is characterized by an early onset with night blindness during childhood and a slow progression through adulthood leading to blindness. The most common gene involved in x-linked retinitis pigmentosa is the RPGR gene in the form of the isotopes RPGR1-ORF15 and RPGR1-19, which show their mutations after exon 15. The RPGR gene is involved with the PDE6 protein that regulates calcium ion channels. The mutation causes an imbalance in calcium concentration within the cell which leads to DNA fragmentation and cell death. A new treatment undergoing human trials used an optimized version of the RPGR gene to treat patients with x-linked retinitis pigmentosa. Patients showed improvement by the first month and major progress by the sixth month.

INTRODUCTION

Retinitis pigmentosa (RP) is a genetic disease that affects photoreceptors in the retina. The disease is characterized by a progression of symptoms that can begin at different stages in life. The first symptom is night blindness, followed by a reduced visual field causing tunnel vision. The most aggressive form can end in complete blindness. Retinitis pigmentosa is caused by a large variety of genes and can be inherited in three ways: autosomal recessive alleles, autosomal dominant alleles or through an x-linked gene.[1] X-linked retinitis pigmentosa is the most aggressive one of the three, beginning to show signs from the very first years of life; however, there is great variance on how fast degeneration occurs between cases.[2]

Retinitis pigmentosa is a disease that is mainly caused by the death of photoreceptors within the retina. Even though it affects millions of people, the pathways through which the photoreceptors die is not well understood. Previous research has shown apoptosis as the primary pathway for cell death, but new research has found alternative pathways. Understanding what causes photoreceptor degeneration in retinitis pigmentosa will allow for a better, cost effective, generalized treatment. This is due to the fact that gene therapy is complicated since it must be tailored to each patient because the disease is caused by more than 45 identified genes.[1]

This paper seeks to compile known information about the pathway through which photoreceptor cell death occurs as well as understand current treatment options and their effectiveness. The paper begins with a general discussion of x-linked retinitis pigmentosa and the genetic models commonly used to study the disease. It is followed by exploring the gene mutations associated with this type of retinitis pigmentosa and the proposed cell death pathways that result from inactivity of the proteins coded by mutated genes. The paper ends with a discussion of potential treatments that are being developed, however, there is no current treatment for this disease and patients just live with progressive blindness.

X-LINKED RETINITIS PIGMENTOSA

X-linked retinitis pigmentosa (XLRP) is the least common of the three types of retinitis pigmentosa. However, it is widely studied because of its fast-paced progression and eventual progression towards complete blindness. XLRP is caused by many known and unknown genes on the X chromosome. XLRP causes irreversible deterioration of photoreceptors, primarily of rods followed by a loss of cones.[3,4] Therefore, during the early stages of the disease, the main symptoms are night blindness, as rods are essential for dark adaptation, and tunnel vision, since the outer edges of the retina have a higher concentration of rods. This disorder can be nonsyndromic, occurring on its own, or syndromic where it is associated with other neurological disorders, commonly deafness.[1]

About 70% of all XLRP cases occur with mutations of the RPGR gene.[1] Genetic models used to study XLRP are most used in mice. One of the examples are mice showing a mutation in exon 7 of the homologous gene for human RPGR; this is known as the *rd1* model.[6] In this model, the mouse experience rod

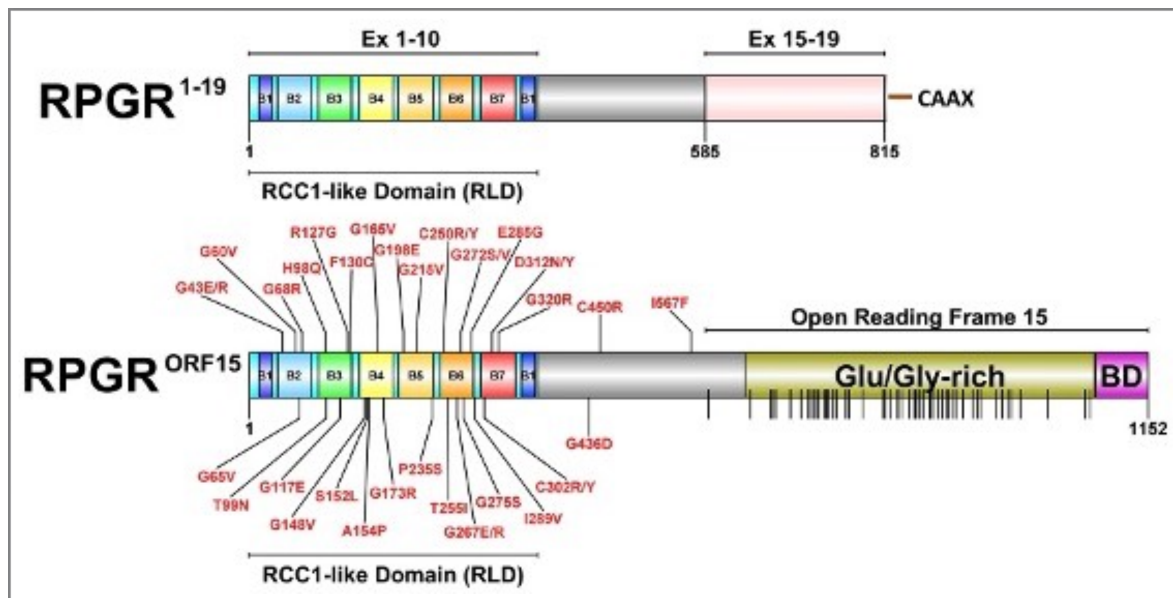

Fig. 1:[7] Shows the two isotopes of the RPGR gene caused by alternative splicing. The $RPGR^{1-19}$ isotope includes the same conformation as the normal gene in exons 1-13 and 16-19 and the variant occurs in exon 14/15. It encodes for 815 amino acids. The $RPGR^{1-ORF15}$ has the normal exons on 1-1 but includes a mutated glutamic acid rich region on

photoreceptor degeneration starting at post-natal day 10, peaking at days 12-14, and finalized by day 21; cone photoreceptor degeneration is unaffected by this mutation but is observed at least six months after their birth.[6] Another model with a mutation in exon 13 of the same gene, known as the *rd10* model, shows primary cone photoreceptor cell death instead of rods where degeneration begins at post-natal day 16, peaks at day 20-25, and is finalized by day 30.[6] Both models are great for understanding the effect of different mutations of the RPGR gene and they show that, regardless of where the mutation is located on the gene, the progression of the disease is very similar.

When compared to human cases, the models show major similarities, making them crucial for studying XLRP. A different model shows mice with a mutation in the gene coding for peripherin; this is the *rd2* model for RP. This model photoreceptor cell death starts after at least two weeks from birth, resulting a much slower onset when compared to the *rd1* and *rd2* mice.[6] However, peripherin is not the protein affected by the RPGR gene observed in humans.

RPGR Mutation

As previously mentioned, XLRP is mainly caused by mutations in exon 15 of the RPGR (retinitis pigmentosa GTPase regulator) gene,[5] the most common isoforms being $RPGR^{1-ORF15}$ and $RPGR^{1-19}$. As shown in **Fig. 1**, the $RPGR^{1-ORF15}$ has 15 exons and codes for 1,152 amino acids; while the $RPGR^{1-19}$ has 19 exons coding for 815 amino acids.[5] About 60% of mutations in this gene occur in exon 14/15, in the isoforms mentioned previously exons 1-13 are completely identical.[4]

The RPGR gene has been found to be involved with microtubule distribution and transport regulation of calcium in the cilia of photoreceptor cells.[4] The RPGR gene codes for the PDE6 protein which regulates cyclic guanosine monophosphate (cGMP), the mutations present in XLRP cause increased intracellular levels of cGMP which affects calcium ion channel regulation.[6] This reduces the phototransduction process.[6]

CELL DEATH PATHWAY

The RPGR gene codes for the PDE6 protein in humans, an enzyme involved in the hydrolysis of cGMP in photoreceptors.[6] The PDE6 mutation induces a downregulation of cGMP levels within the cell, therefore, cGMP gated calcium ion channels open in the plasma membrane.[1,6] Such high levels of cGMP and calcium within the cell alters the physiology in a way that prevents function completely.[8] This process is best observed in the *rd1* mouse genetic model for XLRP.[8]

The proposed pathway for cell death caused by high levels for cGMP is the following. **Fig. 2** shows rhodopsin (RHO) being activated by a photon stimulating the retina.[6] Active rhodopsin binds to a G-protein (G-GDP) in the cell forming the RHO-G-GDP complex which phosphorylates GDP to form active GTP.[9] GTP binds to the PDE6 protein causing it to become active.[8] As discussed previously, this enzyme is the one affected by the mutations in the RPGR gene. The active PDE6-G-GTP (denoted as E*) complex hydrolyses cGMP to form active GMP; the reaction can be observed in the Michaelis-Menton model for kinetics portrayed in equation 1.[9] As shown in **Fig. 2**, when cGMP is converted to GMP cGMP-gated calcium channels close. This causes the cell to have a hyperpolarized membrane potential decreasing the strength of propagating graded potentials, therefore, voltage gated calcium channels at the end of the photoreceptor remain closed.[11] This causes a small amount of glutamate to be released which excites the bipolar neurons attached to the photoreceptors.[11] However, the PED6 protein has a mutation that prevents the hydrolysis of cGMP and the reaction in equation 1 never happens. The cGMP gated calcium channels remain open and the photoreceptor becomes extremely polarized. Therefore, the bipolar neurons are not depolarized and the action

potential can't occur. Since the rod physiology is altered in a way that impedes function, XLRP causes night blindness from a very young age.

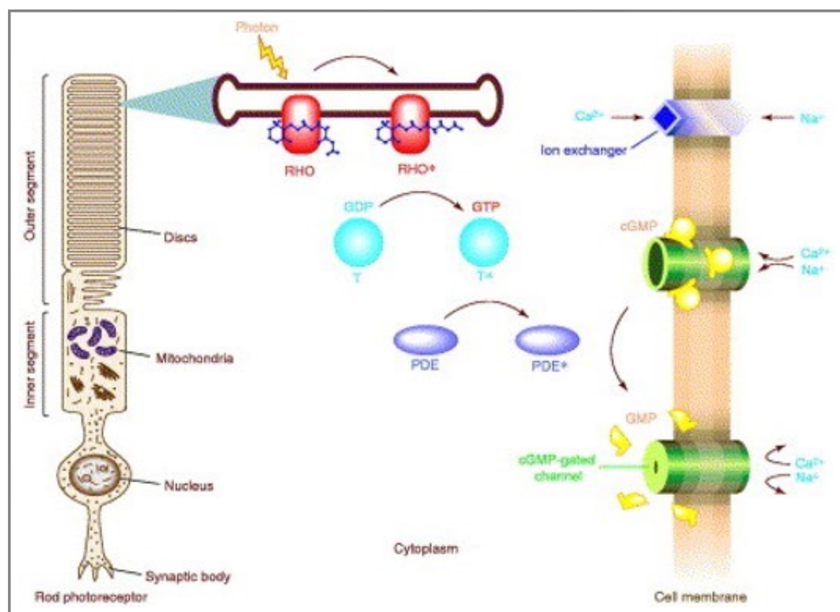

Fig. 2:[10] This figure shows the phototransduction cascade as it occurs in a healthy eye. A photon stimulates the retina activating RHO which phosphorylates GDP to GTP. GTP activates the PDE6 protein; this enzyme hydrolyses cGMP to GMP. GMP unbinds from cGMP gated ion channels which prevents the influx of calcium ions. Low levels of calcium ultimately cause photoreception. $E^{*} + cGMP \leftrightarrow E\text{-}cGMP \rightarrow E^{*} + GMP$. (1)[9]

Furthermore, as shown in **Fig. 3**, the increased levels of calcium in the cell activates cAMP. cAMP causes the downregulation of the cAMP-response element binding (CREB) protein activity by increasing the amount of active CREB kinases.[6] It was observed in the *rd1* model for XLRP that increased kinase activity reduces CREB activity instead of increasing it, which causes the downregulation.[6] **Fig. 3** also shows that the decrease in CREB activity then causes a decrease in calpastatin transcription; therefore, calpain kinases are no longer inhibited.[6] This strong increase in calpain activity raises levels of reactive oxygen species (ROS) which prevents oxidoreductase activity impeding DNA repair activity.[6] Since oxidoreductase proteins are unable to repair the damage, specific enzymes like poly-ADP-ribose polymerase (PARP) begin consuming ATP to repair DNA damage.[6] However, extreme activity of the PARP enzyme leads to energy depletion occurs.[6] After the energy has depleted, PARPs are no longer able to fix damaged DNA. When that is combined with high calpain activity, apoptosis inducing factor (AIF) nuclear translocation occurs; ultimately, DNA fragmentation occurs within the cell and finally the photoreceptors die.[6]

This pathway is not well understood, and more research is required to confirm it. It is known that a massive calcium influx causes the death of the photoreceptor through DNA fragmentation.[1] However, all the pathways that are triggered by this influx are hard to understand as there are many processes within photoreceptors that are regulated by calcium levels.

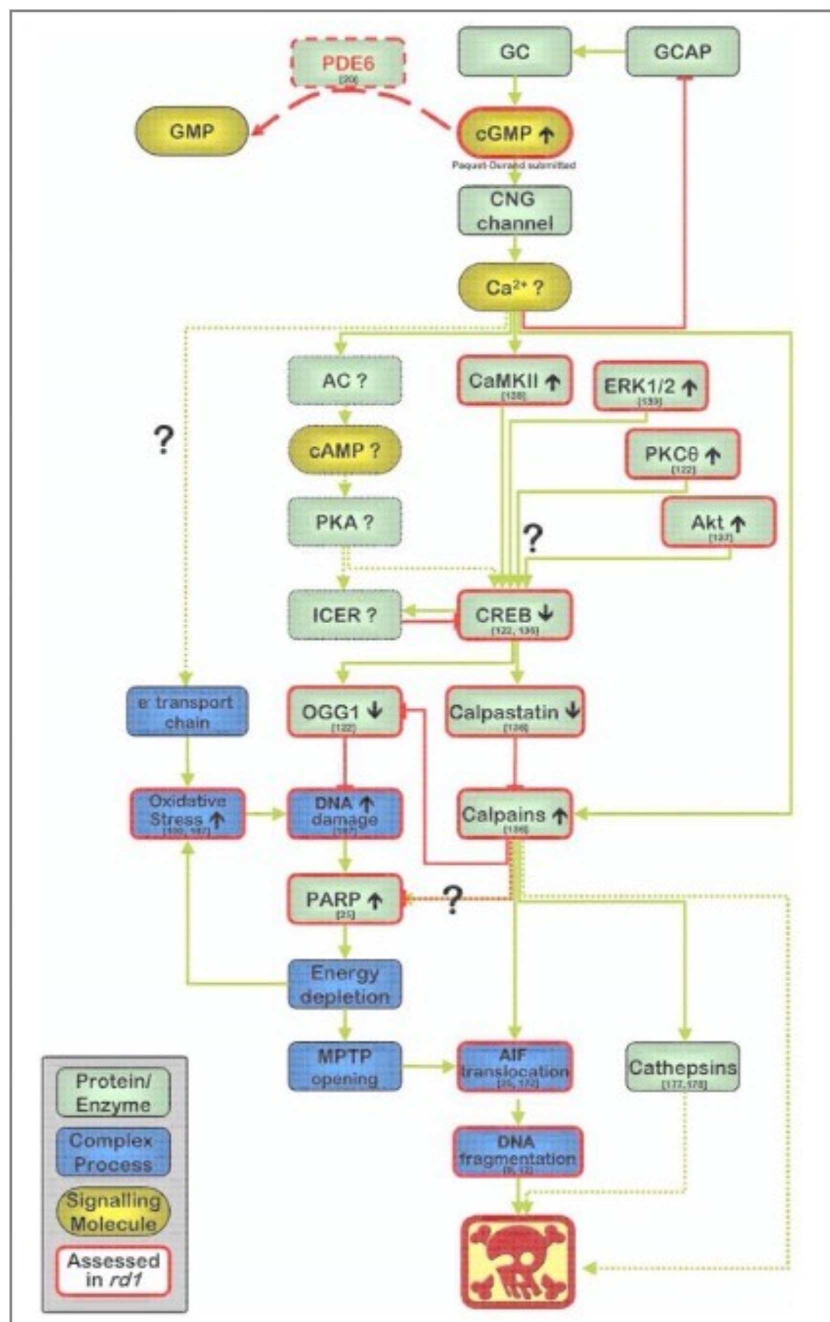

Fig. 3:[6] This figure shows the multiple effects that increased calcium levels have in photoreceptors. Calcium activates cAMP, the molecule that regulates CREB activity. Decreased CREB activity causes a rise in CREB kinases which inhibits calpastatin transcription and the calpain concentration increases. High calpain levels increase the amount of reactive oxygen species within the cell and PARP begins to use energy to fix damaged DNA. High PARP activity causes energy depletion and the DNA remain damaged as it can't be repaired. Calpain activity and the inability to repair the DNA causes apoptosis inducing factor translocation which ultimately results in DNA fragmentation and cell death.

Fig. 4 shows a simplified explanation of what is being discussed. It shows the photon activating the retina but the mutations in PDE6 prevent normal physiology. This causes an increased intracellular level of cGMP which increases the calcium influx, ultimately leading to DNA fragmentation and cell death.

TREATMENTS

New research seeking to find a treatment for XLRP is published regularly. As it was mentioned before, gene therapy is unlikely to be used since it is expensive and tedious because it must be tailored to each specific patient. Furthermore, some of the genes that cause RP have not yet been identified, and so it is not a viable

treatment for many patients. A recent study specified the results of a human trial in which patients were injected with an optimized version of the RPGR gene, adeno-associated viral vector encoding codon-optimized human *RPGR* (AAV8.*coRPGR*).[12]

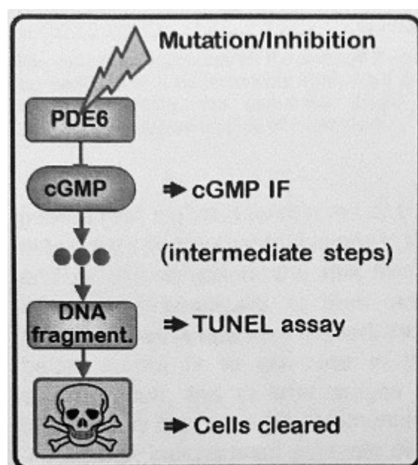

Fig. 4:[8] This figure shows a simplified version of how damaged PED6 proteins cause an increase in cGMP levels. This in turn gives rise to a series of events that ultimately result in DNA damage and fragmentation which cause the apoptotic death of the cell. A TUNEL assay was conducted in order to quantify cGMP and calcium levels in rod photoreceptors in a *rd1* RP model.

Fig. 5 shows the results after six months of treatment with AAV8.*coRPGR*. It shows that by the first month there is already an increase in the visual field, which they found true for all 18 patients that participated in the study.[12] **Fig. 5** shows the images of three of those 18 patients, who had a six-month follow-up.[12] These patients showed major improvements in visual field by the end of the six months and strong increase in retinal sensitivity.[12] This research shows that there is a possibility for a generalized treatment for people suffering from XLRP. However, there is not enough information of how much visual recovery the treatment can bring to RP patients.

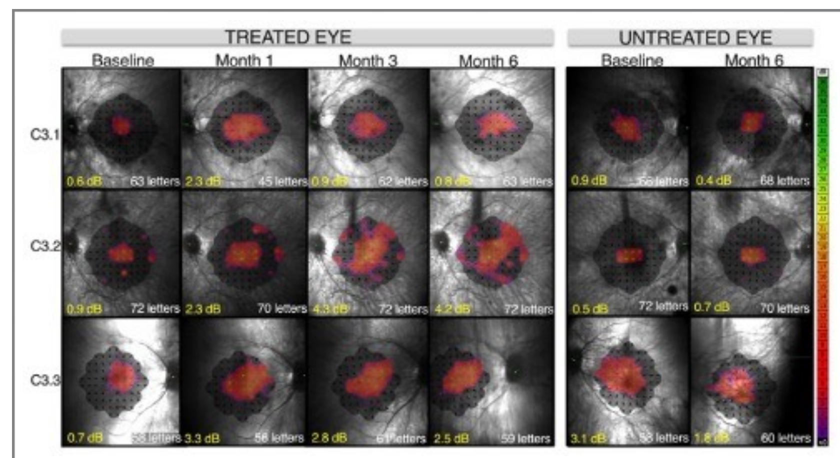

Fig. 5:[12] This figure shows the progression of three patients treated with AAV8.co*RPGR*. On the left, the figure shows the retina after it has undergone treatment. This is compared to the images on the right side which show untreated retinas. In the figure we can observe the retinal sensitivity (dB) and the visual fields shown by the heat maps. We observe an increase in sensitivity and larger visual fields for the treated eyes over a period of 6 months and no change for the untreated eyes.

CONCLUSIONS

Retinitis pigmentosa is a degenerative genetic disease that affects rod and cone photoreceptors in the retina. The disease can be inherited in three ways: autosomal-recessive, autosomal-dominant, and x-linked. X-Linked retinitis pigmentosa is widely studied because it is the most aggressive one of the three. Symptoms like night blindness begin at a very young age and progress quickly through adulthood until complete blindness is reached. The most common mutated gene in x-linked retinitis pigmentosa is RPGR which affects the PDE6 enzyme, this mutation is best observed using the *rd1* model. Ultimately, it was observed that the death of photoreceptors is caused by inactivity of the mutated PDE6 enzyme. This causes cGMP and calcium levels to rise within the cell ultimately impeding the repair of damaged DNA, leading to fragmentation and finally death of the photoreceptor. Finally, a promising new treatment for x-linked retinitis pigmentosa was explored, where an optimized version of the RPGR gene was given to 18 patients via injection. All patients showed improvements by month one, and three of them showed major improvements by the sixth month of treatment. ❖

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The citation system used in this essay is CSE 8th, Citation-Sequence.

ALISSA AVERY

CORONARY ARTERY BYPASS GRAFT SURGERY AND THE ROLE OF EXERCISE

ABSTRACT

Coronary artery bypass graft (CABG) surgery is the gold standard of treatment for severely blocked coronary arteries that cannot be treated by non-surgical methods. It is one of the most common cardiac procedures throughout the world, indicating the high prevalence of the mechanisms and diseases which mandate the need for a bypass surgery. Coronary artery disease and severe myocardial ischemia are the predominating reasons for CABG surgery. However, exercise is effective in reducing the risk of both of these conditions and should be highly recommended for individuals at risk of developing them. If coronary artery occlusion or dysfunction persists to the point that a CABG procedure is warranted, exercise is still important in enabling individuals to maintain or improve their functional capacity following surgery. Consequently, the role that exercise plays in the prevention, treatment, and management of this condition is essential and must not be neglected.

CORONARY ARTERY BYPASS GRAFT SURGERY AND THE ROLE OF EXERCISE

Coronary artery bypass grafting (CABG) is a surgical treatment for blocked coronary arteries. This surgery has been in use and has evolved for over 100 years. The gold standard for the CABG procedure comes from Dr. George Green in 1968 at Saint Luke's Hospital in New York City, where for the first time he successfully grafted the left internal thoracic artery to the left anterior descending artery (Melly et al., 2018). Since this success, further experimentation with cardiac graft surgeries has led doctors to optimize the procedure to the point that mortality rates are extremely low. CABG is necessary and especially effective in patients with left main coronary artery disease or multivessel coronary artery disease, because these conditions are particularly serious to the point that they cannot be treated by non-surgical methods alone (Head et al., 2017). However, exercise can play an important role in minimizing the loss of functional capacity in bypass surgery patients. Studies such as that of Ximenes et al. (2016) suggest that short-term exercise-based rehabilitation in addition to standard cardiac rehabilitation can improve functional capacity, and the earlier an exercise intervention is implemented, the more likely that patients will be able to maintain preoperative functional capacity. Furthermore, preoperative home-based rehabilitation programs may reduce the length of hospital stay following surgery, in addition to minimizing the deleterious effects of the procedure on functional capacity (Waite et al., 2017).

Exercise plays an integral role in reducing the risk of needing coronary artery bypass surgery. Because coronary artery disease (CAD) is the predominant reason for an individual requiring CABG, any changes an individual can make that reduce the progression of atherosclerotic plaque buildup will lower the risk of CAD serious enough that it requires CABG. A sedentary lifestyle is one of several risk factors that accelerate the buildup of atherosclerotic plaque; consequently, exercise is critical for lowering this risk (Thompson, 2019).

CORONARY ARTERY BYPASS GRAFTING

Epidemiology

Coronary artery bypass grafting is one of the most commonly performed cardiac surgeries worldwide. On average, there are 200,000 CAB graftings done every year in the United States, according to Montrief et al. (2018). Additionally, there is a higher prevalence in men than in women: 60% of these procedures are done on males (Sousa et al., 2015). Wu et al. (2013) found that CABG patients are more likely to be between the ages of 60-79 years old and have 3 affected coronary arteries and an ejection fraction of <50%. This study also found that patients had a higher occurrence of comorbidities such as cerebrovascular disease, peripheral artery disease, congestive heart failure, malignant ventricular arrhythmia, chronic obstructive pulmonary disease, diabetes, and renal failure. Approximately 92% of these surgeries are performed on white patients, 4% on Black patients, and the remaining 4% on other races (Angraal et al., 2018). The mortality rate for patients who have had a CABG procedure is about 3% in the United States. The 5-year

survival rate is 85% to 95%, and the 10-year survival rate is 75% (Head et al., 2017).

Pathophysiology

A coronary artery bypass graft is necessary when blood supply to the heart is so impaired that other minor surgeries or non-surgical methods are ineffective in restoring adequate blood flow. This procedure may also be necessary in the case of a severe heart attack to aid in recirculating blood to the heart (National Institutes of Health [NIH], 2020). A bypass graft surgery removes arteries or veins from other parts of the body and uses these grafted blood vessels to redirect blood flow around the clot. The blood vessels most commonly used for the grafts are either arteries from the chest or arm, or veins for the leg, although in other countries, there is a large amount of variability in the vessel selection. Currently, the Society of Thoracic Surgeons recommends that the left internal mammary artery (LIMA) be used first, then the right internal mammary artery followed by the radial artery, if multiple grafts are necessary. The reason for this selection is the long-term performance of these particular vessels has proven greater than that of other vessels (Head et al., 2017). There has been experimentation with both synthetic grafts and tissue engineered grafts, however, the patency rates for these materials have not proven to be satisfactory. Interestingly, the American CABG guidelines recommend that complete arterial revascularization be considered in patients who are 60 years old or younger, and do not have any comorbidities (Melly et al., 2018). This demonstrates how successful modern-day CABG procedures are, that complete revascularization is considered a safe and valid procedure in patients who meet the appropriate criteria.

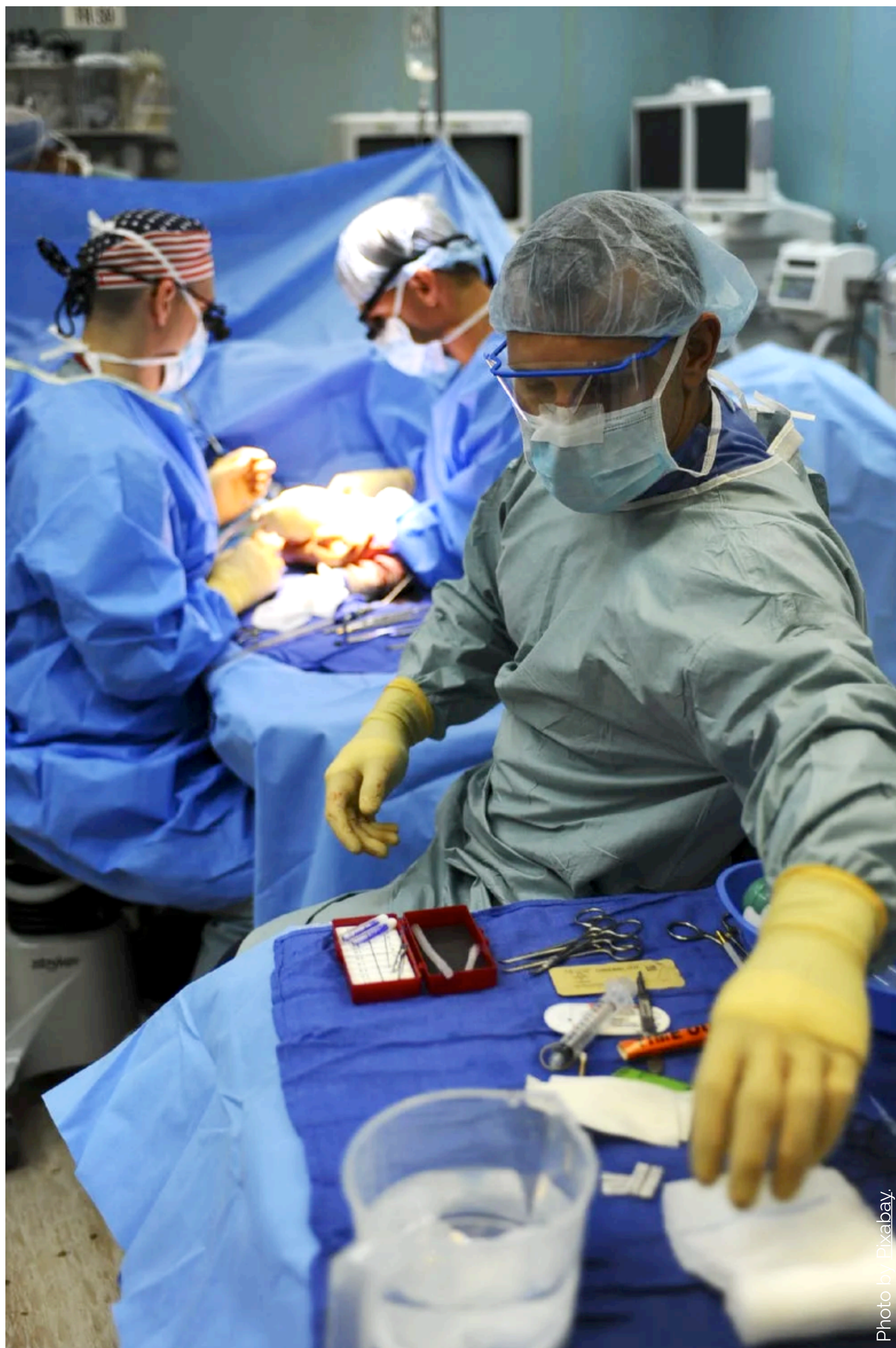
Photo: Pixabay.

Risk Factors

The primary risk factor for coronary artery bypass grafting is the presence of coronary artery disease. As atherosclerotic plaque builds up, it can eventually obstruct the blood vessel and result in a blood clot. As mentioned previously, a sedentary lifestyle is one risk factor for accelerating the buildup of this plaque. Additional risk factors include hypertension, smoking, an unhealthy diet, unmanaged stress, high blood pressure, high cholesterol, and being overweight or obese (Thompson, 2019). Each of these factors must be reduced in order to minimize the chance of having a clot so severe that it requires coronary artery bypass graft surgery.

Signs, Symptoms, and Complications

Before an individual is aware of the seriousness of a clot that may mandate coronary artery bypass graft surgery, severe myocardial ischemia or myocardial infarction can indicate the need for this procedure (Thompson, 2019). Other indicative signs can be shown in an electrocardiogram or an echocardiogram, both of which can show if there is damage to the heart that warrants a CABG. Angina and dyspnea may also be signs of occluded coronary arteries.

While this surgery is a serious undertaking, the mortality rate is quite low, approximately 3%, and, as previously mentioned, the risk of short-term complications is also low, at 4% (Fudulu et al., 2016). To ensure patient safety and well-being, however, patients will typically stay in the hospital following surgery up to seven days, so that any symptoms or complications can be monitored. After the short-term postoperative period, the 5-year survival rate is over 80% in patients (Wu et al., 2013).

CURRENT TREATMENT OPTION

On-Pump Versus Off-Pump Surgery

There are two variations of the CABG procedure: on-pump bypass grafting (ONCABG) and off-pump bypass grafting (OPCABG). ONCABG is performed on the heart, which is accessed via a sternotomy, wherein the sternum is broken down the midline. The heart is then arrested through a potassium-full solution called cardioplegia, which prevents the heart cells from dying. According to Head et al. (2017), on-pump surgery potentially has greater graft patency than off-pump surgery. However, OPCABG is performed away from the heart, and consequently appears to be safer and more beneficial for patients who are at higher risk (Fudulu et al., 2016). Additionally, OPCABG postoperative renal, bleeding, transfusion, and respiratory complications are lesser than those of ONCABG, and while this surgery is more technically demanding than on-pump surgery, it may be the better option for individuals with compromised immune systems or other complications (Fudulu et al., 2016). Short-term complications for both ONCABG and OPCABG procedures include mortality, stroke, myocardial infarction, renal failure that requires dialysis, and re-exploration for bleeding; however, all of these have an incidence of less than 4%, though the risk is further reduced in OPCABG surgeries (Head et al., 2017).

Pharmacological Intervention

Following a coronary artery bypass graft procedure, there is great intersubject variability in regard to medical management aiding in recovery. Anticoagulant therapy, such as aspirin, is assigned to patients with the intent that it be prolonged indefinitely. Some patients may have been prescribed aspirin prior to the surgery, but it must be stopped before the procedure, and then it can be started again (Thompson, 2019). The AHA/ACC recommend aspirin dosages that vary from 100-325 mg each day, as these levels have shown to be advantageous in secondary prevention of coronary artery disease (Thompson, 2019). Other types of medications used postoperatively include ACE inhibitors, angiotensin II receptor blockers, and HMG-CoA reductase inhibitors, each dependent upon the extent to which there is myocardial damage or dysfunction. Additionally, antiarrhythmic drugs, pacemakers, and defibrillators may be used in individual cases if there is an arrhythmia or excessive myocardial dysfunction that warrants such measures.

Surgical Advances

With the advancement of technology, modern medical techniques have been developed which may increase the graft patency and longevity of bypass surgeries. One of these advancements is the creation of an anastomotic stapler, which reduces the demand on the surgeon without compromising the integrity of the graft and its patency (Melly et al., 2018). Additionally, progress has been made in terms of minimizing the invasiveness of this surgery by moving towards a more endoscopic method. Minimally invasive direct coronary artery bypass (MIDCAB) allows for the graft vessel to be harvested endoscopically, while the anastomosis of the graft to the coronary artery is still done in direct sight, but through a mini-thoracotomy. Despite advances in other revascularization surgeries, such as percutaneous coronary intervention (PCI), which has proven to be less invasive and more comfortable for patients, CABG surgery remains the optimal treatment for multi-vessel coronary artery disease, especially when there are three vessels affected or the left main coronary artery is dysfunctional (Melly et al., 2018).

Exercise in the Prevention and Treatment of CABG

Exercise has been shown to be effective in reducing the risk for coronary artery disease, thereby also reducing the risk of needing a coronary artery bypass graft (Thompson, 2019). Furthermore, Waite et al. (2017) demonstrated that preoperative rehabilitation programs can also be effective in reducing the length of hospital stay in CABG patients. While Ximenes et al. (2015) found that early application of resistance exercise following bypass surgery did not enhance pulmonary function, they did observe that it helped to maintain functional capacity in patients. Short-term, exercise-based rehabilitation following the procedure can also increase exercise capacity, improve peak VO_2

and ventilatory exchange, and has been shown to be safe for these cardiac patients as well. Additional favorable effects include enhanced exercise tolerance, improved quality of life, and increased activity of daily living (Spiroski et al., 2017). Consequently, exercise, both preoperatively and postoperatively, is highly beneficial in patients for reducing the risk of needing bypass surgery, and also maintaining or improving functional capacity in patients should a CABG procedure be necessary.

THE ROLE OF EXERCISE IN CORONARY ARTERY BYPASS GRAFTING

Exercise Testing

Following a coronary artery bypass graft procedure, exercise stress testing is a valid option for determining whether or not there is remaining myocardial ischemia (Thompson, 2019). It also may be necessary in cases of patients with post-operation complications to determine their functional capacity or decide if they are capable and ready to return to work and other normal daily activities. Additionally, an exercise test can help prescribe an appropriate exercise prescription. The exercise test should be performed 3-4 weeks after surgery to allow for appropriate healing and reduce the risk of complications. To determine if there is persisting ischemia, the exercise test should be performed while monitoring the patient via ECG assessment or through nuclear perfusion imaging. If the patient has any angina, or if the ECG or nuclear perfusion imaging so indicates, there may be lingering myocardial ischemia. However, if the surgery proceeded successfully without any complications, there is clinically no need for the patient to perform an exercise test.

Exercise Progression

While a CABG procedure is a serious surgery, the sooner a patient is able to begin an exercise progression, the better their chances are of minimizing the damage to functional capacity (Ximenes et al., 2015). Patients can begin stretching and flexibility activities 24 hours post-surgery. 2 to 3 days following the procedure, patients can begin walking, and this is highly recommended and encouraged, because it is a safe and effective means of exercise (Thompson, 2019). Patients without any complications can then begin a cardiac rehabilitation program within a week of surgery. After assessing the patient for contraindications, he or she may then progress to an aerobic exercise training program, which should begin at a target heart rate of the resting heart rate plus an additional 30bpm, or at an RPE of 11 to 13. However, due to intersubject variability that presents when using approximations such as these, the patient should be closely monitored to ensure safety, and intensity should be adjusted as needed. After transitioning from inpatient to outpatient cardiac rehabilitation, the CABG patient can progress to a more traditional exercise program. However, there may be discomfort from the chest and back musculoskeletal regions, or from the incision sites, that warrant modifications of intensity in individual patients. After 3 to 4 weeks of an aerobic training program, the patient can begin light resistance training as well (Thompson, 2019).

To progress to a resistance training program, there must be no evidence of congestive heart failure, uncontrolled dysrhythmias, severe valvular disease, uncontrolled hypertension, or any unstable symptoms. Additionally, if the procedure was an on-pump coronary artery bypass graft, the sternum and other incision sites will still be healing, so the patient should be monitored for any complications involving these sites. The sternum will typically be healed by 3 months; however, if there is sternal movement or any wound complications, exercises should only be performed in the lower extremities. For the patient to progress to a resistance training program involving lifting weights at 50% or more of 1RM, he or she should be at least 5 weeks post-operation (Thompson, 2019).

Upper body range of motion activities are essential for restoring and healing the soft tissue and bone damage that occur during a coronary artery bypass graft. The upper body must be strengthened and restored to an appropriate range of motion following surgery or adhesions may develop, which in turn weaken and shorten the postural muscles (Thompson, 2019). This weakening will then negatively affect posture and strength gains in the patient.

CONCLUSION

Because coronary artery bypass grafting is one of the most prevalent cardiac surgeries in the world, understanding the mechanisms by which coronary arteries become clogged to the point that a CABG surgery is warranted is critical. Furthermore, understanding the role that exercise can play in the prevention and treatment of coronary artery disease, along with the recovery from a bypass grafting procedure,

could be extremely advantageous for individuals at high risk for coronary artery disease or myocardial infarction. Exercise can reduce the risk for coronary artery disease, which is one way to eliminate the need for a coronary artery bypass graft surgery. However, if coronary arteries are occluded to the extent that a CABG is necessary, preoperative rehabilitation can be beneficial in minimizing hospital stay and maintaining or increasing functional capacity following the surgery. While mortality rates and chances of postoperative complications are low, cardiac surgery is significant and requires intentional, safe, and effective rehabilitation. In addition to standard cardiac rehabilitation, exercise-based rehabilitation programs are extremely effective in increasing functional capacity, restoring range of motion, and reducing the risk of returning occlusion or narrowing of arteries. Patients should begin a postoperative rehabilitation program as soon as is safe, so that the negative effects of bed rest and being sedentary do not accumulate. Patients that progress from a typical cardiac rehabilitation program to a traditional aerobic endurance training program, and then to a resistance training program, maximize their chances of returning to full or increased functional capacity. Though coronary artery bypass surgery is widespread across the globe and is a highly serious surgery, exercise is powerful in preventing and treating the mechanisms by which the procedure becomes necessary. ❖

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The citation system used in this essay is CSE 8th, Name-Year.

ISABELLA LYNN

PREEXISTING CONDITIONS ASSOCIATED WITH SEVERE COVID-19

ABSTRACT

SARS-CoV-2 emerged in Wuhan, China in late 2019. It quickly spread and became a global pandemic. Those who are older or have a preexisting condition are at an increased risk of developing serious COVID-19. Obesity, diabetes, and hypertension have been studied in relation to COVID-19 complications. Obesity is associated with an increased need for hospitalization, ICU transfers, ventilation assistance, and a higher mortality rate. Diabetics are likely to have a poor outcome from COVID-19 infection, and the outcome might be predicted based on lymphocytes present at patient intake. People with hypertension and COVID-19 have a lower mortality rate than obese or diabetic patients, but the rate is still elevated in comparison to the general population. A significant portion of the population has one or more of these conditions, which results in many people being at risk of developing severe COVID-19. Precautions should be taken by everyone, but especially those with preexisting conditions to ensure they are not infected.

Photo by Markus Spiske.

INTRODUCTION

SARS-CoV-2 is the virus that causes COVID-19. COVID-19 was officially declared a pandemic in March 2020, and, since then, numbers have rapidly climbed. As of March 2021, there have been 123 million identified cases with 2.7 million deaths worldwide. Predominantly, these deaths have occurred in people with preexisting conditions. This article will look that three preexisting conditions, obesity, diabetes, and hypertension. These conditions have been associated with the development of severe COVID-19 and an increased risk of mortality from the virus.

COVID-19 was first identified in Wuhan, China in December 2019. The initial cases can be linked to Huanan Wholesale Seafood Market. Many of the initial patients were stall owners, market employees, or regular visitors to the market. The market sells seafood and exotic animals, and it has been postulated that the virus made the transition from animals to humans at this location. Such a location would be the perfect place for a spillover event to occur. A spillover event is where a virus crosses from animals to humans. Markets are often indoor facilities that are crowded which may result in close contact between people. Additionally, the selling of exotic animals in this enclosed space may be what lead to the virus's transition to humans.

SARS-CoV-2 is a virus of zoonotic origins. Like SARS-CoV, which caused the 2003 outbreak, SARS-CoV-2 is suspected to have originated in bats. The original outbreak of SARS-CoV occurred in China and only infected 8,098 people (Fleming et al., 2020). It had a much smaller impact than SARS-CoV-2. SARS-CoV was found to have had an ecological reservoir in bats with an intermediate host that resulted in the spread to humans. Many attempts have been made to trace the origins of SARS-CoV-2 since the discovery of the virus. It is likely that it also had a natural reservoir in bats

with an intermediate host of pangolins (Lytras et al., 2020). Pangolins are some of the most trafficked animals in China and are often used in natural medical practices. Given the nature of the Huanan Market, it is likely pangolins were present in this location.

Symptoms of COVID-19 are highly variable. They can range from fever, sore throat, loss of sense of smell, headache, body aches, and exhaustion (Korell et al., 2020). Additionally, the severity of symptoms can range from asymptomatic to mild or severe. Currently, the mortality rate for the general population is between 2-3.7% (Fleming et al., 2020; Gentile et al., 2020). Additionally, the severity of COVID-19 is extremely variable. Some people can contract the virus and be asymptomatic, while others have extreme reactions and die from the virus.

COVID-19 is worse in people over 50 and those with preexisting conditions. The category of preexisting conditions is extremely broad. It may be defined as a condition that existed before applying for health insurance. Examples of preexisting conditions include, but are not limited to, depression, arthritis, heart disease, liver disease, cancer, epilepsy, obesity, diabetes, hypertension, and kidney disease.

Given the broadness of preexisting conditions, it is important to identify the conditions that are known to increase the severity of COVID-19. This paper will review three conditions, obesity, diabetes, and hypertension. Commonly, more than one of these conditions are occurring in a person at one time. These conditions have been associated with an increased risk of mortality with COVID-19 and additional factors such as the need for hospitalization, ICU transfers, length of stay, and length of recovery.

COVID-19 AND PREEXISTING CONDITIONS

Obesity

Obesity is a common condition that affects around 500 million people globally (Green and Beck, 2017). Obesity is defined by a person's BMI. BMI stands for body mass index and measures body fat based on a person's height and weight. It is not a perfect measure as it does not consider muscles versus fat, and a person's overall health is not defined by their BMI. However, BMI can be used to establish a baseline as to whether a person is overweight or not. Someone with a BMI under 18.5 kg/m^2 is considered underweight, a normal BMI is 18.6-25 kg/m^2. Those between 25-30 kg/m^2 are considered overweight, and a BMI greater than 30 kg/m^2 is considered obese. If the BMI is over 40 kg/m^2 is considered extremely or severely obese. Obesity is often accompanied by other preexisting conditions like type 2 diabetes or hypertension but can occur alone. Given that COVID-19 is still relatively new, data on the subject is still limited. However, numerous studies have identified a relationship between COVID-19 and obesity.

Several studies have found that obesity increases the risk of mortality in people with COVID-19. The mortality rate for COVID-19 is between 2-3%. One study found that those with a BMI >35 had a mortality rate four times higher (Mostaghim et al., 2020; Kim et al., 2020). Additional studies have found those aged 50 and older with a BMI over 40 kg/m^2 have a 5.1-fold higher mortality rate (Kim et al., 2020). There is no significant difference between those considered normal weight, those considered overweight (BMI 25-30), or those in obese class 1 (BMI 30-35) (Staub et al., 2020). Interestingly, one Korean study also found an association between higher mortality and patients being underweight (BMI under 18.5) (Kim et al., 2020). Those who were underweight had a 2.28-fold higher mortality rate than the normal weight group, thus suggesting that patients at both extremes are at risk if they contract COVID-19.

Furthermore, patients who are obese are much more likely to need hospitalization, be transferred to the intensive care unit, and require assisted ventilation. Patients were much more likely to be hospitalized with severe or critical COVID-19 symptoms if they were obese (Popkin et al., 2020). An Italian study found that 41.3% of obese patients were transferred to the ICU while only 18.7% of normal-BMI patients needed the ICU (Busetto et al., 2020). The same study also found that obese patients required assisted ventilation 41.4% of the time and normal-BMI patients required assisted ventilation 15.6% of the time. However, it is important to note this study had a higher mortality rate in those with a normal BMI. The mortality rate for obese patients was 6.9% while in normal-BMI patients it was 31.2%. The researchers attributed this to their normal patient pool being on average 10 years older and having several other comorbidities such as type 2 diabetes, cardiovascular disease, cancer, hypertension, and dementia.

Obesity has been shown to impair the adaptive immune response (Kim et al., 2020). In an animal model study, mice with diet-induced

obesity died more often than lean mice (Green and Beck, 2017). Additionally, these mice had greater lung damage, higher numbers of cytotoxic CD8+ cells, fewer suppressive T-regulatory cells, and a decreased production of B-cells, indicating that obesity impairs the adaptive immune system. The adaptive immune system is the specialized portion of the immune system which responds days after viral infection. These immune cells (helper t-cells, cytotoxic t-cells, and b-cells) have specialized receptors unique to the antigen they are targeting. They are essential to getting a viral infection under control. Given this impairment, obese people's immune systems are at a disadvantage when responding to viral infections resulting in the complications observed in COVID-19 patients.

These findings have significant implications for obese people worldwide. A significant portion of the population is considered obese. Approximately, 500 million people are considered obese. Younger people are much more likely to be considered obese than older (Busetto et al., 2020; Staub et al., 2020). Additionally, comorbidities such as hypertension and type 2 diabetes often occur in obese patients, putting them at significant risk of developing severe COVID-19. Given such a large portion of the population suffer from obesity, many people are at risk of developing severe COVID-19 and potentially dying from the infection.

Photo by cottonbro

Diabetes

Diabetes is a metabolic disorder in which the body has high sugar levels for prolonged periods. There are two main types of diabetes, type 1, and type 2. Type 1 means that little or no insulin is produced by the islets of the pancreas. Type 2 is characterized by high blood sugar, insulin resistance, and a relative lack of insulin. Type 1 diabetes is normally diagnosed in children or young adults and is a lifelong condition. Type 2 diabetes is typically diagnosed in individuals 45 and older who are overweight. This type can be reversed through proper diet and exercise. It commonly occurs with other comorbidities like obesity and hypertension. Several studies have shown that diabetes is associated with COVID-19 complications and increases the risk of death.

One study found that diabetes was associated with an increased risk of mortality, severe COVID-19, acute respiratory distress syndrome (ARDS), and disease progression (Huang et al., 2020). Additionally, patients with diabetes were more likely to be admitted to the ICU (Yan et al., 2020). 66.7% of patients with diabetes were admitted to the ICU while only 41.1% of patients without diabetes

were admitted. The same study also found that diabetic patients were much more likely to receive mechanical ventilation. However, diabetic patients had shorter hospital stays. This could be happening because diabetics were more likely to die than nondiabetics, shortening their hospital stays. Another study had over 7,000 participants (Fleming et al., 2020). Only 10% of these patients had been diagnosed with diabetes. Diabetics were disproportionately admitted to the ICU, with 32% of admissions being comprised of diabetics. The mortality rate was 7.3% in diabetic patients and only 2.3% in the control population.

A study conducted in Wuxi, China, found looked at the lymphocyte counts in diabetic and non-diabetic COVID-19 patients. Lymphocytes were measured and recorded when patients were admitted and throughout the treatment of the patient. The study yielded several interesting findings. First, the minimal lymphocyte count for diabetics was lower than the non-diabetics at $0.67 \pm 0.36 * 10^9/L$ vs. $1.30 \pm 0.54 * 10^9/L$ (Wu and Gao, 2020). Second, diabetics reached the minimal count faster at 2.68 ± 2.33 days. The non-diabetic group took 5.29 ± 4.95 days to reach the same level. Diabetics had longer hospital stays at 20.44 ± 5.24 days with the non-diabetic group only requiring hospitalization for 17.11 ± 4.78. Finally, this study also found that diabetics tested positive for COVID-19 longer than non-diabetics. Diabetics were positive for 14.8 ± 4.85 while non-diabetics were positive for 17.11 ± 4.78 days.

Lymphocytes are divided into several categories, T-cells, B-cells, and natural killer cells (NK-cells). They are extremely important to virus control and clearance. After an infection, lymphocytes often decline for several reasons including, the consumption of lymphocytes after virus invasion, the direct killing of the lymphocyte by the virus, or viral suppression of the immune system. These results suggest that the lower the lymphocyte count, the longer it will take for viral clearance. They further suggest that patient outcomes can be predicted based on the number of lymphocytes they have at admission. This could be extremely beneficial to healthcare providers as they could predict and monitor at-risk patients. Early intervention could be helpful to these patients and may be lifesaving. Since diabetic's lymphocytes declined faster than non-diabetic, they are at extreme risk of developing severe COVID-19 and experiencing a complication.

Photo by Anna Shvets

There are many implications for those with diabetes and the current COVID-19 pandemic. Diabetes is an extremely common condition. In America, 30.3 million people have diabetes, this equates to 9.4% of the population. Approximately 463 million people globally have diabetes (Fleming et al., 2020). COVID-19 poses a serious threat to those with diabetes. Diabetics are at an increased risk of catching COVID-19 because of their compromised immune system and if they do catch it, they are more likely to experience complications that require an ICU stay. Diabetes commonly goes undiagnosed and 1 in 4 people are not aware they have it. People with diabetes must be extremely cautious during the pandemic and if they are infected with COVID-19, physicians should pay special attention to them. They will likely require more intervention and attention than others.

Hypertension

Hypertension is a common condition throughout the world. Hypertension or high blood pressure is characterized by a blood pressure of 140/90 mmHg most of the time. Normal blood pressure is below 120/80 mmHg most of the time. It can increase the risk of developing serious conditions like heart, brain, or kidney disease. High blood pressure impacts a significant portion of the population. Approximately 1.13 billion people worldwide have high blood pressure. Many people do not have their blood pressure under control, and it is one of the leading causes of premature death. Hypertension is often found in people suffering from obesity and diabetes. Several studies have been conducted to ascertain the relationship between COVID-19 and hypertension.

One study was conducted in Zhongnan Hospital of Wuhan Hospital in Wuhan, China. This study had a sample size of 106 COVID-19 patients and was conducted from early January 2020 to the end of February 2020. They found that hypertension was the most important risk factor for severe COVID-19 (Chen et al., 2020). Hypertension occurred predominantly in male patients in this study and those patients took longer to clear the virus, increasing the severity of the disease. The study suggests that this is due to drugs that are used to treat hypertension.

Hypertension is often treated with ACE2 inhibitors. This type of drug affects the presence of ACE2 receptors. The SARS-CoV-2 virus has a spike protein that binds to cells through the ACE2 receptor, this receptor is a type 1 integral membrane glycoprotein (Pranata et al., 2020). The receptor is found on epithelial cells located in the cardiac system, kidneys, lungs, and intestinal tissue. Ultimately, suggesting ACE2 inhibitors provide more anchor points for the virus to attach. Thereby increasing the severity of the infection. However, there is some debate over this (Lippi et al., 2020). Some have suggested that hypertensives may experience a decreased ACE2 receptor expression.

A meta-analysis of COVID-19 studies found that hypertension patients are at a 2.5-fold higher risk of developing severe disease or dying from infection (Lippi et al., 2020). They found that COVID-19 and hypertension had a synergistic effect resulting in a poor prognosis. with poor prognosis being defined as the development of acute respiratory distress syndrome (ARDS), multi-organ failure (MOF), and death.

Another analysis also found that hypertension was associated with mortality, severe COVID-19, ARDS, ICU care, and disease progression (Pranata et al., 2020). Interestingly, this study also found a two-fold increase in risk for hypertension patients. This is extremely similar to the previously mentioned study. This relationship was influenced by gender. The relationship was stronger in studies where the patient population was primarily female.

This has several implications for people with hypertension during the COVID-19 pandemic. Globally, 31.1% of adults suffer from high blood pressure. Since so many people have hypertension, the amount of people at risk of developing severe COVID-19 is high. Furthermore, hypertension often occurs with other morbidities like obesity, diabetes, and cardiovascular disease. Thereby increasing the risk of major complications which could result in hospitalization or mortality. People with hypertension should take precautions during the pandemic to prevent infection.

CONCLUSION

COVID-19 has caused a serious pandemic affecting the globe in numerous ways. It has been suggested by numerous organizations such as the CDC and World Health Organization that older people, those who are immunocompromised, and those with preexisting conditions are at risk of developing severe complications from an infection of COVID-19. The three main preexisting conditions associated with complications are obesity, diabetes, and hypertension. In the general population, the mortality rate is between 2-3.7%

(Fleming et al., 2020; Gentile et al., 2020). In obese individuals, the mortality rate was four times higher (Mostaghim et al., 2020; Kim et al. 2020). The mortality rate for diabetic individuals is 7.3% and hypertensive individuals are at a two-fold increased risk (Fleming et al., 2020; Lippi et al., 2020).

These conditions affect a large portion of the population. Globally, obesity affects 300 million people, diabetes affects 463 million people, and hypertension affects 1.39 billion adults. These diseases can occur simultaneously in people or by themselves. Considering this, COVID-19 infections in these populations are extremely dangerous. These people will likely need assistance from medical professionals, require ICU stays, and need mechanical ventilation.

These individuals must take precautions. According to the World Health Organization (WHO), several things can be done to slow transmission and prevent infection. People should wash their hands often, avoid touching their faces between washes, sanitize surfaces that are regularly touched, and stay home as much as possible. If travel is necessary, they should keep at least 1 meter or 3 feet away from other people and use personal protective equipment like masks, gloves, and face shields to prevent infection. Additionally, those with obesity, diabetes, or hypertension should get vaccinated as soon as their state allows. Vaccines are extremely effective at preventing COVID-19 infection and may be the difference between life and death. ❖

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The citation system used in this essay is CSE 8th, Name-Year.