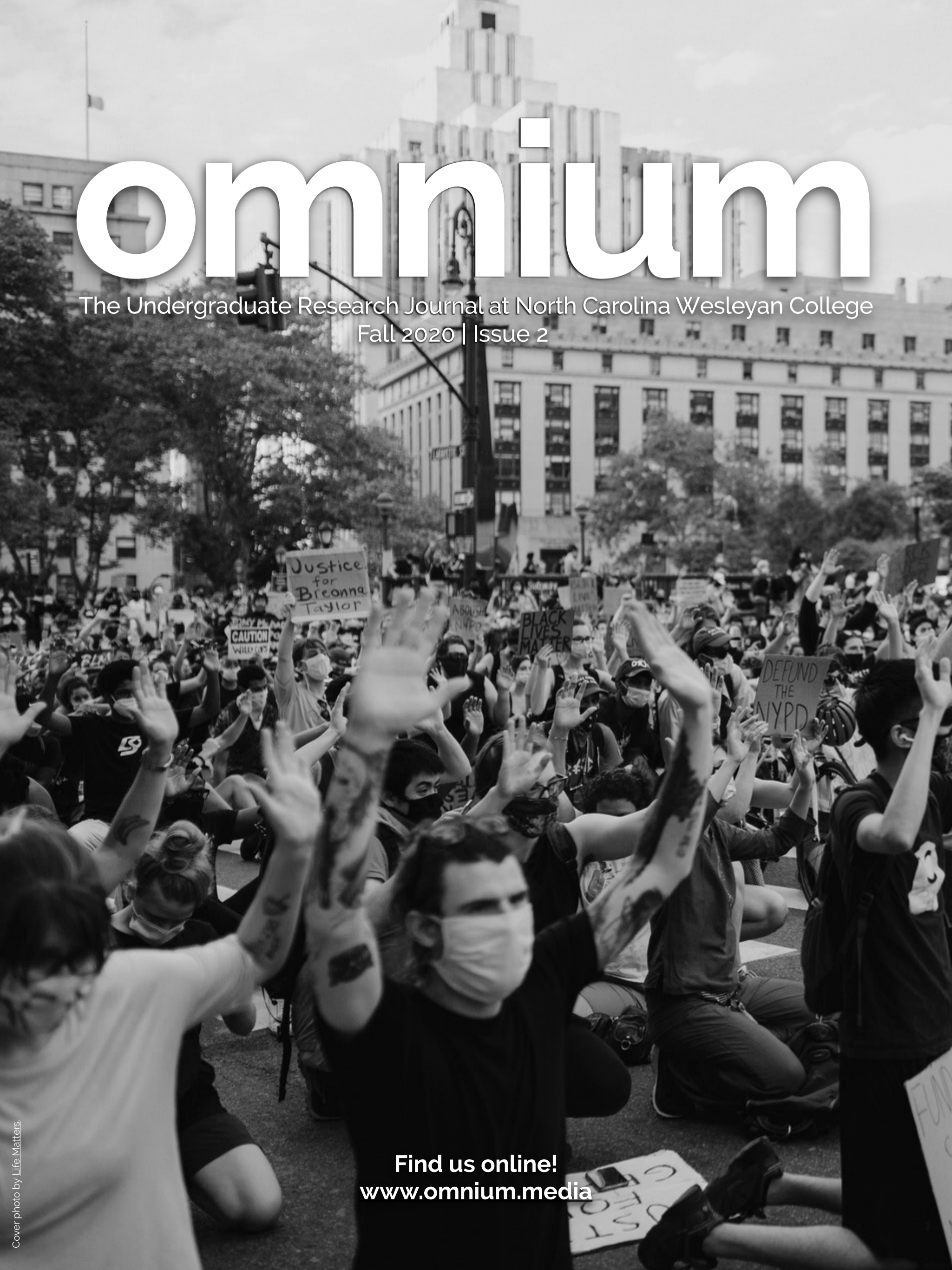


# omnium

The Undergraduate Research Journal at North Carolina Wesleyan College  
Fall 2020 | Issue 2



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# THE NORTH CAROLINA WESLEYAN INTERDISCIPLINARY WRITING COMPETITION

The NCWC Writing Center, Writing Minor, and Sigma Tau Delta invite all North Carolina Wesleyan students to submit up to two writing projects completed for classes at NCWC to our annual Interdisciplinary Writing Competition.

You may submit papers to different categories, including categories outside of your major. You do not have to have written the paper this year.

Competition winners will receive a cash prize and be published online in Omnium, our undergraduate research journal.

We strongly encourage revising before submitting to ensure that your work meets the competition submission guidelines.

## Submission Guidelines

To help with the judging and publication process, please make sure that your submissions follow these guidelines:

- Submissions must be your own work.
- Submissions must have been submitted to a class at NCWC for a grade. Major papers only.
- All work must be submitted as a .doc or .docx Word file.
- Any outside material (books, articles, etc.) used must be cited correctly in the citation style dictated by the field of study (MLA, APA, CSE, Chicago, etc.).
- Writing should conform to correct academic grammar and spelling unless the use of dialects, etc. is an explicit goal.

If your work wins, but does not strictly follow these guidelines, you will be asked to revise before the Omnium editors will publish your work. In extreme cases, such as plagiarism, your work will be disqualified.

## Call for Spring 2021 Submissions

We are now accepting submissions for the 2021 Interdisciplinary Writing Competition. Entries must be received by 9 PM April 3, 2021. Winners will be announced on Spring 2021 Reading Day.

Click this link to begin the submission process: [IWC Submission Form](#)



# Editors' Note



Working under quarantine conditions—even on collaborative projects such as this—can be lonely. So much greater is our joy in being able to present the second issue of *Omnium*, the Undergraduate Research Journal at North Carolina Wesleyan College. *Omnium* is a joint effort of the Writing Program and the Writing Center at NCWC. It collects work by promising scholars and invites students as well as teachers to learn from, engage with, and use as models the fourteen new essays presented here.

Now, in the summer of 2020, we are well underway in establishing the NCWC Interdisciplinary Writing Competition as an annual event. As was the case last year when we inaugurated *Omnium*, we invited all NCWC students to send us whatever academic writing they were most proud of—with the caveat that it had to be written in the past academic year. Despite our campus closing in March 2020 due to the COVID-19 crisis, we received submissions by as many students as in 2019, a spectacular success in light of the devastating global health crisis in which we find ourselves.

Our thanks go to Drs. Jason Buel, Jung Choi, Daniel Elias, Bennie Felts, Bill Grattan, Jarrod Kelly, Chad Ross, Andrew Stern, John Temple, Lee Templeton, Ami Thompson, and George Whitwell for reviewing the papers in their respective disciplines and for doing so in record time. Our colleagues aided us in selecting the most outstanding essays in each of our five categories, following the structure of our College Divisions: First-Year Composition, Humanities, Social Sciences & Education, Business & Computer Information Sciences, and Natural Sciences & Mathematics.

Our readers will notice that, throughout this issue, NCWC students examine a wide variety of structural problems at work in society. The mounting urgency of these issues, in addition to the havoc wreaked by COVID-19, has led to a turbulent summer, a reality we acknowledge with our cover which depicts a scene from anti-racism protests in New York City in June 2020. Our students' essays, such as Paul Turamye's piece on the long-term mental health disparities in Rwanda following the 1994 genocide, Savannah Flanagan's oral history of school desegregation in Eastern Carolina, Will Plyler's investigations into masculinity and domestic abuse, Ariana Aysanoa's review on military sexual trauma, and Gordon Layton's exploration of how plastic pollution contributes to breast cancer, provide thoughtful insights into the inequities and systemic violences built into our lives.

We hope all of our readers—our students, colleagues, and all who might come across our publication—will be in good health when this issue reaches them. Perhaps now more than ever, an education grounded in the liberal-arts tradition and based on academic research principles is indispensable to the bodily health of human beings and the survival of their communities.

The *Omnium* Editors,  
Doreen Thierauf  
Keely Mohon-Doyle  
Julie Perino  
Assistant Professors of English,  
North Carolina Wesleyan College

**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.





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**FIRST  
YEAR  
COMPOSITION**



# IGNACE MIKELANGE NGAKALA

## THE EFFECTS OF MEDIA MISREPRESENTATION OF AFRICA

Africa is one of the seven continents that exist on this planet. It is the second-largest continent, both in terms of land size and population. It is ethnically diverse and comprised of over 50 different countries with over 2,000 different languages spoken across the different and beautiful cultures it has to offer. It contains around 30% of the world's natural resources and is responsible for much of the world's wealth. Like any other continent, it has many large cities with modern infrastructure as well as rural areas and villages. There are plenty of sights to see and places to visit that everyone can enjoy. At this point, you might be wondering if we are talking about the same Africa. Because, if you live outside of it, you have probably heard that Africa is a giant infested wasteland inhabited by sickly, malnourished people who cannot fend for themselves. That people there live in huts with no electricity and that the water is undrinkable. That they are always at war and that there is no helping them. You might have heard something of the sort about Africa. That is because the international media has made it its job to scrutinize Africa and misrepresent it in the eyes of the world. This misrepresentation by the media has hurt Africa for a very long time. It is the reason why Africa is not respected from a global perspective. This paper will try to prove that there exists a deliberate misrepresentation of Africa in the international media and also try to go through some possible reasons for why they exist and how this problem can be solved.

Throughout the years, the international media has misrepresented Africa, be it in the west or the east. There is a discrepancy between what local African news outlets report and what their international counterparts have to say about the same news. Dennis Pinto from the *Financial Times* provided an excellent example of this in an article he wrote. He recounts a story of a time when international media had exaggerated a riot in a Kenyan slum. International media said that the entire country was "burning" when local media reported that violence only occurred in densely populated city slums. International media also reported that millions of middle-class Kenyans were involved in the conflict when, in fact, that was not true (Pinto). This is a perfect example of the media not only misrepresenting but also exaggerating a situation to make it seem worse than it is. Pinto also argues that if the media gave the same attention to real issues, the ones that hurt Africa, like corrupt political leaders, the large sums of money stolen by governments, or how some European countries exploit Africa and take its resources, maybe they might be solved.

Although misinformation about Africa is a problem, the real problem is that there is a lack of African coverage in international news all over the world. African coverage only accounts for about 6% to 9% of all western international news (this means about 2% of the news in general). These numbers drop to about 3% in Japan. If that was not bad enough, most of the coverage about Africa is negative. Over 60% of coverage



Luanda, Angola. Wikimedia Commons



about Africa is about conflict, terrorism, disasters, and diseases. In Japan, that percentage goes up to 70% (Hawkins). The media focuses so much on all the conflict in Africa that when the conflicts are actually resolved, they are unlikely to be covered in international media. African news is also overshadowed by news from other parts of the world. For example, if a kidnapping were to happen in both Europe and Africa, the one in Europe would get more coverage than the one in Africa (Hawkins). This sort of favoritism that the international media has towards stories from everywhere but Africa will keep Africa's coverage at a minimum.

Many times, when Africa does get coverage, Africa is not even the leader of the story. It is often the victim and westerners are represented as the saviors who come to its rescue. Westerners represent themselves as building infrastructure and getting children out of the situation into which were unfortunately born. The media is so focused on spreading this narrative that they forget to talk about Africa's other problems, like all the money that foreign corporations take from Africa via illicit financial flows or how rich countries benefit from the unfair trade rules which drain money out of Africa (Hawkins). This representation of Africa by the international media serves as propaganda by western countries to reinforce the belief that westerners are superior. There is a belief that the salvation of Africans "lies in Caucasians helping them to learn and embrace superior western culture" (Aina 26). Being portrayed as the victim makes Africa a less legitimate continent than the others. I would go as far as to say that this version of Africa, in the eyes of many people, makes it seem like a burden on the planet, a place that always needs saving, and the mighty, heroic westerners are there to save it again and again. The media even goes as far as to use Africa's problems to its advantage. The term *poornography* was created by Charles Quist-Adade and Anita Van Wik by combining poverty and pornography. It refers to the use of naked pictures of poor people, usually

young children used in the west to raise money without concern for whether such representations are ethical or not. (81). The people in these pictures are real—and their situations are real as well—but the pictures present a distorted view of reality. These pictures are taken in the poorest villages of Africa, but the media will make it seem like the entire continent is like that.

Apart from destroying Africa's image in the eyes of the rest of the world and reducing it to a mere place of disaster and tragedy, media misrepresentation also hurts the African continent on an economic level. Adverse media reports have been shown to scare away possible investors from Africa, making them—and Africa—lose out on many opportunities. Because of all the negative news and portrayal





that Africa receives, many foreign investors have no desire to invest in the continent. Gustav Johnson, an adviser for a Spain-based consulting firm, even confirmed that because of all the bad news reported by the media about Africa, European investors are disinterested in investing there (Fikru). This can be clearly seen when you look at the fact that big enterprises like McDonald's or KFC, for example, are nowhere to be found in most of Africa, despite consumer interest being high enough. With Africa's already existing problems and media representation only making everything worse, Africa is in a place where it is hard to build a modern economy.

One of the reasons Africa might be forgotten in the international media is simply a lack of interest by non-African news consumers. Interest in African news has always been low all over the world, which is, without a doubt, linked to the days of colonialism and the notion that Africa ranks below the rest. This creates a chain reaction very detrimental to Africa. People have no interest, meaning that the media will not show it, which in turn makes people dismiss it as irrelevant and unimportant (Golan). This feedback cycle repeats over and over, and if it is not broken, it will continue indefinitely. Lack of interest, however, is only a small part of the real reason for the misrepresentation of Africa in the international news. Race and socioeconomic status are the main reasons. As mentioned earlier, the misrepresentation of Africa is not a new phenomenon. I would even argue that ever since the western world has come in contact with Africa, it has misrepresented Africa in one way or another. At first, it came from the idea that white people were superior to Africans. Westerners described the people they met on the land as uncivilized and inferior. They described them as monkeys or even demons, saying they had "nothing in common with humanity," and that they were not aware of their own being, not conscious that they were even human beings, as Friedrich Hegel said in his famous *The Philosophy of History* (93). Because every explorer who came back from Africa said the same thing about the continent, this idea was eventually accepted as a truth in the west—that Africans are a bunch of primitive barbarians, who do not have the brain capacity to build cities or anything of the sort (Aina 26).

These notions were inevitably accepted as truth and taught from generation to generation in the west. From a very early age, kids are taught that Africans are inferior and that they

need the help of westerners, Caucasians, in particular, to come and save them from their misery. Western countries want these ideas to be taught so selectively that a Belgian teacher who was married to a Nigerian man decided to quit her job after she had realized that the school at which she used to teach deliberately misinformed children about the situation of African countries, saying that there existed no cities whatsoever in Africa (Aina 26). This goes to show how deliberate this misinformation is. The insistence on spreading misinformation to the young makes sense for what they are trying to accomplish. The Belgian teacher asked her students what they would find in Africa. Her students answered that they would find animals and men with spears hunting those animals. The school system was obviously used as a tool to misinform the population about the realities in Africa—and it works, judging from the fact that Belgian secondary and post-secondary students still view Africa as the media describes it.

These notions did not stick with western countries only. Soon, the entire world came to believe the same thing about Africa. Thomas Jefferson, one of the founding fathers of the United States, as well as its 3rd president, also supported the stereotypes about Africa and said that Caucasians were justified for believing them. In his book, *Notes on the State of Virginia*, Jefferson writes,

Comparing them by their faculties of memory, reason, and imagination, it appears to me, that in memory they are equal to the whites; in reason much inferior, as I think one could scarcely be found capable of tracing and comprehending the investigations of Euclid; and that in imagination they are dull, tasteless, and anomalous. (73)

In China, a museum was accused of racism after comparing a black child to a monkey. It is not uncommon to watch international TV shows or movies and see a character make a reference to how poor Africa is or call it a third-world country despite this term being out of date due to its insulting nature.

At this point, people's perception of Africa is set. Changing the way people see things is going to be a hard task, but it can be done. I don't think there is one specific solution that will accomplish this; rather it's the combination of many small parts that will help solve this bigger issue.

First, the international media has to recognize that Africa, like any other continent,



deserves fair and much broader coverage. If Africa never receives coverage to a degree that is similar to that of the other continents, no number of good things said about it will change anything, simply for the fact that no one will see it. For the other changes to matter, Africa needs to be covered equally. Africa also needs to be covered fairly. As mentioned above, an absurdly large percentage of the already little coverage Africa gets is negative. This hurts Africa's image and helps shape it as a place of disaster in the eyes of those who watch the news. If we want to solve the misrepresentation of Africa in the media, it has to portray Africa the way it is, the good as well as the bad. As stated earlier, the media also has to focus on the more significant issues Africa is facing (governments stealing money, resources being stolen, unfair trade rules, etc.), which is why many people see Africa in a negative light. By portraying it correctly, people will see that Africa is not a place full of catastrophe and that it is a place full of possibilities. Portraying it correctly will also bring the more prominent issues to light and give them a chance to be solved.

The second way this problem could be solved is by changing what is taught in schools about Africa. As established earlier, the reason why a large part of the western world believes the stereotypes about Africa is that these beliefs have been placed inside people's heads ever since they were young. The same way schools have been able to misinform children about the real situation in Africa, they can teach them about what Africa is really like. If they are taught

actual information about the continent, not only will they not believe in what the media says, but as they grow up, some might work in the media and change the way Africa is portrayed. It would create a positive cycle in which children are taught the truth and spread their knowledge around until everyone is knowledgeable. Doing this would do more than changing the media misrepresentation. It would also help change the overall perception of Africa around the world. The advantage of tackling this problem through young people is that having an educated youth leads a society with an educated population in the future. The youth grows up and, in turn, teach the next youth.

The most significant factor in solving the misrepresentation of Africa in the media are the inhabitants of Africa itself, the African people. Changing the perception of Africa in the international media is a long and laborious process, but I believe that Africans themselves are at the center. It might not look like it, but Africa itself has its part to play in the scrutiny and bad treatment it receives from the media. While Africa is being torn apart by the international media, Africans remain passive, quietly receiving the insults, the scrutiny, and the injustice. In fact, many Africans even think of Europeans' treatment of Africa as some kind of blessing. They embrace it and embrace the cultures of others more than their own. This has become so ingrained that I have personally met African people who have told me that they wish they were white. Growing up in Africa, I have learned more about the history of other



Lekki-Epe Expressway, Lagos, Nigeria. Photo by Chukwuka Tolulope Obu. Wikimedia Commons.



countries than that of my own. I had to go out of my way to learn things that should have been taught at school. In her speech "The Danger of a Single Story," Nigerian author Chimamanda Ngozi Adichie talks about how, as a child, she would write stories with white characters in them, despite having never met a white person. This was due to European and American culture and literature being more prevalent in Nigeria than African culture. All of this could be a result of colonization and slavery, a result of Europeans always putting in African people's heads that they are inferior. But even if that was the case, times have changed, and so should people.

With technology becoming more prevalent than ever, it had never been easier to get a new message across. That is what African people should do to change the international perception of them. They should take the initiative and make a change. In her speech, Adichie says that to help solve the lack of African literature in Africa, she helped start a nonprofit to build libraries and refurbish already existing libraries. You do not need to be an author to start such a campaign. One of my uncles has also decided to found a library in the town of France where he lives to promote African literature abroad and, most importantly, to help young Africans who live there and who like to read appreciate literature from Africa.

These changes will not be easy, and it will be a long road. For example, my uncle who is trying to open a library keeps getting shut down by the mayor of his city. He thinks people will not be interested in reading African literature, but my uncle keeps trying because that is all he can do, try. That is how changes are made.

Building libraries, however, is not the only way to improve Africa's perception in the media. Something as small as telling a friend about the reality of things can go a long way to improving the media's perception if enough people do it. I, like many other Africans, take pride in learning all sorts of things about different cultures, countries, and places in the world. That is why it is sad to find out that some people still have no idea about the real situation in Africa. It is painful to hear questions like "Do you guys live on top of trees?" or "What language do you guys speak, African?" It is painful to find out that many people do not even know that Africa is a continent. Instead, many people think it is one vast country where uncivilized people fight unending wars and die from poverty and disease. If there is one thing I hope this paper

accomplishes, it is to teach at least one person about the reality. I think this is something people should learn about because Africa is a continent with a very diverse culture where more than 2,000 languages are spoken.

Africa plays and has always played a significant role in human history. That remains a fact, even though many of its contributions have been downplayed or erased from history. Africa is a continent full of diversity and a rich cultural heritage. It has a large middle class, like any other continent, and has the potential for great things. All it needs is to be given a chance. ♦

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## **DEPRESSION AS A RESULT OF THE RWANDAN GENOCIDE**

### **INTRODUCTION**

Depression can be defined as a mood disorder that influences the way you feel, think and act ("Depression Basics"). It comes in many various forms and it's an issue that a lot of people experience knowingly and unknowingly. Depression exists among people of all genders regardless of age and it may be difficult to recognize. The most effective way to determine what kind of depression you may be suffering from is through measuring the duration of your symptoms. Major depression and persistent depressive disorder are the most common types of depression. Major depression has numerous symptoms that last for more than two weeks and affect your ability to carry out your daily activities ("Depression Basics"). In contrast, persistent depressive disorder is more complex due to the fact that its symptoms could linger for over two years ("Depression Basics"). I have come to the realization that, in my home country of Rwanda, most people seem to suffer from persistent depression because it is a condition that they have been stuck with since the genocide which occurred more than twenty-five

years ago. But the idea of feeling depressed is perceived as strange in Rwanda, and people feel insulted when advised to seek any kind of mental assistance.

A wide variety of people suffer from depression in my country but they continuously refuse to acknowledge it under the pretext that they are feeling sad. On that note, I would like to utilize this essay to show the Rwandese population that depression is a complex disorder that affects people differently and that could lead to significant life-threatening consequences if it is not diagnosed and treated in a suitable manner. This essay will play an essential role in highlighting the reasons why Rwandan people need to take care of their emotional and mental health. I want my audience to gain an understanding of the severity of the genocide in Rwanda and how it affected the nation for generations to come in terms of mental health. In addition to that, I want to persuade my audience to perceive discussions concerning mental health through a more optimistic lens by highlighting the positive consequences of talking about it.



Mental health awareness is spreading in Rwanda. Hategekimana Bashar (left), members of his family, and Mental Health Social and Community Support Coordinator Sifa Dorcas (second from right) chat outside Bashar's home in Rwanda in July 2016. Photos by Bob Muhumuza / [Partners In Health](#).



## ROADMAP

Can painful memories lead to the resurfacing of depression? In this essay, I will investigate the recurrence of depression in Rwandese people due to the fact that people are unable to move beyond their past experiences. Many people go through painful or heartbreaking experiences like the loss of a loved one or life-threatening situations but do not realize how deeply they may have been affected (Zara 163). They tend to believe that they are feeling temporary sadness that will fade away with time. As mentioned earlier, people in my country are forced to re-experience their depression as the horrendous memories of the genocide come flooding back. I have heard people use the phrase "time heals all wounds" which, in my opinion, is not true because depression does not heal on its own.

Firstly, I will commence by providing a historical context of the genocide. Then, I will talk about depression in Rwanda as a result of this genocide. The next few sections will be used provide conclusive proof of my theory starting with an interview with my uncle, a genocide survivor who lost his entire family and barely survived himself. I will present his experience and how it affected him as a case



Photographs of genocide victims displayed at the Genocide Memorial Center in Kigali, Rwanda. Photo by Adam Jones. [Wikimedia Commons](#).

study to serve as a foundation for my argument. Furthermore, I will highlight a few of the policies Rwanda has employed to deal with depression even though they were not fully sufficient. I will conclude by talking about how depression can be dealt with and evaluate the various tactics the Rwandan government could implement to encourage genocide survivors to seek mental assistance. I will create a comparison between Rwanda and Germany to convey the differences in how they dealt with the implications of the genocides.

## HISTORICAL CONTEXT

Rwanda, commonly known as the land of a thousand hills, is a small land-locked country located in the Central Eastern region of Africa. In 1994, Rwanda experienced one of the most horrific tragedies in world history. There was a nationwide slaughter in which over one million people were murdered within a period of three months. Since precolonial times, Rwandans were divided into three ethnic groups, namely Hutu, Twa, and Tutsi. These ethnic groups lived together in unity and harmony, and the ethnicities were associated with varying social status. The Tutsi were the wealthiest and most politically dominant group while the Hutu, the majority of the population, were mainly servants of the Tutsis. The Twa, who were a minority group, were comprised of indigenous people who lived in mostly undeveloped areas. When Belgians took over as the colonial power in 1916, they decided to utilize the "divide and rule" policy to govern the country which involved highlighting the differences in physical appearance and political hierarchy between the Hutus and Tutsis with the intention of creating division and hatred (Sellström and Wohlgemuth 10).

Over the years, the relationship between these two ethnic groups deteriorated significantly to the point where Hutus started killing Tutsis to gain power. On the night of April 6<sup>th</sup>, 1994, the plane of President Juvenal Habyarimana was shot down, which served as a commencing point for the genocide. Hutu extremists known as the 'Interahamwe,' aided by the military, blamed the death of their president on the Tutsis and began killing as many Tutsis as possible, regardless of their age or gender. People were forced to live a life a complete and utter terror for three months (Sellström and Wohlgemuth 50). They would be in a constant state of fear because they were unsure of when they would be attacked. In the beginning, most



people were unaware of what was happening and would only hear rumors of killings. This was due to the fact that the perpetrators started killing in silence. But then the government began supporting the 'Interahamwe' and spreading hate propaganda on all media platforms, encouraging all Hutus to gather weapons and begin killing every single Tutsi they could find. This created fear in all Tutsis and they began fleeing and seeking refuge.

Innocent men, women, and children were hunted and slaughtered mercilessly like animals. People were forced to watch their loved ones being murdered in all sorts of ways while trying to run away from the perpetrators or remain unnoticed. They would hide in roofs, under dead bodies, or bury themselves in any kind of concealed space they could find regardless of its sanitary condition. The genocide lasted three months, and over one million Tutsis were killed, approximately 77% of the Tutsi population, with many others left severely injured or utterly shattered (Sellström and Wohlgemuth 51).

## CONSEQUENCES

Countless people developed long-term depression after the traumatic experiences they went through during the 1994 genocide against the Tutsi. The Rwandan government has tried to provide free counseling services for mental support for genocide survivors. Unfortunately, most people refuse to seek help with the justification that there is no cure for how they feel (Ng 85). A lot of people do not treat depression as a serious condition because they consider it to be sadness that will fade with time. According to Nancy Schimelpfening, "while it is possible that an individual episode of depression may go away on its own without treatment, there is no guarantee that things won't get worse before they get better."

I grew up watching so many people in a state of depression which would always be further emphasized during the commemoration of the genocide which happens every April. Even after so many years, people still find it difficult to deal with the month of April. During this month, people seem to face a fresh reappearance of their horrendous memories and, as a result, they experience a resurfacing of the trauma and depression brought on by these events. At night, you can hear people screaming out of their homes as they remember what happened. Numerous people are unable to work or perform their daily activities due to the

severity of those memories. The manner in which people are still affected by the commemoration emphasizes the fact that their pain and grief have not faded but instead turned into depression (Ng 86).

## INTERVIEW

Silas Ndamage, my uncle, is a genocide survivor who lost his entire family in the genocide and went through a long period of depression. I conducted an interview with him to obtain first-hand information from a victim who experienced the genocide and its aftermath. This is what my uncle told me:

When we first heard of the killings, we were not too worried because we thought they would be handled by law enforcement. But then, the government granted the Interahamwe permission to spread hate propaganda on all media platforms, including national television and radio channels. We started receiving warnings about killings in our neighborhood and soon Tutsis from all parts of the country were being murdered. It seemed as though the whole world had turned their backs on us. At the end of each day, the perpetrators would submit a report showing how many people they killed, and those with the highest numbers would be rewarded. The perpetrators would carry out most of their attacks from night till dawn because they were unexpected. I watched my entire family being brutally killed and this left me damaged for life. It still haunts every time I think about it...

One night as we were going to bed, I heard people screaming outside and I told my family to go hide in the closet. I saw four men climb our fence and they kicked the door off. One of them had a gun and the rest had machetes and huge knives. I tried to fight them off but of course they won. One of them decided that I should be killed last since I came out first. My wife, who was pregnant at the time, was cut open in order to "see who the baby looked like," they said while laughing. My 12-year-old daughter was raped by all five of them to the point of death in front of me. They asked me for money to shoot my son because it was considered the fastest and least painful death. I was tortured and dragged through a flight of stairs over and over again. By the time they left, I was in extreme shock and I was bleeding non-stop to the extent where



they thought I was dead too because I lost consciousness.

For the next few years, I was completely lifeless. I had to quit my job and move out of my house because it was a representation of the worst time of my life. I lived with your parents but I felt nothing on the inside. I would barely leave the house or interact with anyone. Most of us who survived were left emotionless for a while. I was haunted by the memories of that day and I felt like I had lost all chances of happiness in my life. As a result, I was unable to sleep and I also lost a lot of weight. To make matters worse, I had to endure the pain of losing four friends who committed suicide because they could not deal with the trauma they were experiencing and they felt like they had no reason to live because they had lost their entire families. I attempted to commit suicide once so I could be with my family once again because I could not picture a life without them. I slowly began to restart my life but my friends and family did not believe that seeking mental help would be beneficial. I would tell them I was feeling depressed and they would tell me that I was being delusional. They would tell me that there was no cure for how I felt because I was experiencing grief and sadness. Till this day, I still struggle immensely with severe depression but, fortunately, I commenced seeking mental assistance.

## ANALYSIS

I believe this interview with my uncle serves as extensive proof that there is indeed a huge problem in the way that Rwandans view depression because the belief that depression is mere 'sadness' is not restricted to my family but to the entire nation as a whole. No one was willing to pay attention to what my uncle was saying because they all thought that it was his grief talking. Even though he was showing all the signs of depression, there was no one to recognize them. Personally, I do admit that I used to find the idea of depression slightly humorous because I would think that people had the ability to control how they feel and how it affects them. This is because I was always taught that strong men do not get sad or let their sadness affect them because people will perceive you as 'soft.' So the mere thought that a person did not have the power how they felt

sounded unbelievable to me. But, as time went on, I watched my uncle deteriorate in both his physical and social abilities. He lost weight and barely wanted to speak to anyone. I started realizing that it was possible to feel extremely sad for a long period of time—which is depression.

## AFTERMATH

Similarly to my uncle, the atmosphere in the entire nation was horrific and extremely chaotic for the next couple years following the genocide. People were unwilling to leave their houses and so many families had been separated or wiped out. Countless parents were unable to find their children who they were forced to hide to protect them. Many people were experiencing various symptoms of depression even without their knowledge. Numerous genocide survivors quit their jobs with the justification of not being able to work because of their mental and emotional stability. The country's productivity deteriorated significantly which, I believe, was reflected on the Gross Domestic Product (GDP) of the country. According to *Country Economy*, the Rwandan GDP decreased by 41.9% to approximately \$753.6 million and over 1,300 businesses closed. Suicide rates had risen by 33% by the end of 1994, and research shows the main cause was depression ("Rwanda GDP").

As a result of depression, many people developed addictions to drugs and alcohol in the effort to relieve themselves of the depression they were feeling. Insecurities, anxiety, and trust issues arose amongst people making it difficult for people to live harmoniously together (Schaal 34). The majority of these insecurities were found in women due to the fact that countless women were tortured and raped during the genocide, and this impacted them significantly. Most people believe that men were affected more than women because a lot more men were killed. But, based on a survey conducted in several regions of Rwanda to find the rate of impact of the genocide on women in comparison to men, results showed that women suffered more traumatic episodes because, in addition to death, women were subject to physical and sexual abuse (Rugema et al. 4). Hence, there was a much higher level of insecurity for women.

Some of these issues were dealt with efficiently, like the GDP. Over the years, the country has experienced a massive boost in its economy to approximately \$12.3 billion (Rugema





"800,000" exhibit at the U.N. in June 2014 to visualize and commemorate the lives lost in the Rwandan genocide: "800,000 are the pages in 2500 books displayed in 100 crates: one page for each victim, one crate for each day of the genocide. The books were hand-bound through the collaboration of the "800,000" team, high schools, and three groups of volunteers. Each victim is acknowledged through a hand print on one of the 800,000 pages. The project asks to acknowledge each life lost, remember the victims, and renew hope and support. The exhibit was presented by William Snyder III." For more information, see [the project's website](http://www.800000.org). Photo Credit: Bo Li/Africa Renewal.

et al. 7). But, unfortunately, my society was a bit inefficient in solving individual problems like drug and alcohol addictions, personal insecurities, and emotional stability.

### **RWANDA'S SOLUTION**

The Rwandan government has employed several policies with the goal of aiding people in dealing with their depression. Firstly, it has hugely invested in setting up many counseling centers nationwide with all necessary facilities (Sellström and Wohlgemuth 57). They provide free health insurance to ensure that people of any social status have access to their services. In addition to that, educational shows concerning mental health are aired on many television and radio networks all over the country. The problem that arises is the fact that depression is portrayed as a minor aspect of mental health. These shows tend to focus on other mental disorders like bipolar disorder and schizophrenia. Unfortunately, many people still find it difficult to believe that depression is a real disorder that could have serious consequences, although depression has been connected to an assortment of diseases, including heart disease, obesity, diabetes, Alzheimer's disease, and other chronic disorders. On account of diseases related to the heart, hypertension, and diabetes, depression may increase the progression of such illnesses (Schimelpfening). This highlights the fact that depression should be perceived as

a disorder of the highest severity and treated with utmost urgency. Ironically, people with depression are portrayed as soft or spoilt because it is often thought of as a disease for the rich and privileged. My grandmother used to tell me that my uncle was pretending to be sick while other people were dealing with real diseases like cancer and diabetes. She was unwilling to recognize his depression as an actual condition which required treatment because, in her opinion, he was just grieving and his grief would fade with time. There are countless other people who share her perspective with regards to this matter. This leads to the conclusion that the tactics used by the government are insufficient because it needs to deal with the root of the problem.

In order to achieve to this goal, Rwanda needs an immense shift in its cultural context. This is vital to enabling the universal acknowledgement of depression as an actual mental disorder. Rwandans need to comprehend that depression is not just an emotion like sadness that can be suppressed easily. Even though educational shows concerning mental health are aired on television, the government should take a step further by talking about depression specifically. The government needs to inform people about how to recognize depression, the dangerous implications of depression, and how it can affect their daily lives. According to *Healthline*, mental





Photo wall with images of the victims of the genocide at the Genocide Memorial Center in Kigali, Rwanda. [Wikimedia Commons](#).

health professionals utilize the American Psychiatric Association Diagnostic and Statistical Manual of Mental Disorders (DSM-5 criteria) to determine if someone is sad or depressed. The DSM-5 criteria include nine potential symptoms of long term depression (Whelan). The government could introduce television shows, advertisements and phone applications that teach people about how to use the criteria. My uncle, just like many other genocide survivors, could have diagnosed his depression using the DSM-5 criteria because he experienced most of these symptoms, like lack of interest and enjoyment, inability to sleep, and weight loss. This will be immensely beneficial because you need to diagnose depression prior to acquiring treatment.

Finally, Rwanda needs to create safe spaces where genocide survivors can talk about their depression freely and access treatment. This is especially required for the current generation of young adults (who were young children during the genocide) and women because, according to numerous surveys, they suffered the most harm. These two groups experienced and witnessed the most horrific aspects in that, on top of facing death in the eye, women and children were physically and

sexually abused (Rugema et al. 10). Young children were raped and forced to watch as their loved ones were being killed. (Palmer et al.). As a child, these kinds of events can leave you permanently traumatized. Yet as these children grew up, they were expected to recover on their own with the passing of time because no one really thought that they could have been affected to that extent (Palmer et al. 87). The problem is that depression does not simply heal on its own. Depression is absolutely treatable, however, so there is no compelling reason to endure the discomfort of an episode (Meija 22). While it may appear heroic to tough it out, there is no need to do so (Schimelpfening). Therefore, the creation of safe spaces for these groups of people would be quite therapeutic because people would connect with others in a similar situation and realize that they are not alone. This would enable them to work together with the help of experts to fight their depression.

### **COMPARISON WITH GERMANY**

However, on the bright side, Rwanda would be considered fairly successful in dealing with the implications of the genocide in comparison to other countries like Germany. According to Jacob Eder, "there are clear indicators that the



established consensus on the centrality of the Holocaust for German national identity is eroding" (Eder). To make matters worse, "According to a 2017 poll, for instance, roughly 40 percent of German high school students cannot explain what happened in Auschwitz" (Eder). There is a massive problem in Germany because the refusal to recognize the Holocaust as the center of their culture does not eradicate the problem but instead leads to culture loss. Even though Germany may have succeeded in dealing with the economic implications of the Holocaust, the fact that it is no longer discussed with younger generations shows that they are unable to deal with its aftermath in terms of mental health because in order to deal with an issue, you need to be able to talk about it. This leads to the conclusion that the effects of the Holocaust may have impacted the culture negatively over time, leading to denial or downplaying. Fortunately, Rwandans have embraced the genocide as a part of their past and culture which makes it easier to talk about and brings about the efforts to deal with the various consequences.

## CONCLUSION

The 1994 genocide against the Tutsi had excruciating consequences, and the mere thought that I could have been alive at the time has me utterly terrified. People were left broken, shattered, and the memories of these despicable events led to depression which has lingered in an enormous proportion of the country's population for the past twenty-five years. The month of April is still one of the hugest challenges faced by the Rwandan population, especially genocide survivors, due to the resurfacing of their depression. The government has successfully managed to deal with several implications of the genocide, but still needs to put a lot of effort into aiding its citizens diagnose and deal with depression.

Furthermore, depression should be perceived as a serious mental condition that needs medical attention or could otherwise lead to dangerous consequences as proven throughout the entirety of this paper. In my opinion, your life revolves around your mental health and emotional stability because these two determine how you behave and the decisions you make about everything. If your mental health is in jeopardy, then your entire life will be massively affected in every aspect (Schimelpfening). My uncle's life came to a standstill and he was unable to live in a normal

healthy manner because of depression. Fortunately, he sought treatment and improvements were visible in his daily life. From a broader point view, the Rwandan society needs a change in mindset in the sense that the idea of self-care connotes being 'soft' or 'spoilt' and realize that it is quite essential to focus on yourself before anything else. ❖

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**CHEATING IN THE HIGHER EDUCATION SYSTEM**

Education is an important field, where, regardless of what major students are pursuing, they strive to master it. Education combines studying and teaching, and one does not go without the other. Unfortunately, not everybody understands the importance of a good education. Thus, some students resort to unethical behaviors such as cheating. Most recently, cheating within the higher education system has become normal for many students. According to Sunčana Taradi et al., cheating is unethical conduct that involves plagiarism, using outside sources to excel in an exam, and trying to complete an assignment or exam by other means than personal knowledge and experience (2). According to these authors, 99% of all freshmen students in Croatian universities were accused of cheating, and only a few of them adhered to the rules of academic integrity (2).

In this literature review, I will use existing studies to analyze how schools deal with cheating in higher education. Through my research, I identify four main findings that contribute to the understanding of academic cheating and how to deal with it. First, as many scholars mention in their literature, social, situational, and institutional factors impact students' academic integrity. Secondly, researchers claim that technological advancements aid students in cheating. Third, scholars suggest that schools should stop prioritizing grades in determining students' academic performance. Finally, researchers propose that the issue of academic dishonesty should be taken into even more serious consideration than previously.

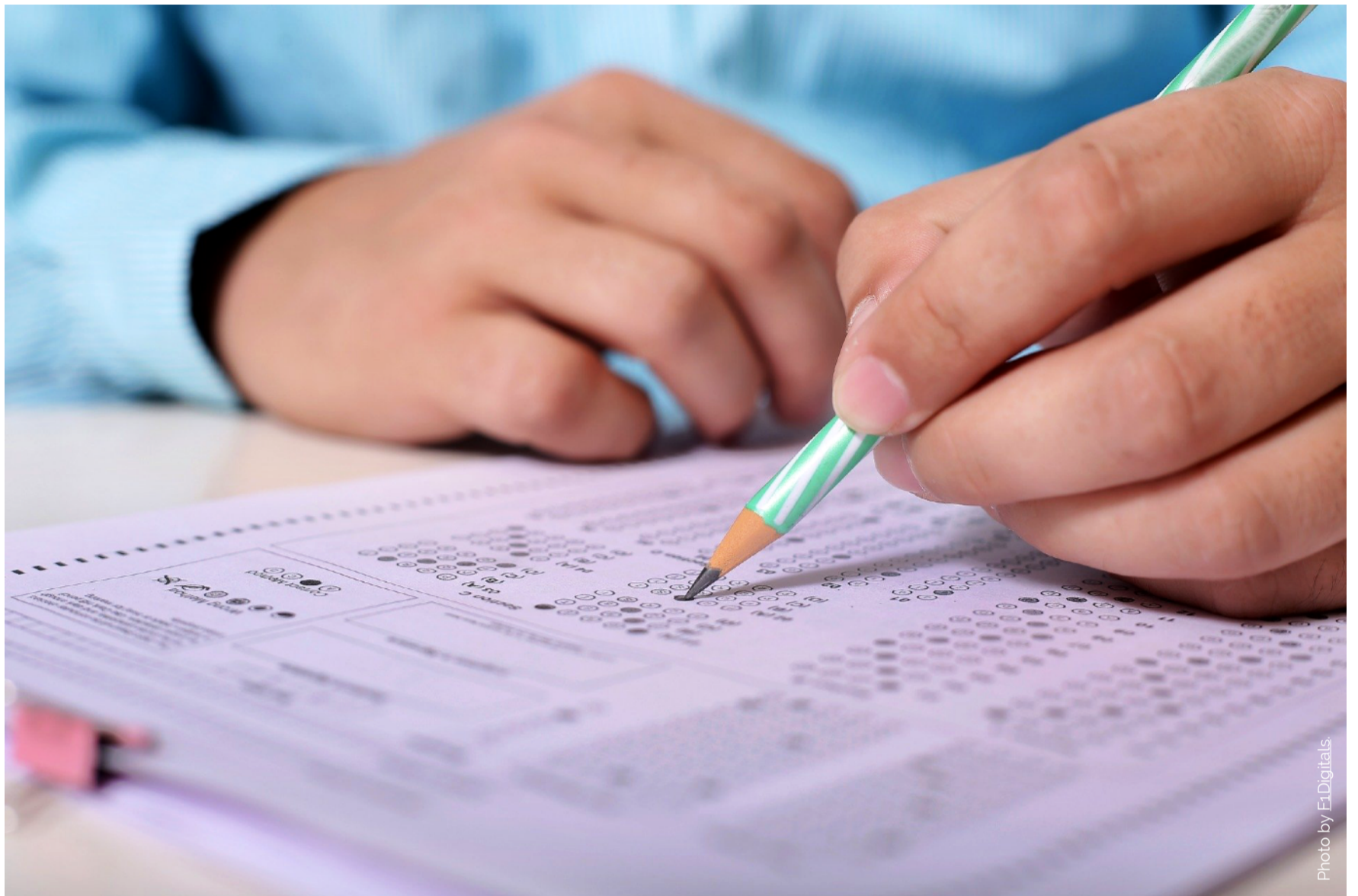
First, scholars believe that, in order to understand cheating best, several factors should be taken into consideration. Several scholars agree that personal, institutional, and situational factors greatly influence students' academic integrity. To start with, researchers Caroline Pulfrey and Fabrizio Butera, in their article "Why Neoliberal Values of Self-Enhancement Lead to Cheating in Higher Education: A Motivational Account," highlight these three factors as the main reasons for why students cheat. According to Pulfrey and Butera, students tend to follow neoliberal values of self-enhancement which are phenomena that

describe people's desire to win approval by other members of society (2). Students try to earn good grades that will help them get hired and earn money, which, they believe, will help them win approval by society (2). Students do not study because they want to master their fields, but because they wish to be accepted by society. Similarly, researcher Anne L. Tonkin highlights personal, institutional, and situational factors as key elements to understanding the reason for why students cheat (3). She elaborates on several kinds of factors, such as personal factors which include age, social background, and income; institutional factors that include school staffing, the ways schools fight cheating, equipment, and classes offered; and situational factors which are composed of the occasions that make students more likely to cheat. Overall, evaluating the reasons for cheating by understanding these factors is the first step in fighting academic dishonesty.

Second, researchers claim that, due to technological advances, students have new and more convenient options for cheating. Tonkin claims that, over the past ten years, there has been a breakthrough in online technology. These advancements have aided students in coming up with new and more convenient ways of cheating in higher education (3). For example, ten years ago, students could not take screenshots, nor were they able to find answers for multiple-choice questions on the internet. Additionally, students could not copy from each other so easily. Marcus Hening et al., the authors of the article "Reasons for Academic Honesty and Dishonesty with Solutions," believe that medical students in New Zealand cheat on their exams because most of the answers can be found in the internet (2). Moreover, Taradi et al. state that students recall their exam answers and submit them to different platforms that keep massive databases. According to their research, about 80% of students were involved in submitting questions from their tests and exams to such databases (5). All in all, the scholars highlight that with daily advancements in technology, students will come up with new ways of circumventing preparing honestly for exams and tests.

As part of the solution, scholars claim that schools should not prioritize grades as the most





important part of academia. Caroline Pulfrey and Fabrizio Butera state that students are willing to commit dishonest behavior to earn good grades (4). In other words, students study for exams, not for actual knowledge. Often, this will lead them to cheat because one part of self-enhancement is to succeed, no matter what.

Likewise, scholars Francesca Gino and Cassie Mogilner conducted a broad research study investigating students' main motivations for cheating, including time and money (4). The study consisted of two different scenarios. In both cases, participants were given a set of questions. In the first case, their prize was money—the participants were given twenty questions and twenty USD. For each correct answer, they could keep the money (one question equaled one USD), but their time to answer was restricted. In that scenario, more students attempted to look at each other's responses and cooperate, although they were instructed to accomplish tasks individually. In the second scenario, students were given twenty questions along with twenty USD outright. The rules were the same as in the first scenario, but participants had more time to complete the task. As a result, the number of students who tried to cheat decreased

drastically. The scholars explain that schools assign way too much homework that students must complete in too short a time. This resembles the first study scenario for which the prize was money because students believe that good grades will lead to high salaries. So, students tend to cheat because they have too little time and they do not want to fail. On the other hand, if students have more time or fewer assignments, they are more likely to keep their academic integrity. Schools prioritizing grades and GPA along with overloading them with assignments will lead students to cheat. Therefore, institutions should lessen the importance of GPA or grades to help their students to pay more attention to gaining actual knowledge.

Finally, researchers state that the issue of academic dishonesty should not be neglected and that staff and students should cooperate to battle cheating. Tonkin states that professors themselves contribute to students' cheating by neglecting the issue (5). She claims that teachers and professors should pay more attention to students' academic integrity. According to Tonkin, 46% out of 1902 employees sampled ignored cheating (3). Tonkin concludes that students should understand the ethics and



morality of academic performance, and teachers should explain the issue rather than just ignoring it. By the same token, scholars Marcus Henning et al. conducted a survey asking students, "what reasons would students articulate in reference to engaging in dishonest behaviours?" (2). Among the top reasons students gave were not fearing the consequences, that teachers seemed to ignore cheating, and that they worried about their grades (3). The researchers then asked students about reasons for not cheating. Not surprisingly, the most repeated answer was that dishonest behavior conflicted with students' ethics (4). Henning et al. conclude that if educators paid more attention to cheating and organized specific presentations to help students understand the importance of academic dishonesty, they would be more effective at preventing cheating.

After reading the literature, I was able to identify some gaps in the current research. When organizing future studies, scholars should choose participants more randomly. In other words, instead of including students from specific categories (such as freshmen or international students), scholars should try including the whole student body in their research. This will help them analyze how staff and institutional context impact the student body regardless of students' background. Moving forward, scholars should also have a baseline group to which students' integrity can be compared. Current research lacks this baseline, that is, a group with minimal academic dishonesty. Finally, in future research, scholars should try to follow students' behaviors more closely throughout their studies. For example, by performing long-term observations on a group of students, researchers could track their academic performance. This would provide scholars with a wider scope of data on how students adhere to rules of academic integrity and whether that adherence changes over time.

Academic integrity is an important aspect of education. The number of existing academic studies on the topic suggests that scholars are paying attention to education and are trying to improve it. As education is a combination of teaching and learning, scholars stress that both aspects should be taken seriously. Additionally, technological advances are the main concern of scholars because they aid students in cheating. Finally, researchers believe that schools should put less emphasis on grades and instead pay more attention to students' actual learning. ❖

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# HUMANITIES



# **MENTAL HEALTH STIGMA INFORMED BY CHILDREN'S MOVIES: A PILOT STUDY**

## **ABSTRACT**

This study focused on the formation and spreading of stigma related to mental illness. The literature review of this study examined pre-existing research on mental health stigma in children's media (including movies, books, and video games), religious stigma regarding mental health, and the dangers that the public perceives to be involved with mental illness. Additionally, a content analysis was performed on 80 Reddit posts that discussed 10 Disney characters who were theoretically diagnosed with mental illnesses based on the character's words and actions in their respective films. These posts were coded for sentiment (positive, negative, and neutral on a 5-point matrix), and whether those who posted on Reddit connected the experiences of the characters to their own experience with mental illnesses. The results of the study provided no statistical evidence that personal experience with mental illness changes one's perception of mental illness in Disney films. Based on this study, neither personal experience with mental illness nor lack thereof seems to have an effect on stigma: it is generally negative either way.

*Keywords:* stigma, mental illness, mental health, depression, anxiety, children's media, Disney

## **INTRODUCTION**

Mental health crises are on the rise in the United States. According to the American Foundation for Suicide Prevention, suicide was ranked the 10<sup>th</sup>-leading cause of death in the United States in 2017. 129 Americans commit suicide every day ("Suicide Statistics," 2019). According to *Mental Health in America*, 18.07% of the U.S. population, equivalent to roughly 44 million Americans, are currently suffering from mental illness of some kind, including, but not limited to, depression, anxiety, bipolar, and post-traumatic-stress disorders. In my home state of North Carolina, 1,440,000 adults are suffering from some form of mental illness ("Mental Health in America").

1.4 million Americans attempted suicide in 2017, and of those, 47,173 lost their lives. Roughly 70% of these victims were white males. In fact, the number of men who commit suicide in America is 3.54 times greater than women's

("Suicide Statistics," 2019). Why do males account for such a vast percentage of our suicides? Is it perhaps that men do not seek professional help as readily as women do? Clarke of the Centre for Emotional Health, Department of Psychology, Macquarie University, and her associates seem to think so. In a recent study published in the *Australian Journal of Psychology*, Clark reported that 14% of all Australian adolescents will struggle with some form of mental illness. Focused particularly on anxiety related disorders, the *AJP* reported that only 15% of clinically anxious males would seek professional help. Based on their research, Clark and associates concluded that perceived social stigma (the idea that men who struggle with their mental health are "weak, not sick") and a lack of education about mental health issues are the greatest obstacles young Australian men face when seeking help with their struggles (Clark et al., 2018). **RQ1: Does social stigma regarding mental health vary dependent upon gender of the stigmatized?**

In an article published in *Communication Education*, Smith and Applegate of Pennsylvania State University define stigma as "profoundly negative stereotypes about people living with mental disorders." This is further divided into two categories: "public stigma" refers to the stereotypes about mental health which a community has normalized, and "internal stigma" defines how an individual who struggles with mental illnesses absorbs stigma into his or her identity. Stigma often arises because of misunderstandings about those living with mental illness. Poor education on mental disorders, it seems, creates the idea that people who suffer from them are somehow threatening or dangerous to others (Smith & Applegate, 2018). **RQ2: How are social stigma regarding mental health developed and communicated?**

The unfortunate reality is that many of today's students are educated about mental health issues by looking at examples such as the Columbine shootings and other such disasters. Discussing mental health struggles in such a manner takes an atypical occurrence and makes it normal, stereotyping all mental health sufferers as mass murderers and the like. However, "it is important that discussions of



mental health not be dictated by the unthinkable acts of a few individuals, but rather should focus on the challenges, concerns, and opportunities associated with a topic that affects millions [...] across the world" (Rudick & Dannels, 2018).

### **RQ3: Why is education about mental illness not sufficient to derail stigma?**

I consider myself a well-positioned researcher in this study as one who personally has battled both anxiety, depression, and subsequent suicidal spells. Having suffered from these issues and the stigma that is often attached to them, I have a personal motivation to learn how to change them for myself, and to help improve the emotional health of those who suffer as I do, as well as hopefully improving their ability to reach out for help.

## **LITERATURE REVIEW**

### *History of Mental Illness Stigma*

It has been mentioned that the number of male suicides in the United States is over 230% higher than the number of female suicides. Is this perhaps caused by a difference in the stigma attached to mental illness in men versus in women? Whether or not that is true remains to be seen, but there is certainly a significant difference between the two. According to

research by Hagget in *British Psychological Society*, there is a great disparity between the number of men who suffer from mental illnesses and the number who are actually diagnosed, and part of the reason for this is the social stigma that has developed over the centuries. In the Georgian Period in England (1714-1830 A.D.), men were seen as thinkers and feelers. To be a man meant to be "virtuous and wise," so personal introspection and reflection were encouraged. Later, as the times changed from the days of the Enlightenment to the Industrial Revolution, social constructs of what it meant to be male and female began to shift. With a greater emphasis on the philosophy that Christian masculinity meant simply to be a good husband and father, little room was left for a man's emotions during this period in history. This cultural return to conservatism was compounded by the new evolutionary ideas of Charles Darwin, which emphasized the differences between men and women. Women were considered inferior to men, supposedly dominated by impulse and emotion. Men, on the other hand, were supposed to be respectable, rational, and self-restrained. These ideas of what it meant to be a man were prevalent through the days of the Industrial Revolution all the way through the World Wars. Men who suffered from



Photo by Amateur Hub.



shell-shock, anxiety, and other similar disorders were assumed to have simply been scarred by war. Depression and agitation were possible diagnoses for men, but neurosis was a diagnosis reserved for women. On the other hand, it was more socially acceptable for men to binge-drink to cope with emotional stress in those days, while women who consumed alcohol were depicted as promiscuous. This is interesting to note, since rates of both suicides and alcohol consumption are higher in men than women (Hagget, 2014). **HYPOTHESIS 1: Men with mental illnesses will be more heavily stigmatized than women.**

This mindset has been passed down through the years until it has reached the present generation. The formation of these ideas starts early, likely during childhood. The *Journal of Mental Health* reported in 2003 that children often did not have a concrete knowledge of what mental illness really is, nor of how it symptomatically manifests itself. They did, however, seem to know that mental illness was "somehow less desirable than other kinds of health conditions" (Wahl, 2003, p. 2). Though it may be assumed that children learn about mental illness from their parents, the truth is likely more complicated. Wahl states in his research that ideas about mental illness start young, and that even children who do not have a concrete knowledge of what mental illness is

and what it looks like symptomatically still know that it is less desirable than other health issues (Wahl, 2003). Rudick and Dannels also notice this trend, stating in *Communication Education* that most school psychologists expect that children will want to avoid other children with perceived depression or anxiety (Rudick & Dannels, 2018). Rudick and Dannels believed that this behavior would be spurred on and encouraged by parents, but Lorona and Miller-Perrin at Pepperdine University disagree with this theory. According to their research, children do not spend much time talking to their parents about mental health issues, yet they seem to know that the subject is somewhat of a social taboo, and that people with mental illnesses are to be avoided (Lorona & Miller-Perrin, 2016).

### *Children's Media and Stigma*

There must be, then, other sources of stigma. Lorona, Miller-Perrin, and Wahl all propose that one possible source is children's media. Wahl published several studies in the *Journal of Mental Health* during the late 1990s, and each reported negative portrayals of characters with mental illnesses. From Saturday morning cartoons to Disney movies like *Dumbo* (1941), *Alice in Wonderland* (1951), and *Beauty and the Beast* (1992), much of children's televised entertainment featured characters with mental health issues. These characters were usually





single Caucasian males. They were not often identified with actual diagnoses, but with slang terms such as “psycho,” “wacko,” “losing your mind,” “nuts,” “certifiable,” and “mad.” They failed more often than they succeeded, rarely attaining whatever their goal or dream was in the narrative. Physically, these characters were portrayed as unattractive, usually with unruly hair, missing teeth, or bad breath. These characters were rarely treated for their conditions, and the success of such treatment was even rarer (Wahl, 2003). **HYPOTHESIS 2: Children’s media negatively influences stigma.**

### *Religion and Stigma*

Religion, surprisingly, also seems to play a role in this dangerous mental health stigma, marking members of their own community who suffer so as “less than” the general population. According to research by Wesselman and Graziano (Purdue University), those with mental health issues are often deemed by Christians to have committed some gross sin or overlooked some important religious performance. Those who suffer from mental illness, it would seem, are just not exercising enough faith, or not praying enough, etc. Often, this leads Christians to be skeptical about the practicality or usefulness of psychiatric or medical help in cases of mental illness, preferring to seek spiritual or scriptural remedies instead (Wesselman & Graziano, 2010).

**HYPOTHESIS 3: Religious beliefs play a significant role in the formation of stigma.**

### *Mental Illness Perceived as Dangerous*

Rudick and Dannels found that children with ADHD or major depression were perceived by their classmates as very likely to be dangerous, both to themselves and to others. This is perhaps due to a misconstrued view of the dangers of mental illnesses. Though individuals with mental illness statistically have just about the same homicide rate as those of the general public, many people believe that those who suffer from mental illnesses are much more dangerous (Rudick & Dannels, 2018). This, too, is also likely due to exposure to negative media narratives about mental health. In his research, Wahl continues with reporting that mentally ill characters were not only portrayed as unattractive misfits and outcasts, but they were often the evil, villainous, and dangerous characters. Wahl cites the children’s book *How to Eat Fried Worms* by Thomas Rockwell which includes the following quote: “Crazy people are like dogs. If they see you’re afraid, they

attack” (Wahl, 2003, p. 253). Wahl also referred to J. K. Rowling’s *Harry Potter and the Prisoner of Azkaban*, in which Harry Potter is warned to be wary of a prisoner who is mad and “a danger to anyone he comes across” (2003, p. 253).

Superhero comic books of the late 90s and early 2000s also share this sentiment. In a 2001 issue of *Green Lantern*, the villain, Nero, starts out in a psychiatric ward with a diagnosis of schizoaffective disorder. Others superhero stories, like the Joker in *Batman* and The Green Goblin in *Spiderman* enforce the idea that “madness is what turns good people [...] into villains” (Wahl, 2003, p. 253).

Religion continues to feed this argument as well. Since many religious people believe that mental illness is ultimately a spiritual issue, their mindset is often that the sufferer should be able to take care of themselves. After all, what is needed is simply a little more faith. Because of this, when mental health patients do not get better, they are labeled by believers as “Unpredictable, unattractive, indecisive, and dangerous” (Wesselman & Graziano, 2010, p. 404). They are either looked down upon for not measuring up to the religious standard of faith and trust in God, or worse yet, they are deemed as dangerous to the group and possibly demon-possessed (Wesselman & Graziano, 2010).

If the mentally ill are dangerous people, then they need to be dealt with as such. At least that is the next logical conclusion to which media takes us. Wahl continues in his research to report on several online video games. In one game, *Lunatics Online*, kids take on the role of a mental patient attempting to escape from a wacky mental institution. Another, *Twisted Metal: Black*, features mentally ill patients who have escaped from an asylum, one of whom preys on human flesh (Wahl, 2003).

Even though schools have attempted in the past to educate children on mental health, and hopefully improve their attitudes about it, these attempts are often unsuccessful, simply on account of the massive amount of stigma that media, religion, and parents both create and spread (Lorona & Cindy Miller-Perrin, 2018). This leads me to the following hypothesis as a tentative answer to my third research question, “Why is education about mental illness not sufficient to derail stigma?” **HYPOTHESIS 4: Educators fail to change stigma because the mentally ill are portrayed as dangerous in children’s media.**



## METHODS

Due to both the time and financial constraints of this study, I was not able to test all four of my hypotheses. Instead, I chose to focus on trying to satisfactorily study and test just one of them, "HYPOTHESIS 2: Children's media negatively influences stigma."

The research method I chose to use for this project is a content analysis. Content analysis, according to *Communication Research* by Keyton, is the simplest method of analyzing message content. It is an effective method for examining emerging themes in human reaction to the media with which they interact. In the case of this study, a content analysis would be the most effective because the desire is to discover if the mental illness themes expressed in today's children's media echo the sentiments of the media reported by Wahl. The studies conducted by Wahl only encompass the children's media of the late 1990s and early 2000s. The purpose of this content analysis is to discover whether that trend has continued.

As an example of an effective content analysis, the *Journal of Electronic Media and Broadcasting* published a study on rap music in 2009. Conrad, Dixon, and Zhang wanted to investigate how rap music videos influence cultural views about violence, sex, misogyny, and beauty (Conrad et al., 2009). The trio directed a content analysis of a population of 108 popular rap music videos of the day, coding for variance in materialistic, misogynic, violent, love, cultural expression, and political content. In addition, references to differences in perceived physical beauty between whites and blacks were also coded, including hair texture, skin tone, eye color, etc. Their samples came from three major television music video outlets: Black Entertainment Television (BET), Music Television (MTV), and Video Hits 1 (VH1). Though their study was limited by the fact that they only studied rap music videos that had been released in that year (2009), the trio believed that their study was still relevant because, by studying just current releases, they would find an accurate sample of what the majority of rap culture was doing at that time (Conrad et al., 2009).

Their studies concluded that the men in these videos were much more likely than women to use their music for community building, fighting oppression, and so on. Women, by contrast, were primarily presented in rap music videos as submissive to men, or as sexual objects. Conrad, Dixon, and Zhang used what they found to develop hypotheses about how

these music videos affect cultural insecurities about beauty, identity, and societal roles for women (Conrad, et al, 2009).

In the same way, my research investigated mental illness stigma in current children's media. My research delved into one of the frontrunners of children's media and entertainment: The Walt Disney Company. Wahl's aforementioned research on mental health stigma discussed negative stereotyping of mental illness in multiple Disney films, including *Dumbo* (1941), *Alice in Wonderland* (1951), and *Beauty and the Beast* (1992) (Wahl, 2003). In order to investigate whether this stereotyping seems to be continuing, this study focused on cultural reaction to Disney cartoon films that have released subsequently to the films cited by Wahl. However, studying all Disney films made since 1992 would be an impossible task to accomplish within the time constraints of this study. Thus, this study focused on audience reaction and perception to portrayals of mental illness in popular characters from these films as expressed on Reddit, the popular internet forum site.

### *Making the Case for Studying a Forum*

The *Journal of Media Psychology* released a study of internet forums in 2013. In this study, internet forums are defined as "an online discussion site" (Holtz & Wagner, 2012, p. 55). They generally begin with one member writing a post on a particular subject, and then other users can reply with subsequent posts of their own. One advantage of analyzing forum posts is that there is a near-infinite amount of information to be found (Holtz & Wagner, 2012). Forums can, in some senses, serve as a sort of "virtual focus group" (Moloney et al., 2003, p. 274). For the purposes of this study, forum posts about Disney characters with mental illnesses will serve as a focus group of sorts for research.

The following Disney characters have been theoretically diagnosed with mental disorders by multiple sources, including screenrant.com, ranker.com, and therichest.com film review websites (Casano, 2019; Geller, 2016; Voutiritsas, 2017).

Among this list, two characters are (theoretically) diagnosed with sociopathy, two with depression, two with attention deficit hyperactivity disorder, one with avoidant personality disorder, one with atelophobia (fear of failure), one with generalized anxiety disorder, and one with Stockholm syndrome. Five characters are male, and five are female. It is



also worth noting that two of the male characters (Tigger and Piglet) are animals instead of human.

**Table 1**

*Disney Characters Diagnosed with a Mental Illness*

Character Name	Diagnosis	Film	Release Year
Jafar	sociopathy	<i>Aladdin</i>	1992
Scar	sociopathy	<i>The Lion King</i>	1994, remake 2019
Mulan	atelophobia	<i>Mulan</i>	1998
Tigger	attention deficit hyperactivity disorder	<i>The Tigger Movie</i>	2000
Piglet	generalized anxiety disorder	<i>Piglet's Big Movie</i>	2003
Rapunzel	Stockholm Syndrome	<i>Tangled</i>	2010
Merida	avoidant personality disorder	<i>Brave</i>	2012
Elsa	depression	<i>Frozen</i>	2013
Anna	attention deficit hyperactivity disorder	<i>Frozen</i>	2013
Charlie Brown	depression	<i>The Peanuts Movie</i>	2015

This study conducted a search on Reddit for posts about each of these characters and their respective mental disorders. These searches were based on keywords such as the characters' names and their respective perceived mental illnesses. For example, Tigger was searched under the following Google search: "Tigger" "ADHD" "Site:Reddit.com." The search was made using Google Chrome, and under an Incognito tab.

In each search, the number of search results was recorded. The top ten most popular results for each search were examined in detail. Data was collected in each search of these examinations, and each post's text was coded based on how the perceived mental illness was described on a sliding scale (Very Positive–Somewhat Positive–Neutral–Somewhat Negative–Negative–N/A). Additionally, it was recorded in each post whether the author

related personal experience to the character's perceived mental illness. Though the sample size was small, due to time constraints of this study, it is still possible that these posts provide a strong example of the overall opinion of the general public. There were relatively few posts on these characters and their respective mental illnesses, and so it seems reasonable that examining the first ten search results provided should give an inclusive, representative sample of the sentiments of the population.

## RESULTS

My study provided the following results (please see next page). The search that provided the greatest number of results was "Elsa, Depression" with 2,190 results. The smallest number of results was a tie between "Anna, ADHD," and "Scar, Sociopath" with 118 results a piece. It is also worth noting here that the searches "Mulan, Atelophobia," "Merida, Avoidant Personality Disorder," and "Elsa, Avoidant Personality Disorder" provided zero results.

In each character's search, the top 10 results were not always relevant for the purposes of this study. For instance, a result for the search, "Rapunzel, Stockholm Syndrome," was a post asking commenters to share which Disney princess they would most like to sleep with: the post did not mention Stockholm Syndrome. This post was discarded from the study in favor of result #11. In another case, a result for the search "Jafar, Sociopath" was a post that did not mention sociopathy and simply read "F\*\*\* Jafar." Posts such as these were also discarded from this study. Because of this, not every character's perception was based solely on the top 10 results in my incognito Google search, and in the cases of "Scar, Sociopath," and "Anna, ADHD," less than 10 search results were actually found to bear any relevance for the purposes of this study.

Of the 70 posts that were considered relevant for this study, 12 included a connection between the film character's mental illness and the writer of the post's own experience. The mean sentiment score of each post that included some sort of personal relation to the alleged mentally ill character (1) was calculated.



**Table 2***Data Analysis*

Character Name & Mental Illness	Total Number of Results	Senti-ment Score of 1	Senti-ment Score of 2	Senti-ment Score of 3	Senti-ment Score of 4	Senti-ment Score of 5	Relation to Personal Experience Mentioned
Jafar / Sociopath	122	7 / 10	0 / 10	2 / 10	1 / 10	0 / 10	1 / 10
Scar / Sociopath	118	6 / 8	1 / 8	0 / 8	1 / 8	0 / 8	2 / 8
Mulan / Atelophobia	0	N/A	N/A	N/A	N/A	N/A	N/A
Tigger / ADHD	394	1 / 10	0 / 10	7 / 10	1 / 10	1 / 10	1 / 10
Piglet / GAD (Anxiety)	962	1 / 10	2 / 10	6 / 10	1 / 10	0 / 10	0 / 10
Rapunzel / Stockholm Syndrome	149	1 / 10	2 / 10	5 / 10	1 / 10	1 / 10	2 / 10
Merida / Avoidant Personality Disorder	0	N/A	N/A	N/A	N/A	N/A	N/A
Elsa / Depression	2,190	0 / 10	0 / 10	4 / 10	4 / 10	2 / 10	3 / 10
Anna / ADHD	118	0 / 2	0 / 2	1 / 2	0 / 2	1 / 2	1 / 2
Charlie Brown / Depression	1,230	3 / 10	3 / 10	3 / 10	0 / 10	1 / 10	2 / 10

The mean sentiment score for posts that did not include any sort of personal relation to the alleged mentally ill character (0) was also calculated (values were rounded to the nearest hundredth):

Mean Sentiment Score (0) = **2.66**

Mean Sentiment Score (1) = **3**

Mean Sentiment Score (All) = **2.83**

The median for each was also calculated:

Median Sentiment Score (0) = **2.64**

Median Sentiment Score (1) = **3**

Median Sentiment Score (All) = **3**

The mean sentiment score was also calculated by gender of the character from the posts that were analyzed in this study.

Mean Sentiment Score (Male) = **2.17**

Mean Sentiment Score (Female) = **3.54**

The median for each was also calculated:

Median Sentiment Score (Male) = **2.13**

Median Sentiment Score (Female) = **3**

## DISCUSSION

The mean sentiment score of the posts of group 0 (no relation to personal experience within post) was lower than the mean sentiment of group 1 (relation to personal experience within post). The same was true of the medians for each group. The 1s also had two characters with a mean sentiment score of 5 ("Elsa, Depression," and "Anna, ADHD"), whereas the highest mean sentiment score for the 0s was 4.75 ("Elsa, Depression"), and the next highest mean score was 3.11 ("Tigger, ADHD"). It is also worth discussing the fact that, of the 70 posts

analyzed, only 12 (about 17%) included personal relationship to the mentally ill character. 58 posts (about 83%) did not. This would lead me to believe that, of the people who watch Disney films and theorize about mental illnesses among characters in the film, most do not suffer from or have personal experience with mental illnesses (or at least they do not express that they do on Reddit).

An unpaired t-test was performed on these data. The P value equals 0.34, which is not considered to be statistically significant. The implication of this result is that the presence or absence of a viewer's personal relation to a film character with mental illness does not change the viewer's perception of that mental illness. Because the value is small, there still could be a connection between the two but a larger sample would help determine whether this connection is significant or just due to chance. Continued research in this area would certainly be required to know for sure. Future researchers might consider analyzing posts on other social media sites, as well as other forms of children's media.

Additionally, the mean and median sentiment scores of the female characters in these posts were much larger than those of the male characters in these posts. Though my method was not designed to test "HYPOTHESIS 1: Men with mental illnesses will be more heavily stigmatized than women," this information could possibly provide evidence of its validity. Again, future study would be required.



## CONCLUSION

It seems that there is not a connection between a viewer's ability to relate to mental illness perceived in children's media and a viewer's own experience with mental illnesses. This could support Smith and Applegate's report that stigma is often informed by a lack of public knowledge about mental illnesses. It would presumably be difficult for a person's experience with mental illness to change their mindset about mental health if they have insufficient knowledge of what mental illnesses are or how they work.

The data also supports Lorona and Miller-Perrin's studies that show that children seem to know almost intuitively that mental illnesses are less desirable than other disabilities. Of the 70 posts that were studied, 27 (39%) had a sentiment score of 1 or 2, while only 15 (21%) posts had a sentiment score of 4 or 5. Interestingly, the majority of the posts were scored neutral, with 32 posts earning a score of 3. It would seem that, if perception of mental illness is changing in children's media at all, it is changing from a feeling of fear or disgust to one of indifference. It is also worth noting the discrepancy between the mean sentiment score of the female characters versus the male characters, which reinforces Hagget's research that mental illness is less socially acceptable in men than it is in women.

However, this study only covered the top 80 posts about 10 theoretically mentally ill Disney characters on Reddit. Although I believed that this is a broad enough sample to give at least an idea of how mental illness is portrayed in children's media, based upon the popularity of Disney films and their significance in previous research, such as Wahl's, this is a topic that undoubtedly deserves deeper study. It would be interesting to know whether this trend of viewer perception continues across a wider sample of posts, or for children's movies from other film companies, such as Universal or DreamWorks. I believe that other forms of children's media, such as video games, books, and iPhone apps, should also be studied.

Additionally, another realm of future study to be considered would be to investigate stigma on other social media platforms (Twitter, Facebook, etc.) Also, though this study began with the intention of finding posts in which the authors connected their posts to their own personal experience with mental illness and stigma, this study only discovered a small sample of posts which actually did so. It would

also be important in a future study to find information from more people who have experience with mental illnesses, especially from those who have experienced stigma themselves.

Finally, my study did not have the time or finances to more thoroughly investigate religion and its influence on stigma, so this could be another realm of future study to pursue. ❖

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# MARY REYNOLDS

## IS WITCHCRAFT FAKE NEWS OR FATE? A STUDY OF THE WITCHES IN *MACBETH*

In William Shakespeare's play *Macbeth*, the three witches use their reputation to influence Macbeth's actions and make him believe that what they say is fate. The Weird Sisters, as they are commonly called, tell Macbeth several prophecies throughout the play, but that is all they do. The actions of Macbeth and others are their own. However, Macbeth blindly follows their words because he trusts in magic and prophecies, which results in his death. During the time period when Shakespeare wrote this play, "the witchcraft hysteria in Europe had already waxed and waned a number of times" (Kennedy 720). The author would have

had plenty information about the history of witchcraft. During the seventh century, "England ... became one of the most active arenas in Europe for both accusations of and skepticism about witchcraft" (Kennedy 724-5). King James, the person for whom this play was written, also had a great amount of knowledge about witches and believed in magic, which may be the reason why the witches play such an important role in the play (*Riverside Shakespeare* 1357). Shakespeare's witches, like many of the accused women of that time period, did not perform magic. But Macbeth believed that the witches told fate, not just possibilities.

The witches, or the Weird Sisters, appear at the beginning of the play before the action moves to a military camp where King Duncan of Scotland hears news of generals and their success in battle. The generals, Macbeth and Banquo, encounter the witches when they cross a moor and they are told a prophecy that Macbeth will first become a thane of Cawdor before eventually rising to King of Scotland. Banquo, while never being King himself, will sire a line of kings. The two are skeptical about the witches after they vanish until some soldiers come and tell Macbeth that he has been named thane of Cawdor. Macbeth is intrigued but uncertain about the rest of the prophecy, so he writes to his wife, telling her everything. She, however, is not as cautious about the prophecy. Lady Macbeth begins to plan the murder of Duncan and persuades her husband to kill the king the night he comes home. Their plan succeeds even though Macbeth still has doubts and has visions of a bloody dagger. Macbeth assumes the throne and Duncan's sons flee the country. The new king of Scotland fears for his throne because of the witches' other prophecy concerning Banquo's heirs, so he hires men to



Photo by Pixabay



kill Banquo and his son. Banquo is killed but his son, Fleance, escapes. That night, the ghost of Banquo visits Macbeth, who scares his guests when he rambles in fear at a feast. Lady Macbeth tries to control the damage, but the nobles are questioning his legitimacy, so Macbeth visits the witches. They show him demons and spirits who tell him more prophecies: "beware Macduff / Beware the thane of Fife," "The power of man, for none of woman born / Shall harm Macbeth," and "Macbeth shall never vanquish'd be until / Great Birnam Wood to high Dunsinane Hill / Shall come against him" (1377-8). Despite these unsettling prophecies, Macbeth is relieved and feels secure because he believes that a realization of the prophecies is impossible. After learning that Macduff has joined Malcolm, Duncan's son, he orders Lady Macduff and her children murdered. News of this reaches Macduff and, vowing revenge, Macduff joins Prince Malcolm's army as they ride to Scotland. Several Scottish nobles, appalled by the tyrannical behavior of Macbeth, support this invasion. Lady Macbeth kills herself after sleepwalking, believing that blood is covering her hands. Macbeth, in great mourning, still waits for the invasion by fortifying the castle but believes he will be invincible because of the witches' prophecy. However, fear strikes his heart when the army advances with tree branches from Birnam Wood, making one prophecy true. Macbeth fights back but is eventually overwhelmed and confronted by Macduff, who was born of a C-section, thus "not of woman born." Macbeth still fights, knowing his doom, and is beheaded by Macduff, making the latter the new King of Scotland.

When looking at the witches in *Macbeth*, many scholars have varying opinions on what they are. Some see them as the embodiment of evil, similar to furies or demonic spirits. Others see them as mere old women, while yet other consider them actual witches: "There are two modern schools of thought on the subject. According to one, Shakespeare was deliberately vague as to the precise nature of the three strange creatures ... The other popular modern view is that the Witches are demonic spirits" (Wentersdorf 432). One point that many scholars agree on is "that Shakespeare's Witches do not determine fate, since the Witches' prophecies are not concerned with actions to be taken by Macbeth, and Macbeth himself never charges the Witches with responsibility for his evil deeds" (Wentersdorf

431). But even though this is a commonly shared opinion, others still disagree. Karl Wentersdorf discusses many of these different views in his article "Witchcraft and Politics in *Macbeth*" by going over each side, showing how scholars view the witches in such different ways due to vague information in the play itself. Wentersdorf mentions several scholars who consider the witches to be supernatural, such as Warner who "refers to them as 'Fairies'" (433). Wentersdorf also makes the point that, although the witches seem to lack magic, they might be demons since they have the ability to vanish. He states,

Shakespeare did not expect his audience, or at least, the more sophisticated members of his audience, to think of the Witches as literally dissolving into air rather than just cunningly disappearing ... it was widely believed that witches in touch with the Devil were able to create illusions of various kinds, including the illusion of disappearance. According to no less an authority on witchcraft than King James I, who *Daemonologie* (1597) was well known in Shakespeare's day, witches cannot vanish, but the demons whom they serve can "thicken & obscure so the air, that is next about them, by contracting it strait together, that the beams of any other mans eyes cannot pearce thorow the same, to see them." (434)

Peter Stallybrass, on the other hand, talks about the lack of evidence of actual witchcraft during that time period in his article "*Macbeth* and Witchcraft" and notes that even though witchcraft beliefs were held in many countries, "Their frequency, however, should not be taken as evidence for the truth of witchcraft (there is no proof, for instance, that 'witches' eat their own children, cause sickness, plague or famine, or have sexual relations with devils)" (189).

While many scholars disagree on the extent of the witches' magical power, they also have different views on Macbeth's role in the witches' prophecies and about how much of his actions are fate. Anthony DiMatteo writes in his article, "Classical Aspects of the Witches in *Macbeth*," that Macbeth

has crossed a line in the interpretation of the power of witchcraft that Banquo (and Conti) carefully avoided doing. The goddess of witches, Hecate herself, is only an instrument of a force greater than her own; she is the course and power of fate divinely communicated into mortal bodies. Of course, this perhaps fine though rather



crucial distinction between instrument and cause is muddled by Macbeth's evidently swelling desire to know what will happen. Ironically, Macbeth himself has become an instrument of his desire to know, a trespass of the boundaries of reason. (45)

DiMatteos says that Macbeth's interpretation of the prophecy is what causes his demise, not the witches' prophecies themselves. Macbeth becomes a toy that the witches can manipulate with their words.

Much scholarly research shows the different views regarding the witches, fate, and Macbeth in the hopes that the reader will understand Shakespeare's play better. Although the different sides of this argument must be known, one should focus on certain parts of the play to truly understand the witches and their behavior.

Looking at the different views of scholars, one can see how diverse the opinions are about the witches and that Shakespeare is rather vague in his presentation of them. However, one can also see that the witches, while they may be slightly supernatural, are only good at making people *believe* that what they say is true. The witches only inform Macbeth of their prophecies but do not say how they will come to be. The actions of others caused the tragedy of *Macbeth*, not the witches'. The characters acted based on the witches' words, while the witches merely planted the seeds; "Witches are only capable of seeing what is likely to happen and have no way of defining the course of events. Macbeth's moral downfall begins when he forgets this boundary and begins seeing the witches as having the power to define life's course" (DiMatteo 45). When the witches told Macbeth that he would be king, he was unsure about how he should act, but his wife was the one who persuaded him to spring to action. Lady Macbeth's actions were not determined by the witches but, owing to the witches' reputation, Lady Macbeth thought their prediction was fate.

Macbeth fails to take into account the prophecies he hears from the demons and spirits later in the play. The witches' ability to summon demons and spirits might suggest that they are part of the supernatural world, but they do not perform any other magic. In Act 1, Scene 3, the witches vanish after delivering their message to Macbeth and Banquo. However, like Wentersdorf has mentioned, the witches are not using magic, but instead using a sleight of hand to disappear from the two generals, and the

actors who performed this play during Shakespeare's time also would have used tricks to make the audience believe that they were disappearing. Through talking with Macbeth and their non-magical disappearance, the witches are revealed not as demons but as intelligent women who, with only their words, influence Macbeth and his wife. Since Scotland is a land rich of history of the supernatural, there is historical evidence to Macbeth and his wife believing the witches, who would have taken advantage of this blind acceptance of truth. Stallybrass mentions that witchcraft was not just part of England's folklore: "Although witchcraft accusations reached epidemic proportions in sixteenth- and seventeenth-century Europe, witchcraft beliefs are endemic in many societies" (189). This influence by reputation and local belief is what helps the witches in their goal of leading Macbeth down a certain path of eventual failure.

Through Macbeth and Lady Macbeth's actions, one can concur that they both believe that the witches' prophecies are fate, not mere suggestions. This eventually leads to their deaths when the throne Macbeth usurped is taken from him. Fate implies that events are set in stone, but the witches only said that Macbeth would become king of Scotland. They did not say how he would become king or how long he would last in that position. Lady Macbeth assumes that Macbeth would have to kill the king in order to win the throne, and Macbeth assumes that the throne cannot be taken from him. But because of their actions, 'fate' happens in a way they did not expect. That is why the witches cannot see the future but are instead planting seeds in Macbeth's mind, pushing him toward the actions they want him to take. They, having told him that he would be king, but that Banquo would sire a line of king, set in motion the events they wanted to happen. The witches did not know how, but trusted Macbeth and his wife would act rashly in order to live out their ambition. But when Macbeth consults them again with concerns about his kingship, they tell him that Macduff will fight against him, that a man not born of woman would kill him, and that his kingship will fall when Birnam Wood advances the castle. Macbeth takes their words at face value and, believing that his kingship is his ultimate fate, thinks he is invincible against the rising invasion. However, the witches cannot decide fate, only plant the seeds for the events in the way they want to. They know that Macbeth is losing his rational thinking and is only



concerned about his throne. Hence they tell him the prophecies in riddles to make them sound impossible, luring Macbeth into a sense of false security. Shakespeare is showing his audience through the witches' manipulation that fate cannot be relied on and that people make their fate, not magic or supernatural forces. This message would have appealed to King James, who did not like witchcraft and thought of the witches as the evil forces in the play—as many scholars still do.

One of the main foci in *Macbeth* are witches, unlike most other Shakespeare plays, who affect important events in the play with their words. During that time period, there was a large cultural belief in fate and witchcraft, which the Weird Sisters use to their advantage. Whether or not the three women have a certain goal in mind when setting down Macbeth the path of tragedy, Shakespeare does not tell his audience, but a reader can clearly perceive that the witches do not force Macbeth to act. His actions are the fault of his wife and himself, not magic, although the witches were able to manipulate him based on their reputation. The witches are shown as women who use sleight of hand and control of their words to affect the actions of others, thus affecting major events. They speak to plant ideas in people's minds and set events

into motion. In *Macbeth*, the villain of the play are not the witches, but instead the other, non-magical characters. Lady Macbeth is the one who convinces her husband to kill the king, not the witches. If Macbeth had never spoken to the witches, his wife would have never convinced him to kill Duncan. Fate is not the driving force of the play, but the notion of possibility. The witches' words offer a possible future, and is up to the listener to decide to pursue that future or not. The future is not set in stone and the witches knew that. Clearly, Macbeth did not. ❖

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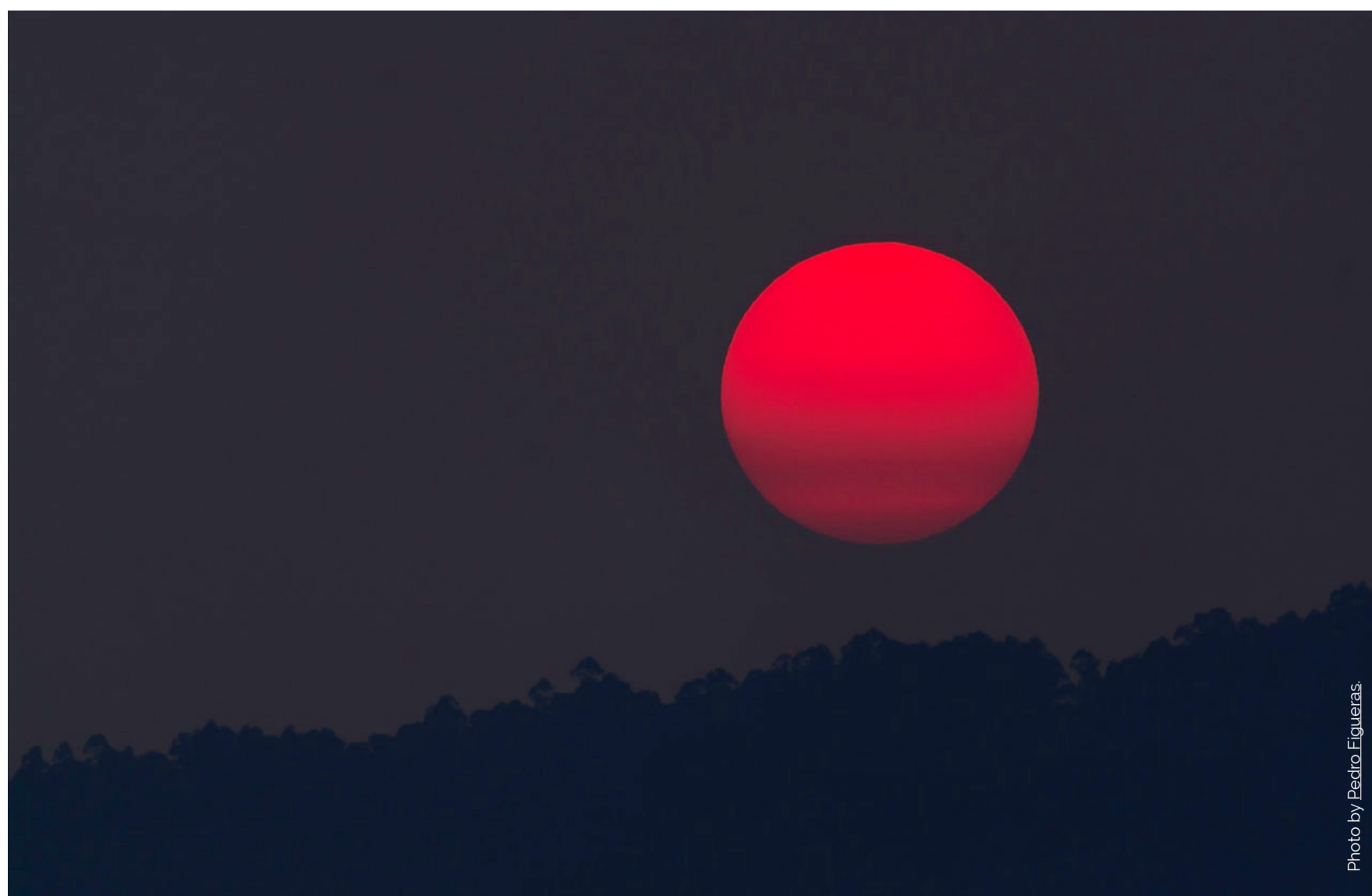


Photo by Pedro Figueras.



**ABUSE AND DIVORCE: THE MODERN CHRISTIAN VIEW**

According to the National Domestic Violence Hotline, twenty-four people in the United States fall victim to some sort of abuse from an intimate partner every minute. 1 in every 4 women and 1 in every 7 men in the United States have been a victim of physical violence from their significant other at some point in their lives. Nearly half of all Americans, women and men alike, have experienced some sort of psychological aggression from an intimate partner (“Statistics”).

With each day, more horror stories of how people—mostly women, but some men, too—are being abused by those who should be their best friends. One woman, Katherine, recalled how her husband used to kick her, slap her, trip her, throw things at her, and yell all kinds of demeaning things at her. Sometimes he threatened worse. “He would threaten to run us all off the road in the car and kill us,” Katherine said, “The violence became a daily occurrence if not several episodes a day” (“Katherine’s Story”). According to another testimony, a Scottish man

left his wife of sixty years after receiving endless abuse from her: “I was getting black eyes, I was getting bruising,” he said, “I got battered, I got my tooth knocked out, I had my knee hammered and incidents like that ... My nose was bleeding, my shirt was ripped” (“My Abusive Wife”). Each one of these abusive marriages ended in divorce. It’s not difficult to see why these individuals eventually decided to leave their spouses when the relationships became detrimental to their physical and emotional health. What is a bit more challenging, however, is to determine whether these divorces would be allowed from a Christian ethical perspective? In this essay, I will use Scripture, the writings of theologians, as well as church history and traditions, to argue that God does allow a husband or wife to divorce his or her spouse in the case of abuse.

Before making this argument, the definition of an abusive marriage must first be established. The New York State Office of Children and Family Services defines “physical



Photo by Kat Jayne.



abuse" as "non-accidental use of force which results in bodily injury, pain, or impairment" (Tracy). For a definition of emotional abuse, Dr. Barbara Shaffer states that emotional abuse is to treat another person with "profound disrespect or with an attitude of entitlement that discounts the abused's dignity, separateness, and autonomy." Shaffer, who holds a Ph.D. in Christian counseling, continues: "Out of entitlement and disrespect spring various overt behaviors that use anger, violence, and/or contempt to induce fear, guilt, and shame. The other person is controlled, punished or demeaned" (Corcoran). Chad Ashby, pastor of College Street Baptist Church in Newberry, SC, provided a sufficient definition for this writing when he wrote for *Christianity Today* that an abusive marriage is one that "crosses the line from relationship to enslavement" (Ashby).

Though marital abuse is an undeniably painful and heart-breaking situation in which to find oneself, Scripture seems at first glance to condemn divorce under circumstances of abuse. The only acceptable grounds for divorce that Jesus gives is when one spouse has been sexually unfaithful. He says in Matthew 5:32, "But I say to you that everyone who divorces his wife, except on the ground of sexual immorality, makes her commit adultery, and whoever marries a divorced woman commits adultery." The Apostle Paul broadened this view slightly, allowing a believer to divorce an unbelieving spouse if the unbelieving spouse desired to leave the relationship in 1 Corinthians 7:12-15:

To the rest I say this (I, not the Lord): If any brother has a wife who is not a believer and she is willing to live with him, he must not divorce her. And if a woman has a husband who is not a believer and he is willing to live with her, she must not divorce him. For the unbelieving husband has been sanctified through his wife, and the unbelieving wife has been sanctified through her believing husband. Otherwise your children would be unclean, but as it is, they are holy. But if the unbeliever leaves, let it be so. The brother or the sister is not bound in such circumstances; God has called us to live in peace.

Neither of these passages directly address the issue at hand, and in all other cases, Scripture makes it clear: "For I hate divorce," says the Lord, the God of Israel" (Malachi 2:16). Though it may seem at first glance that God does not consider abuse as legitimate grounds for divorce, one might draw a different conclusion upon further

study into the intended meaning of both these Scripture passages and the traditional views of the global church.

Though it is not the ideal situation, it has been mentioned above that Scripture does allow for divorce under certain circumstances. In Deuteronomy 24:1-4, God says that a man may divorce his wife if he finds adultery or another form of vile sin in her. He also mentions that it is adultery for the same man to remarry her once he has divorced her:

When a man takes a wife and marries her, if then she finds no favor in his eyes because he has found some indecency in her, and he writes her a certificate of divorce and puts it in her hand and sends her out of his house, and she departs out of his house, and if she goes and becomes another man's wife, and the latter man hates her and writes her a certificate of divorce and puts it in her hand and sends her out of his house, or if the latter man dies, who took her to be his wife, then her former husband, who sent her away, may not take her again to be his wife, after she has been defiled, for that is an abomination before the Lord. And you shall not bring sin upon the land that the Lord your God is giving you for an inheritance.

By the days of Christ, however, the religious leaders had begun to taken this passage to mean that a "certificate of divorce" was all that was required for a man to divorce his wife. If they had the paperwork, a man could divorce his wife for whatever reason he saw fit, and that was perfectly fine in those days (MacArthur).

Then Jesus steps on the scene with His Sermon on the Mount in Matthew 5, in which He elaborates on His views on adultery and divorce. In verses 31 and 32, He addresses the popular teaching of the Pharisees in His day when He says, "It was also said, 'Whoever divorces his wife, let him give her a certificate of divorce.' But I say to you that everyone who divorces his wife, except on the ground of sexual immorality, makes her commit adultery, and whoever marries a divorced woman commits adultery." Jesus demonstrates here that He is passionately against women being tossed to and fro by the will and whim of a society dominated by men. Sexual purity is important to Him, but this Scripture also clearly shows how passionate Jesus is about respecting women. Jesus's mandate was intended to protect women who were divorced without defense based on the



improper application of Deuteronomy 24. To paraphrase, Jesus is saying, "If you divorce your wife for any reason other than sexual unfaithfulness to you, you force her to commit adultery with whoever she may wind up marrying next, and that adultery will be on your head, not hers." The great Christian leader and Protestant theologian John Calvin paraphrased Jesus' teaching like this:

That man ... who puts away his wife, and gives her a bill of divorcement, shelters himself under the pretense of the law: but the bond of marriage is too sacred to be dissolved at the will, or rather at the licentious pleasure, of men. ... The man who, unjustly and unlawfully, abandons the wife whom God had given him, is justly condemned for having prostituted his wife to others. (Ashby)

A few hundred years after the life of Jesus, His passion for the care and respect of women was continued in the Christianized Byzantine Empire. This empire ruled the Western world from 330 to 1450 A.D. The Byzantines had their own unique set of guidelines about divorce, which included provisions for the divorce rights of women as well as men. A man was only allowed to divorce his wife in one of six circumstances: adultery, treason against the empire, plotting against the life of her husband, spending the night away from her husband (if she was not sent away and she spent the night somewhere other than her parents' house), or if she "attends horse races, theatres, or hunts, in order to be seen, without her husband's knowledge or against his prohibition" (Viscuso). Women also had a list of circumstances under which they could legally divorce their husbands. These were similar but not identical to those for men: adultery, accusing the wife of adultery without proof, treason against the empire, and most interestingly, plotting against the life of the wife or offering her up to other men to be debauched by them. Though this law does not directly address an abusive marriage, it does certainly seem to imply that women had the right to divorce their abusive husbands in this ancient Christian society, especially with its addressing of sexual exploitation on the part of the man as grounds for the wife to file for divorce (Viscuso).

Ashby gives his thoughts on the issue in an article written for *Christianity Today's* website. Ashby admits that God does indeed say "'For I hate divorce,' says the Lord, the God of Israel" in Malachi 2:16, but he reminds us that the verse

continues, "and [I hate] him who covers his garment with wrong," says the Lord of hosts. 'So take heed to your spirit, that you do not deal treacherously.'" The Old Testament says repeatedly that God hates injustice and oppression, and He pronounces judgment on the nation of Israel time and time again for their practice of these sins. Ashby says that the pain and suffering of those being abused by their spouse should never be taken lightly by church leaders. "The primary message an abuser should experience from the minister of Christ is that the eternal wrath of the Lord burns hot against those who heap up violence and oppression," Ashby says. "Their abuse has not escaped the watchful eye of the One who declares, 'Vengeance is mine, I will repay' (Romans 12:19)" (Ashby).

Calvin seemed to agree with this train of thought. He taught that it would be cruel to force an abused spouse to remain in the marriage if his partner became ill and unable to control his or her urges to sexually or physically harm the other spouse. He also allowed for a couple to separate (not necessarily divorce) if one spouse contracted a sickness or disease that could prove to be dangerous for the other spouse or their children (Calvin). Theodore Beza, a disciple of Calvin and a Protestant theologian in his own right, took Calvin's thoughts a step further. Similar to the Apostle Paul's views (see 1 Corinthians 10), Beza allowed divorce in the context of abandonment of the marriage by either spouse. Interestingly, Beza believed there were two kinds of marital abandonment: one of the body, and another of the soul. He taught that a spouse could either be physically abandoned (in the case of one spouse maliciously leaving the home of the other), or the abandonment could be spiritual, if one spouse chose to leave the Christian faith. In either case, Beza said it was up to the spouse who had been wronged to decide whether or not to attempt to reconcile the marriage or to seek a divorce. Beza also did not consider it immoral for an abandoned spouse to remarry (Witte).

The Roman Catholic tradition has an interesting method for resolving this conflict. Before a couple can marry in the Catholic church, their marriage must be declared "valid" based on a number of criteria. First, the man and woman must be free to marry. Second, they must be able to pledge their lives to one another in marriage. Third, they must freely exchange their consent. Fourth, the couple must intend to marry and be faithful to one another for life, as



well as being willing to have children. Fifth, they must intend the best for each other. And, finally, the marriage must take place in the presence of at least two witnesses, as well as a church minister. A Catholic marriage can be annulled if evidence is presented that a marriage, which was once declared valid by the church, was actually invalid from the start ("Annulment").

Contrary to popular belief, an annulment does not mean that the marriage never existed. Instead, it simply means that the marriage was missing one or more of these requirements at the time that it began (presumably unknown to the witnesses), and that the church did not perform a valid marriage on the original wedding day. If a spouse wishes to receive a declaration of nullity for his or her marriage, he or she must write a petition to this end and present it to the church. This petition must include whatever grounds the petitioner wishes to obtain the divorce based upon, as well as providing the church with a list of friends or family who can witness to these problems. Proceedings within the church continue from here similar to a secular court of law. If this court, called a Tribunal, agrees that the marriage ought to be annulled, both parties are allowed to remarry within the Catholic church ("Annulment").

There are, of course, several arguments from Christians who believe that divorce is not an acceptable alternative for believers, even in the case of abuse. Scripture does not specifically address domestic violence, and many passages call for women to be submissive to their husbands, such as Ephesians 5:22, "Wives, submit to your own husbands, as to the Lord." One could argue that this command, in tandem with God's hatred of divorce and His call for unconditional love in marriage, means that women cannot seek divorce unless their marriage suffers from infidelity or abandonment; abuse is not considered legitimate grounds for divorce. This trend is being rejected today by most ministers, but, according to a LifeWay Research survey of 1,000 evangelical pastors, 4% of pastors still believe this way (Randall).

Wayne Grudem, a professor of theology and biblical studies at Phoenix Seminary and General Editor of the English Standard Version Bible, used to share this belief. He said in an interview on his website, "In brief, that position is that marriage is a life-long commitment, but that divorce is morally justified, and is not sin in God's sight, if the other spouse (a) has committed adultery, or (b) has abandoned the marriage and

all attempts at reconciliation have failed." Grudem said that an abused Christian spouse should seek help from the church, and could possibly seek separation from their abuser in dire circumstances, but divorce was not an option unless the abuser decided to abandon the marriage by leaving (Randall).

Grudem published these views in his 2018 textbook called *Christian Ethics: An Introduction to Biblical Moral Reasoning*. However, Grudem recanted his own teachings in 2019 in favor of supporting divorce in the case of an abusive marriage. He and his wife saw firsthand several abused spouses who continued to suffer when their abusing spouses did not abandon their marriages. Searching for answers, the Grudems found that 1 Corinthians 7:15 ("But if the unbelieving partner separates, let it be so. In such cases the brother or sister is not enslaved. God has called you to peace") supported this new, adapted view. Upon deeper study of this passage, Grudem found that the original Greek words "in such cases," usually refers to multiple scenarios, not just one. Grudem believed that this left room for the Scripture to be interpreted as allowing divorce not just for physical abandonment, but in "any cases that similarly destroy a marriage," which could include abuse and allow for divorce from an abusive spouse (Randall). In a subsequent paper published on his website titled, "Grounds for Divorce: Why I Now Believe There are More than Two," Grudem made his change of beliefs public.

Another Pastor and teacher, John Piper, agrees with Grudem's new interpretation. The founder of the popular *Desiring God* teaching website, Piper is currently the chancellor of Bethlehem College and Seminary in Minneapolis, Minnesota, and served as pastor of Bethlehem Baptist Church (also in Minneapolis) from 1980 to 2013. Citing Ephesians 5:22, Luke 6:46, and Romans 13:1, Piper teaches on his website that, while a wife is called to live in submission to her husband, both husband and wife are called, as believers, to live in submission to both Christ and whatever human government Christ allows them to live under. Piper goes on to cite Minnesota law which states that physically harming a spouse or family member is a crime punishable by fines, imprisonment, or both. "In expecting his wife to quietly accept his threats and injuries," Piper says, "he is asking her to participate in his breaking of both God's moral law and the state's civil law ... A wife's submission to the authority of civil law, for Christ's sake, may, therefore,



overrule her submission to a husband's demand that she endure his injuries." Piper does believe that men and women of the church ought to intervene and attempt to bring the abuser to repentance and the marriage to reconciliation, but whether this venture is successful or not, the abused spouse should never be left to suffer alone. If needed, Piper allows for an abused spouse to "escape" the marriage, mentioning that many biblical heroes also fled in certain instances rather than suffer unjustly apart from the will of Christ, including when Moses fled the wrath of Pharaoh (Exodus 2:15), when David ran away from King Saul's attempts to murder him (1 Samuel 19:12), and Christ's withdrawal from the crowds in John 9:10 (Piper).

Finally, some believers would argue that the abused spouse ought to remain in the marriage and attempt to save the soul of the abuser. Those who hold to this view cite 1 Corinthians 7:16, which continues Paul's discussion of marriage abandonment and reads, "For how do you know, wife, whether you will save your husband? Or how do you know, husband, whether you will save your wife?" Ashby concedes that some abused spouses may choose to do this after seeking godly counsel. "It is a valiant, humbling display of gospel love when a woman chooses to fight for her marriage despite her husband's sexual immorality, abuse, or abandonment," Ashby says, "However, that is a choice she alone must make." He assures readers that Paul's words do not enslave an abused spouse to remain in a marriage, even if there is a possibility that the abuser will come to repentance. "If God is determined to save a spouse," Ashby concludes, "he is more than capable to accomplish it without the degrading of His beloved daughter" (Ashby).

Though Scripture does not directly address the issue of divorce in the case of an abusive marriage, it is clear that Christ's emphasis on treating women with respect and dignity, combined with the teachings and traditions of church leaders on the issue, would almost certainly allow a husband or wife to file for divorce in order to escape an abusive spouse. It is important when discussing this issue to also bear in mind that both the abused and the abuser are people created in God's image, men and women that God loves and desires to see come to salvation in Christ. The question goes beyond whether God allows abusive marriages to end in divorce. Once the divorce has taken place, the church's

responsibility must be to care for and assist the abused in both physical, mental, and emotionally recovery, as well as joining in prayer for the family of the abused in hopes that the abuser, too, will one day be rescued and reconciled to God and family through Christ. For God desires that abused and abuser alike "should not perish, but ... reach repentance" (II Peter 3:9). ❖

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# SOCIAL SCIENCES & EDUCATION



**WHAT WAS LOST IN THE FIGHT: EXPLORING THE PROCESS AND RESULTS OF EDUCATIONAL DESEGREGATION IN THE RURAL SOUTH THROUGH ORAL HISTORY**

The right to an equal education in the United States is a continuous fight. The Jim Crow laws of the South not only segregated schools, but they restricted the right to an equal-opportunity education. *Brown vs. the Board of Education* ruled in 1954 that the South had to begin the process of desegregating schools. The realization of this ruling took years to spread into the small towns of the South and met a lot of resistance, and not just from white people. While much was gained by integrating schools, there was also a great loss. Integrating not only students, but the educational systems such as school boards, was a slow and tedious process that led to mixed results, especially in eastern North Carolina. This paper will explore the process of educational desegregation and its effects in Edgecombe and Nash Counties through the experiences of Ms. Rosa Brodie, a local student, teacher, professor, and a member of the board of education.

The experience of desegregation in these small North Carolina counties is encapsulated in the life of Ms. Brodie. Growing up, she lived in a deeply segregated community in Martin and Edgecombe county and attended segregated schools all the way through her master's work in biological sciences which she completed in 1957. She witnessed the process of school desegregation in the late sixties into the early seventies while serving as the only African American faculty member at Nash Community College for eight years, from 1966-1974. During this time, Ms. Brodie was selected to sit on the Education Board of Rocky Mount. She witnessed the many underhanded ways in which local whites tried to suppress black access to equal education. Her experiences in her career as an educator not only gave her great insight into the process of desegregation, but she also became aware of what was lost along the way. Ms.

Brodie outlined her experiences in an oral history interview.

The decision of *Brown vs. Board of Education* rippled across the south. The brave actions of the nine students who integrated Central High School in Little Rock, Arkansas, is at the forefront of many minds when desegregation is discussed. Not only was it the first act of enforced integration, but it was extremely inflammatory. The anger and violence aimed at those high schoolers remains striking today. Melba Beals, one of the nine students entering Central High School, recalled the first day when her mother accompanied her through the rioting crowd: "the two of us narrowly escaped a rope-carrying lynch mob of men and women shouting that they'd kill us rather than see me go to school with their children."<sup>1</sup> The integration of schools created conflict in local governments as well. In the city of Greensboro, North Carolina, white education board members quietly voted against allowing a few black students to be allowed to attend a white school after the *Brown vs. Board* decision. Not wanting to interrupt their own peace, "most board members wished primarily to control the situation—to keep the lid on—and prevent the kind of disruption that might hurt the city's image and create instability."<sup>2</sup> While instances of violent resistance to integration tended to be the center of attention, small towns like those in eastern North Carolina were experiencing similar issues. However, instead of bold protests and aggressive actions of those with political power, the battle for desegregation in more rural areas was fought with finesse and dedication.

Segregation in rural Martin County in North Carolina was not plastered across signs that said 'colored' and 'white.' According to Ms. Brodie, "I don't ever remember seeing signs saying whites here drink and blacks over here drink . . . It was a kind of 'knowing' type thing."<sup>3</sup> Segregation in

<sup>1</sup> Melba Beals, *Warriors Don't Cry: A Searing Memoir of the Battle to Integrate Little Rock's Central High* by Melba Pattillo Beals (New York, NY, Pocket Books, 1994), 1.

<sup>2</sup> William Chafe, *Civilities and Civil Rights* (Oxford: Oxford University Press, 1980), 45.

<sup>3</sup> Rosa Brodie, Interview with Savannah Flanagan, Personal Interview (Rocky Mount, October 17, 2020), Part 1, Minute 10.





Protest of the integration of schools in Little Rock, Arkansas, in 1959. Wikimedia Commons.

small towns did not need to be reinforced with signs—people just knew. Ms. Brodie grew up in Martin County, her father a sharecropper and her mother a schoolteacher. She experienced segregation first-hand as a child. Ms. Brodie described the polarization of the races thus: "Everyone at that time knew their position, knew their place, and you just dealt with your area." Whites and blacks got along "as long as you didn't step over on to their area."<sup>4</sup>

The convention of segregation being taught by the community is not unique to Martin County. In another North Carolina county, Sampson, a man named Charlie Holcombe remembered his grandfather making a striking analogy with a catfish he caught. His grandfather said that a black person was like a catfish because, "as long as he is in his mudhole he is all right, but when he gits out he is in for a passel of trouble. You 'member dat, and you won't have no trouble wid folks when you grows up."<sup>5</sup>

<sup>4</sup> Brodie, Part 1, Minute 11.

<sup>5</sup> Leon Litwack, *Trouble in Mind* (New York, NY: Random House, 1998), 4.

<sup>6</sup> Beals, *Warriors Don't Cry*, 6.

<sup>7</sup> Leonard Giles, Interview with Kieran Taylor (July 11, 2003, U0465\_Transcript in the Southern Oral History Program Collection #4007, Southern Historical Collection, Wilson Library, University of North Carolina at Chapel Hill), 5.

Holcombe's grandfather was warning him to stay in his place so he would not get into trouble in the community. Even in other states, these sentiments, meant to ensure safety within the community, could be found. Ms. Brodie's account did not include the violence and hatred that is evident in the memoirs of the time, such as Melba Beals', but they all feature similar evidence of everyday segregation. Beals recalled that "I felt safe only in my sepia-toned world, a cocoon of familiar people and places."<sup>6</sup>

Rural Martin County was deeply segregated; however, it created a strong bond among the African American community. Leonard Giles, a man from a neighboring town, Tarboro, recalled that "it was like a big family. It was like we have to share because it was a struggle. I always look back and think about it, and it was just a struggle, and everybody did and helped each other out the best they could."<sup>7</sup> This strong sense of community was not only



found in the relationships in town, but it was also a pivotal piece of the foundation of black schools.

The reality of the segregated schools does not always match up with what is typically taught about the topic today. There is no denying that school segregation denied African American students the best educational materials and opportunities. Many of these schools received very little funding compared to the white schools in their regions.<sup>8</sup> Strained funding meant used and outdated materials handed down from the white schools. These issues were common in black schools and presented an obstacle for their students. However, the support and dedication that many black communities showed their schools was a major benefit to their students. Rosena Ricks, a local to the Tarboro area, states that "There was a closeness and a caring within the Black community for kids and some of what they have taught the kids now has totally replaced all of that upbringing. I mean teachers were role models and they worked very closely with the parents . . . When I went to college, I knew who I was. I knew I was an African American woman and I was damned proud of my race."<sup>9</sup> Black schools fostered not only education, but also discipline, self-confidence, and identity. Many students from these school recall their teachers, friends, and extracurricular activities with much fondness. These years helped prepare them for careers and gave them a sense of safety from their community.

Ms. Brodie attended schools in Pitt and Edgecombe Counties throughout the forties. She attended the grade school where her mother taught. She graduated from Pattillo High School in 1951. Ms. Brodie recalled her primary school years warmly. Not only was this the time that her biology teacher inspired her to pursue further education in science, but she also recalled the activities available to her through

her school. Pattillo had many different sports programs and classes in the arts, including a glee club in which Ms. Brodie took part during her attendance. Leonard Giles, a 1967 Pattillo graduate, recalled that "we had a rich tradition at our school because we were like family because we had all grown up together for twelve years and went to the same school."<sup>10</sup> This sentiment seems to have been common in rural North Carolina. In Hyde County, black schools were "like the best of families, they functioned as a daily shelter for black children to learn in—one with high expectations, strong role models, and constant reinforcement of their dignity and self-respect."<sup>11</sup> Despite all that had to be overcome to properly educate black schoolchildren, the sense of community and support helped students' form character and learn in the classroom. Because the African American community valued education, students learned that it was vital. Another graduate of Pattillo states that "You know you heard constantly throughout the years education is something they can't take away from you so I wanted something they couldn't take away from me."<sup>12</sup> The value and experience of school was appreciated by the adults in the community as well as by the students.

Extracurricular activities were encouraged and enjoyed by many students. Sports or the arts facilitated friendships and interaction with the community. When asked if she participated in any extracurricular activities, Ms. Brodie smiled: "When I was going to high school, I did, because I was traveling with glee club."<sup>13</sup> She performed with the club for locals and for neighboring communities as well. Discussing this time seemed to bring back good memories. Giles, when asked if he played any sports, replied, "yes. Definitely. We had football, basketball and baseball teams. It was just like a family, like a camaraderie because all of us grew up together."<sup>14</sup> Team sports allowed students to create strong bonds with each other and

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<sup>8</sup> Sequoya Mungo, "Our Own Communities, Our Own Schools: Educational Counter-Narratives of African American Civil Rights Generation Students," *The Journal of Negro Education* 82, no. 2 (2013), 120-121.

<sup>9</sup> Mungo, "Our Own Communities," 118.

<sup>10</sup> Leonard Giles, Interview with Kieran Taylor, 4.

<sup>11</sup> David Cecelski, *Along Freedom Road Hyde County, North Carolina, and the Fate of Black Schools in the South* (Chapel Hill, NC: The University of North Carolina Press, 1994), 35.

<sup>12</sup> Mungo, "Our Own Communities," 116.

<sup>13</sup> Brodie, Interview with Savannah Flanagan, Part 2, Minute 19.

<sup>14</sup> Giles, Interview with Kieran Taylor, 4.



provided role models such as coaches and instructors. An oral history study on graduates from the high school concluded that "Pattillo School provided a variety of social, athletic, and creative opportunities for students. Considering the school participated against other all-Black schools in the county and surrounding areas, the African American schools in the area wanted their students to be well-rounded and recognized the need for their involvement in activities beyond the classroom."<sup>15</sup> By providing these opportunities, schools not only diversified their students' skills, but also got them involved in local and near-by communities.

Educators were an essential part of black schools. They taught, but they also disciplined, inspired, and looked out for their students. They took pride in their work and made sure that their students knew their value in society. In the community, teachers were respected for their influence and dedication. The aforementioned oral history study found that "African American teachers in segregated schools were instrumental in the academic and social lives of African Americans and were highly regarded by their communities."<sup>16</sup> Many teachers made a point to know the parents of their students and discuss their progress. Teachers also evaluated the curriculum and made adjustments to help foster a proper education. The study also stated that "Schools such as Pattillo recognized that the curriculum disadvantaged the history and contributions of African Americans and, therefore, the school made a conscious effort to teach students racial pride."<sup>17</sup> These efforts to educate and support made educators important to their students. Many of the students would go on to pursue careers and were not afraid to assert themselves in society.

The progress of students was the teacher's main concern, and their students remember that fact. Former students from the Pattillo High School still revere their old teachers. Ms. Brodie recalled how her biology teacher, Suzanna Thomas, inspired her to

pursue a career in the sciences: "My high school biology teacher is the one that got me started in the science direction."<sup>18</sup> Many others from Pattillo High School remember having good and caring teachers. They helped their students figure out what to pursue and where to go to college. According to the study, "Rosena, Rudolph, and Quincy said that the Black teachers in the community influenced students' college choices. Most students heard their teachers talk about their alma maters and many chose to attend the same schools based on information they received from their teachers."<sup>19</sup> These educators inspired their students to pursue secondary education, and some, like Ms. Brodie, would become educators as well.

The value of education was fundamental in Pattillo high school. Many of its attendees continued on to college. A graduate from the school, Rudolph, recalled "yeah we had a high percentage of students that went to college . . . but that was a going thing in the sixties starting really in the late fifties up until the end of the sixties that was the expectation, you had to get a college education and different things were happening for that to be provided."<sup>20</sup> The support of teachers, family, and the community helped black students confidently pursue higher education and better jobs. Ms. Brodie, who graduated high school in 1951, recalled a different reality for her and her fellow students. It is evident that her case was not the norm for the entire school in the early fifties. She said that "From the area I grew up in, there were only a few of us who went to college" and that "So very few at that time went off to college."<sup>21</sup> While Ms. Brodie was an outlier because her family and a teacher encouraged her to go to college, this was not the common phenomena that students such as Rudolph experienced. However, it is evident that the influence of teachers at these all African American schools had an impact on the students and their futures.

Now it should be understood that these rural schools in the Edgecombe and Hyde

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<sup>15</sup> Mungo, "Our Own Communities," 115.

<sup>16</sup> Mungo, 112.

<sup>17</sup> Mungo, 116.

<sup>18</sup> Brodie, Interview with Savannah Flanagan, Part 1, Minute 20.

<sup>19</sup> Mungo, "Our Own Communities," 116.

<sup>20</sup> Mungo, 116.

<sup>21</sup> Brodie, Interview with Savannah Flanagan, Part 1, Minute 5.

## THE PEARSALL PLAN

to

- Save
- our
- Schools

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Here, briefly, is the Pearsall Committee plan to preserve North Carolina's public school system. It is the result of a hard, conscientious study conducted since the U. S. Supreme Court decision of May 17, 1954. This pamphlet does not attempt to answer every question. It is designed to give basic information. Full information may be obtained by writing the North Carolina Advisory Committee on Education, Room 357, Revenue Building, Raleigh.

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Front cover of the Pearsall Plan. Full text available through [archive.org](http://archive.org).

Counties do not always reflect every black school in the country. In Sunflower County, Mississippi, the black schools were absolutely destitute in every sense. Ms. Lee, an African American woman who witnessed the state of the black schools in Sunflower County recalled that she "was heartsick at the terrible conditions in most of those schools. But what made her the saddest were the teachers. Lillian said that sometimes the school superintendent would hire, as teachers, cooks from surrounding plantations who could barely read and write themselves."<sup>22</sup> At these schools, students suffered. They already had to work with used and outdated school materials, and they did not have teachers who could expand on the materials or add important lessons to their curriculum. Beyond this, the statistics for Sunflower County's black schools showed how

dire the educational situation was for their students. A survey found that "most of the county schools for blacks ended at the tenth grade, and of the twenty thousand black children in the county between the ages of six and twenty-one, only half were enrolled in school. Almost none of the teachers had a college education, only a third had completed high school, and five had progressed only to the ninth grade."<sup>23</sup> Obviously, the quality of black schools varied across the country. Luckily for the students in Edgecombe County, Pattillo was an exemplary school.

The process of desegregation in the educational systems of eastern North Carolina was slow and timid. For the state as a whole, this process was not welcomed with open arms. The whites who wanted to limit the effects of *Brown vs. Board* instilled the Pearsall Plan. This plan "did not literally prohibit school integration, it simply left the decision of whether or not to desegregate schools to local citizens while giving them a powerful legal tool for defending a decision to resist desegregation."<sup>24</sup> Unless the county had a majority of people who wanted to desegregate, the decision of *Brown vs. Board* came to a standstill. Even the districts that had the votes to move forward with the integration process encountered many deterrents. White schools would have certain requirements for black students who applied for admission. These requirements were not set in stone and could be adjusted as the board saw fit. In the case of high schools around Greensboro, parents became frustrated and did not want to go through the trouble. For many cases, "a school board rejected the request of one parent because her child was a C student, hence not fit to go to a white school; the same board then denied reassignment to an A student because he was doing so well that it would be unfair to move him."<sup>25</sup> For an African American parent, these hurdles were strenuous and for many, all this trouble did not seem worth it.

While there are no accounts of protesting in the streets, the subtle strain and conflict is obvious in the accounts of those who experienced this process firsthand. Ms. Brodie did not reflect on this time as a great success, but as a tiring progression of events that

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<sup>22</sup> Constance Curry, *Silver Rights* (New York, NY: Harcourt, 1995), 33.

<sup>23</sup> Curry, 34.

<sup>24</sup> Cecelski, *Along Freedom Road*, 26.

<sup>25</sup> Chafe, *Civilities and Civil Rights*, 76.

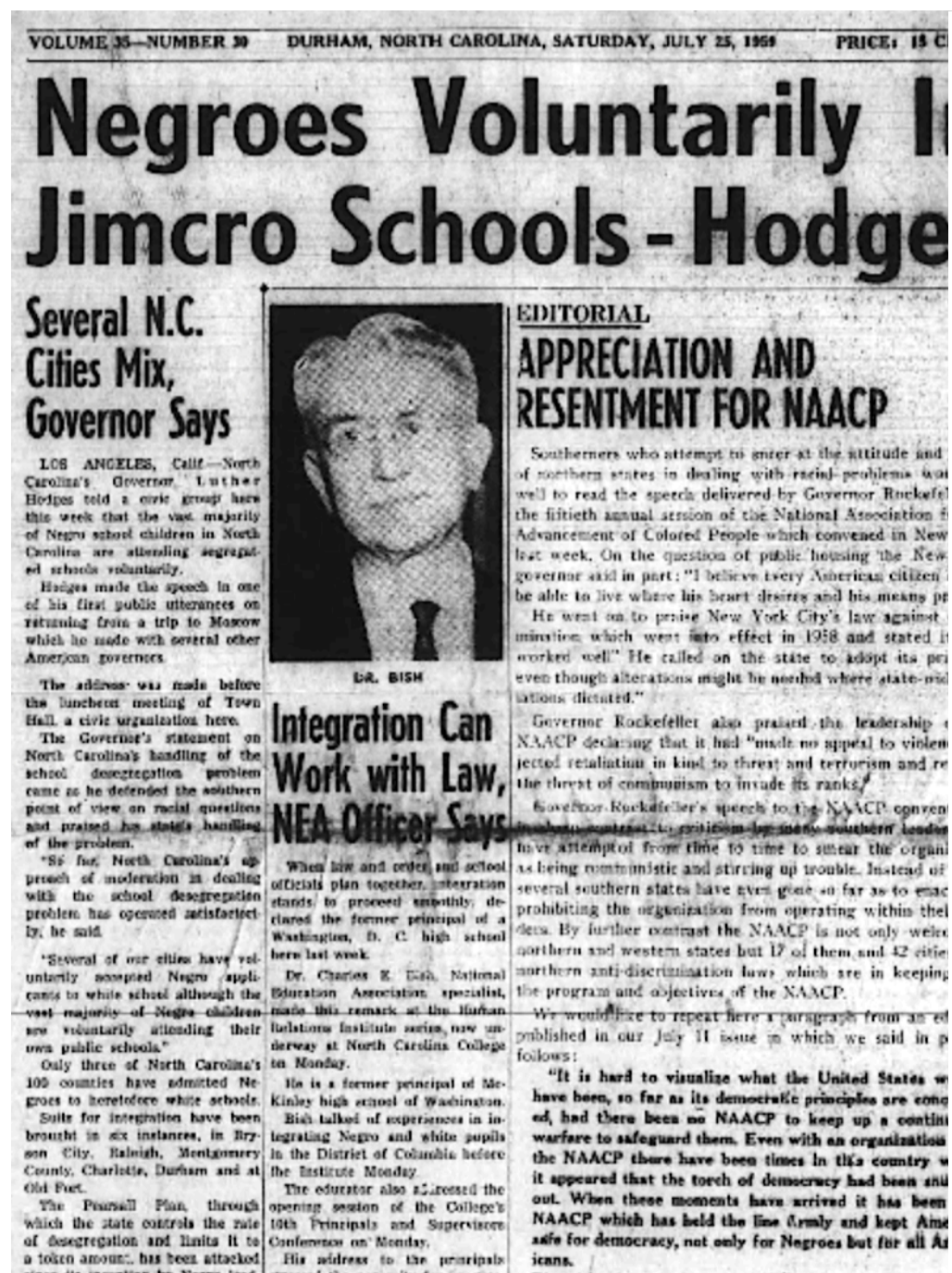


seemed to be more troublesome than a joyous victory. This outlook was not unique to her alone. Desegregation was accepted with apprehension from not only the white community, but the African American communities as well. Many African Americans from these communities were not thrilled with the idea of pursuing desegregation because of the amount of work it would take and all that could be, and eventually was, lost in integration. In many places, black parents were sending their children into school buildings filled with passive-aggressive teachers, angry parents, and hostile students. In extreme cases, like Melba Beals's in Little Rock, students and their families were risking their lives to integrate the high school. She recalled that "we black children maneuvered our way past an angry mob to enter the side door of Central High. But by eleven that morning, hundreds of people outside were running wild, crashing through police barriers to get us out of school. Some of the police sent to control the mob threw down their badges and joined the rampage."<sup>26</sup> Parents feared violence aimed at their families and that their children might lose their connection with the black community. When students from Pattillo were bused to white schools, they did face threats of violence. A student, Cornel Boyd, recalled how "we're getting settled and an announcement across the intercom [says] 'everyone please evacuate the building, there has been a bomb threat' . . . The scary part was thinking about all the racist things that we have heard about going on around the country. Home is racist but we never knew anything to this degree."<sup>27</sup>

The fear of endangering children was felt in other small towns as well. In Norfolk, Virginia, a group of African American parents formed the Parental Involvement Network to stop the busing of students to other schools and to support the desire for neighborhood schools. One of the founders, Nelson White, remarked that "he did not see the value in busing African American students

across town since they often wound up in 'hostile situations'. The burden of desegregation seemed to be placed more on African American students than on whites, and he believed that the 'integrated education' of African American students was not any better than the 'segregated education' he received in Norfolk years before."<sup>28</sup> It was hard for many parents to justify risking their child's education and well-being for the sake of social advancement. The threats of violence were a concern for the African American communities, but the threat to their child's educational and social development as well as their community culture was also at the forefront of their minds.

As stated before, the community was central to African American students in Edgecombe County. Ms. Brodie and other



<sup>26</sup> Beals, *Warriors Don't Cry*, 2.

<sup>27</sup> Cornel Boyd, *A Trojan Called Viking* (Bloomington, IN: iUniverse Inc, 2015), 131.

<sup>28</sup> Mary Doyle, "From Desegregation to Resegregation: Public Schools in Norfolk, Virginia 1954-2002," *The Journal of African American History* 90, no. 1/2 (2005): 75.

students from Pattillo High School expressed how important the community was to not only their educational development, but also their personal development. By following the national format of removing black students from their schools and putting them into white ones, African Americans would be losing the influence and support of their communities. These students would be surrounded by peers who could be malicious in their classes and their teachers were likely indifferent to their character growth. Parents feared the effect segregation would have on their children. At Mattamuskeet High School in Hyde County North Carolina, parent's fear for their children's education mirrored the feelings of the Edgecombe County families. African American parents "had begun to doubt that they would have significant influence over their children's educations or reasonable access to educators at the school. They believed that the school board had not shown respect for their opinions or their tradition of schooling thus far; how could they expect to receive any such respect when the children had to attend Mattamuskeet?"<sup>29</sup> Because these parents had maintained close contact with their children's school and education, sending their children to receive an education that they had little to no influence over made the parents apprehensive. The students were concerned as well. In a questionnaire administered to 212 African American high school students in 1968, "most of the pupils endorsed desegregation as a principle, but, expressed 'affective disquietude concerning local integration.'"<sup>30</sup> The main reasons students were hesitant were "because of 'such concerns as white peer acceptance, fairness of Caucasian teachers and . . . achievement in the integrated milieu.'"<sup>31</sup> With students and parents afraid that they would receive an unequal education, supporters found another front on which the battle had to be fought, local education boards.

Ms. Brodie was an educator and education board member during the process of integration. She was hired by Nash Community College in

1966 and worked at the college level for most of her teaching career. Even after the college started integrating, Ms. Brodie was the only African American faculty member for eight years. Again, she seems to be a pioneer in the Nash and Edgecombe areas in education. During her time there, she watched the school slowly become more and more diverse. She said that integration of Nash Community College "was almost an automatic thing. People were grown, they accepted it because people paid their money and they came to get educated."<sup>32</sup> Meanwhile, Pattillo High School started to dwindle away. Black students were starting to integrate into the local white schools, and eventually there were not enough students to keep the doors of Pattillo open. As Leonard Giles bluntly put it, "they destroyed the black schools, and they sent the black kids to the white school."<sup>33</sup> The process of integration and the education of African American students was quickly becoming a concern. This was the issue for the education boards, which did not have proper ethnic representation. The few African American board members had to figure out how to get the voices of students heard within a white-dominated board.

While most people have to be elected to the education board, Ms. Brodie was appointed by the mayor of Rocky Mount, John Minges, in the late 1960s. There were only a few African American representatives compared to the many whites on the Rocky Mount education board. Ms. Brodie and the other three blacks on the board had a unique opportunity to represent black students for policies concerning desegregation. But they had to work within a structure that was not always receptive to their ideas. When reflecting on her time on the board, Ms. Brodie recalled, "I had got to know how to function in a desegregated group, but I had some experience because I was working in a desegregated atmosphere before going there and found that the same thing prevailed. The black perspective was scrutinized, whereas the white perspective was more or less accepted.

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<sup>29</sup> Cecelski, *Along Freedom Road*, 69.

<sup>30</sup> James Bolner and Arnold Vedlitz, "The Affinity of Negro Pupils for Segregated Schools: Obstacle to Desegregation," *The Journal of Negro Education* 40, no. 4 (1971): 316.

<sup>31</sup> Bolner and Vedlitz, 316.

<sup>32</sup> Brodie, Interview with Savannah Flanagan, Part 1, Minute 25.

<sup>33</sup> Giles, Interview with Kieran Taylor, 2.



So, I just sat and listened and found out what the white perspective was and interjected my ideas into it."<sup>34</sup> Figuring out how to work the white system was the only way African American board members could get their opinions heard without being shot down immediately. Ms. Brodie merely shrugged as she stated that "one voice crying in the wilderness is a lot like John the Baptist. I found that out. That in order to get something through you had to have some backup."<sup>35</sup> These board members had to tow the line to get any support. Often, their goals were simply to have some influence, especially on behalf of black parents.

Education boards around the country were experiencing similar problems. In Mississippi, 1992, a school board member, Eugene Anderson, stated that "the teachers and principals need and must have our input and support for what goes on in school time. I told the school board that the parents don't trust them. The parents believe the school board refuses to listen to them or allow them to play an active role."<sup>36</sup> Even during a time when many considered the integration process to be complete, these issues still prevailed. The quiet battles of the education boards may have mainly happened behind closed doors, but their policies would deeply impact the lives of students, especially black students. It is thanks to people like Ms. Brodie that the desegregation process and the internal support of black students was able to work from the top down.

The process of desegregation in schools took years. The African American community had to fight on many different fronts and use different tactics to carry out the dream behind *Brown vs. Board*. Edgecombe and Nash County schools were integrated thanks to the efforts of the education board members. The first official action taken by the Rocky Mount Board of Education, the Blueprint for Progress, allowed fifteen black students into the local high schools, among other desegregation projects. Before this action, the education board itself was integrated

in 1963 and, "to advance the organization's agenda, Armstrong, Costen, and Dudley agreed to serve as the black representatives to a new biracial task force appointed by the Good Neighbor Committee to draft a comprehensive plan to address the African American community's grievances."<sup>37</sup> Because of this process, African Americans, like as Ms. Brodie, would have the opportunity in the late 1960s to continue to represent their community.

The hard work paid off and African American students were now being educated alongside their white peers. Ms. Brodie reflected on the period after the major integration and stated, "Now was desegregation necessary? I think yes because we wanted everything that you had, you had nice new books, I wanted nice new books."<sup>38</sup> But in her opinion, the effects of desegregation ended up hurting African American students. She sat quietly before carefully saying that "With the concern for the student, desegregation was not a plus because the two cultures were not the same for the learning styles of the children."<sup>39</sup> This sentiment is not unique to Ms. Brodie. Many parents and educators felt the same way. In Hyde County, "almost all blacks expected to lose something during the implementation of school desegregation; merging two races, classes, and traditions into the same schools would have always required many trade-offs and sacrifices by black and white citizens alike. But the more school desegregation resembled a complete subsumption of black students into the Mattamusket School, the more Hyde County blacks feared for their children and communities and reassessed the sacrifices of school desegregation."<sup>40</sup> The aftermath of integration haunted black communities with school closures, educator job losses, and the decline of the quality of education.

As black students were slowly sifted into white schools, their previous schools began to lose students. Eventually, once integration was successful, there were not enough students left

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<sup>34</sup> Brodie, Interview with Savannah Flanagan, Part 1, Minute 28.

<sup>35</sup> Brodie, Part 1 Minute 27.

<sup>36</sup> Curry, *Silver Rights*, 235.

<sup>37</sup> Lisa Hazirjian, "Combating NEED," *Journal of Urban History* 34, no. 4 (2008): 647.

<sup>38</sup> Brodie, Interview with Savannah Flanagan, Part 2, Minute 28.

<sup>39</sup> Brodie, Part 2, Minute 26.

<sup>40</sup> Cecelski, *Along Freedom Road*, 70.



to keep schools such as Pattillo open. Not only did these schools shutting down cost teachers' jobs, but the buildings that were named by the African American communities were repurposed and stripped of their given names. Hyde County high schools had a similar experience to Pattillo High School in Edgecombe County: "When former black high schools did not shut down, they were invariably converted into integrated junior high or elementary schools. White officials would frequently change the names given the school buildings by the black community and would remove plaques or monuments that honored black cultural, political, or educational leaders. They hid from public view trophy cases featuring black sports teams and academic honorees and replaced the names of black sports teams with those used by the white schools."<sup>41</sup> The history of the African American community that was present in their schools slowly faded away. Only those who attended the school, such as Ms. Brodie and Mr. Giles, carry the memories and know the true importance of that institution.

When the black schools started to close, there was not enough job availability at

integrated schools to offset the job losses of black teachers and other staff members. Many black teachers who fought for their students to get into white schools found themselves unemployed. Many had better credentials and greater seniority than the majority of white teachers in the integrated schools. But, for many, it wasn't enough. In Nashville, this was evident: "although deemed successful by the state, teachers' experiences were mixed. Some black teachers were sent to elementary schools, but those sent to high schools were placed as librarians, while others lost their jobs."<sup>42</sup> The value of their education was diminished. These changes greatly affected educators, and they severely impacted black students. Ms. Brodie commented that "When the African Americans got into the desegregated area, they found more white leaders than black leaders and that did not help."<sup>43</sup> This was a common concern among African American educators and parents. The lack of African American teachers in newly desegregated high schools not only affected the teachers, but it took away a valuable part of a black student's education; proper role models.

<sup>41</sup> Cecelski, 9.

<sup>42</sup> Sonya Ramsey, "We Will Be Ready Whenever They Are: African American Teachers' Responses to the Brown Decision and Public School Integration in Nashville, Tennessee, 1954-1966," *The Journal of African American History* 90, no. 1/2 (2005): 40.

<sup>43</sup> Brodie, Interview with Savannah Flanagan, Part 2, Minute 27.



One of the most lamented consequences of the desegregation of schools was the effect it had on black students. While students had access to the same educational materials that white students had always had at their disposal in their schools, their character was not built up the same way that it had been when they attended schools with black leadership. Ms. Brodie looked disheartened as she said that there were "a lot of changes in self-esteem building, role modeling, projection of self was not common thread, but only in those who exerted themselves, but it had to be from within rather than being pulled out of them. And before desegregation, we as black teachers knew the black children, and we pulled it out of them. The white just seem to have ignored it."<sup>44</sup> The self-esteem of African American children was not built up in the white schools. Black teachers knew the challenges these students would face in the world and tried to prepare them for it.

The attitudes of those in Edgecombe County seem to reflect those of Hyde County. In Mattamuskeet High School "the black students 'felt by themselves, like there was no one that they could look up to.' Accustomed to studying under the most honored men and women in their community, the students longed for their former mentors' high expectations and guidance."<sup>45</sup> The lack of community around black students had a lasting effect. While many white teachers tried to help these students adapt, nothing could replace the care and support of their former educators.

The lack of black teachers who served as role models also affected student's education in an inadvertent way. As seen in the accounts of Pattillo graduates, African American teachers were typically extremely dedicated to their student's education. In the integrated schools, the same care for their education was not present. Although this was not always intentional, it was a reality for black students: "Discipline was our thing. That was lax and, because of it, blacks acted up. And when you act up you got sent home. You got sent home,

you get your lessons. You fall behind. So, the bulk of us just acted up."<sup>46</sup> Black students learned that they could get out of work if they acted up, according to Ms. Brodie. This led to students to be kicked out of classrooms and this hurt their education. Teachers also tended to send black students home more often than their white peers. The Association of Child Advocates performed a study in 1998 and, "in a review of suspension rates, suggested that African American students were suspended from 1.5 to 2.4 times more than their proportion in the student population."<sup>47</sup> Without a teacher dedicated to the education of black students to keep control of the class, students acted out and lost valuable access to the education that African American community had fought so hard to gain. The sad of reality of this hard work to integrate schools was that black students "encountered other classroom problems, including hostile attitudes, high rates of suspensions and expulsions, low academic expectations, and little encouragement to prevent them from dropping out."<sup>48</sup> Students had to bear the burdens that resulted from integration. The decision of *Brown vs. Board* had good intentions, but sadly had mixed results across the country.

The analysis of desegregation and the effects is complex. This entire project relies on many sources, but the main type of source used were oral histories. Gathering oral histories allows us to not only gather facts, but also understand them in the context of a person's life. A recorded or transcribed oral history can enrich analysis and help create a compelling narrative. The validity of this practice is still in question by some who find it too emotional or subjective, but they are missing the major purpose of oral history. While a seemingly unconventional process, "oral history does not simplify the historical narrative but makes it more complex-and more interesting."<sup>49</sup> Facts are an important feature to any historical analysis, but they are void of much meaning without context. How events affected people gives

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<sup>44</sup> Brodie, Part 2 Minute 25.

<sup>45</sup> Cecelski, *Along Freedom Road*, 34.

<sup>46</sup> Brodie, Interview with Savannah Flanagan, Part 2, Minute 27.

<sup>47</sup> Emily Arcia, "Variability in Schools' Suspension Rates of Black Students," *The Journal of Negro Education* 76, no. 4 (2007): 597.

<sup>48</sup> Cecelski, *Along Freedom Road*, 170.

<sup>49</sup> Donald Ritchie, *Doing Oral History* (Oxford: Oxford Univ. Press, 2015), xiv.

meaning to history. Of course, many historians worry about their interview subjects feeling nostalgic and making certain facts seem more important than they actually were. However, this can be avoided by cross-examining the information given in the interview with information from other interviews or primary sources. Ms. Brodie's interview provides historical facts that can be verified using other sources as well as a look at how these facts affected her life. Because of this, the topics explored in this paper were centered around Ms. Brodie's oral history. Through this interview, we can see the many issues brought about by desegregation that are not always discussed when it comes to this practice on a national level.

The use of oral histories has provided historians with a tool to explore the experiences of people who have not been represented in the majority of accepted sources. Typically, the stories of the Civil Rights Movement are told about men, by men. However, black women were just as involved in the movement as men were; and some could argue when it comes to educational desegregation, women outnumbered the men involved. It can also be said that black women were quick to take action and made a huge impact. In many cases, "women took civil rights workers into their homes, of course, giving them a place to eat and sleep, but women also canvassed more than men, showed up more often at mass meetings and demonstrations, and more frequently attempted to register to vote."<sup>50</sup> But even though women were greatly involved in the movement, they were significantly underrepresented in its leadership. Even the few women who gained leadership positions experienced sexism from their male colleagues. Septima Clark, a schoolteacher who was appointed to the executive staff of the SCLC, recalled the how the male staff members tended to treat her. She recalled that "they like to send me into many places, because I could always make a path in to get people to listen to what I have to say. But those men didn't have any faith in women, none whatsoever."<sup>51</sup> Even

though female activists worked just as hard and risked just as much as male activists, they did not win the same recognition and respect. It is important to understand that women were deeply involved in this movement; men were not the only ones leading the charge. Ms. Brodie is still well-respected in her community for being a passionate educator and community organizer. By analyzing the stories of women who were involved in different aspects of the Civil Rights Movement, like Ms. Brodie's, we can begin to see a fuller picture of the movement.

This analysis of educational desegregation fits into a couple of historiographical tactics regarding Civil Rights. The first one is the idea that analyzing the grassroots of a movement can show us how a certain part of the population that was not plastered across the national news stations experienced this movement. While this is a relatively new way for historians to analyze the Civil Rights Movement, it is starting to become more popular. In "an early and influential study of the movement's origins by sociologist Aldon D. Morris emphasized the importance of local organizing. A few have attempted comprehensive accounts of the movement in individual towns or states while others have emphasized only one event or aspect of the movement within a community."<sup>52</sup> This analysis follows the second suggestion; it looks at one aspect of the movement, educational desegregation, within the Martin and Edgecombe communities. Another method used in this analysis is specifically looking at this topic through the experience of a woman. Again, this is a newer tactic in the field of history. The "Civil rights literature on women also experienced a major increase after 1980. Much of the new work was biographical."<sup>53</sup> By examining the specific experiences of a woman such as Ms. Brodie, the narrative of Civil Rights gains a point of view that is typically forgotten. The methods of this analysis focused on the views that are usually underrepresented in many histories. As one can see in this paper, looking through the eyes of rural or small-town people and women can reveal a reality that

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<sup>50</sup> Vicki Crawford, *Women in the Civil Rights Movement Trailblazers and Torchbearers, 1941-1965* (Brooklyn, NY: Carlson Publishing, 1990), 2.

<sup>51</sup> Crawford, *Women in the Civil Rights Movement*, 195.

<sup>52</sup> Charles Eagles, "Toward New Histories of the Civil Rights Era," *The Journal of Southern History* 66, no. 4 (November 2000): 828.

<sup>53</sup> Eagles, 831.



does not always agree with the standard textbook.

Through the life of Ms. Rosa Brodie, we have been able to get a glimpse of the difficulty rural areas had during the process of educational desegregation. The importance of the African American community for black students is evident in the education system. But while these communities typically fought hard for their children to have an equal education, the efforts resulted in many unintentional setbacks. While few would argue that integration was not necessary, the cultural support and community ties that were very important to the education of black students were lost in the process. The support of a community that had their best interest at heart was removed from their schooling, and, as is apparent in the accounts of many African Americans, is deeply grieved. ❖

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**TIP OF THE SPEAR: WOMEN IN THE FIFTY-FOUR PERCENT****ABSTRACT**

In this paper I sought to learn about the different issues that women in the military face in regard to sexual trauma. I chose this topic because I felt like it was something that was not taken seriously or spoken enough about; I wrote this essay to highlight the vast inconsistencies in the data and instances in which women have come forward only to be punished or silenced due to the stigma that comes with sexual assault of women in the armed forces. Different reports and statistical data are used to highlight the cold indifference towards the women who have come forward.

*Keywords:* military sexual trauma, veterans, active duty, mental health

**DEFINING SEXUAL ASSAULT AND RAPE**

Women in the military already face life-threatening and traumatic experiences, but people rarely consider the situations military women encounter in their own barracks. Women are regularly sexually assaulted in civilian life and, sadly, being in the military is no different. While they are risking their lives fighting for everyone's freedom, their own freedom is being taken away by someone who feels entitled to their body without their consent.

According to Helgeson's *Psychology of Gender*, rape is a complicated concept to define because there are different distinctions based on different sexual acts (Helgeson, 2017, p. 547). The most conservative definition of rape is "penile-vagina penetration" (Helgeson, 2017, p. 547). In North Carolina, rape is defined as:

Engaging in vaginal intercourse with another person by force and against the will of the other person, and:

- Uses, threatens to use or displays a dangerous or deadly weapon or an article which the other person reasonably believes to be a dangerous or deadly weapon; or
- Inflicts serious personal injury upon the victim or another person; or
- Commits the offense aided and abetted by one or more other persons. (RAINN, 2020)

For the purpose of this paper, sexual assault is defined as "unwanted sexual activity, with perpetrators using force, making threats or taking advantage of victims not able to consent" (APA, par. 1). The legal gray area between sexual assault and rape is that all rape is sexual assault, though not all sexual assaults are rape. If someone forces someone to perform oral sex on them, for example, that would be considered sexual assault but not rape because there was no vaginal intercourse; likewise, if a homosexual man forces another homosexual man to have sex, it would also be considered sexual assault but not rape.

I searched for many journal articles that could help explain the effects of sexual assault and rape and found a graphic, but highly informative description by Barglow (2014) who recounts some of his patients' experiences with rape and comments on whether or not they made a full recovery. One of his anecdotes is that of a young woman who was raped at the age of twenty-five on Thanksgiving Day. She describes the "odd numbness" experienced post-rape and recalls feeling an out-of-body experience—as if she had witnessed the event as a third person (Barglow, 2014, pp. 121-122). According to Barglow, numbing is a natural response to complex trauma which can make it difficult for the patient to trust and speak to a psychologist (2014, pp. 137-138). He follows up by stating that a psychologist "may need simply to help the patient hold together and prevent further regression" (Barglow, 2014, p. 138).

**WHAT EXACTLY IS MILITARY SEXUAL TRAUMA?**

In my research, I found two definitions of military sexual trauma/abuse. According to Gross et al. (2019) Military Sexual Trauma (MST) is defined by the Department of Veterans Affairs as "sexual harassment that is threatening in character or physical assault of a sexual nature that occurred while the victim was in the military, regardless of geographic location of the trauma, gender of the victim, or the relationship to the perpetrator" (par. 1). Meanwhile, Blais et al. (2018) state that MST is defined as "psychological trauma which . . . resulted from a physical assault of a sexual nature, battery of a sexual nature, or sexual harassment that occurred while the veteran was serving on active duty or active



duty for training" (p. 470). Blais et al. explain that, while active-duty personnel experience instances of MST, they tend to not make the claims until the end of their enlistment. Blais et al. theorize that what stops these active-duty members from coming forward are possible negative outcomes, such as being perceived as weak, or a simple desire to move on from the incident (Blais et al., 2018, p. 471). The issue with these undisclosed events is they tend to lead to denial and can be linked to "increased rates of revictimization" (Blais et al., 2018, p. 471). When the victims ignore the traumatic event and attempt to move on, they do not realize that such repression prevents them from overcoming the incident. According to Gross et al., "there is evidence indicating that sexual trauma experienced in the military may be more detrimental than civilian sexual trauma" (p. 67).

### *MST in Regard to Veterans*

Both men and women experience MST, but it is more common among women. According to Gross et al., "25.0% of female veterans who used services at the VA in 2014 screened positive for MST compared with 1.3% of male veterans" (p. 67). I am not attempting to downplay the severity of sexual trauma in the military regarding men; however, for the sake of this research, I am putting the focus on women. A survey conducted by Blais et al. with 359 participants who fit the screening needs of the experiment (females who self-identified as veterans of the U.S. military, who had prior screening history of MST, and who had been discharged from the military) assessed age, race, education, income level, and military characteristics; then they used a VA screening questionnaire to determine MST (p. 471). Participants then specified whether their assailant was a member of their unit. The participants who had not previously disclosed their MST were asked to provide barriers to their disclosure in an open-ended box (Blais et al., 2018, p. 471). Out of 359 participants, 289 (80.5%) reported experiencing some form of MST and out of the 289, 128 "reported at least one

incident of MST that involved physical contact" (Blais et al., 2018, p. 471).

### *MST/MSA in regard to Active Duty*

According to Blais et al., women serving in the Marines or Army were more likely to report MST than those in the Air Force (p. 471). This is important because, according to Rabelo et al. (2019), the Military Sexual Assault rates differ from branch to branch. Rabelo et al. use the term Military Sexual Assault (MSA) because it refers to any sexual assault acts committed against active-duty personnel (p. 78). The U.S. Marine Corps and the U.S. Navy have reportedly higher rates of military sexual assault than the U.S. Air Force (Rabelo et al., 2019, p. 79). A report by the Department of Defense found that,

among the women who had experienced MSA but had not reported, "half believed that no action would be taken, and over 40% had heard about other victims' experiences of inaction or retaliation" (Rabelo et al., 2019, p. 79). These women were so used to their reports falling on deaf ears that they



Photo by Kat Jayne

preferred to keeping silent rather than risking the pain that was sure to come. Rabelo et al. cite the history of an active-duty woman in the Air Force who came forward about a gang-rape committed by three of her co-workers which resulted her being charged with "dereliction of duty (due to underage drinking) and indecent behavior" (p. 79).

The Service Women's Action Network (SWAN) surveyed veteran women and divide data on participants into four major categories: highest level of education achieved (ED), race/ethnicity (R/E), service branch (BR), and service era (ER). Veteran women's mental health issues were shown to be negatively influenced by either their highest level of education, race/ethnicity, military branch, or their service era (Thomas et al., 2018, p. 106). This study puts into perspective why these women might have felt unsafe in their branch or might have felt that

their lack of education or that their race would lead to people not believing them.

### *Why Don't They Just Speak up?*

In the survey conducted by Blais et al., almost 25% of the female veterans indicated that they had not disclose their MST status when they were initially screened. One can infer that the rates of military sexual trauma, as estimated by the VA, could be inaccurate and are likely to be higher (p. 471). Out of the 35 women who did not disclose their MST during their screening, only 28 (80%) provided responses (Blais et al., 2018, p. 471). Out of those 28 women, 18 "reported stigma [. . .] was a barrier to disclosure. Seven [. . .] reported discomfort with the provider or the institution in which the screening occurred, seven [. . .] reported experiential avoidance, two [. . .] reported too long a duration between their MST and the screen, two [. . .] reported they did not consider the event assault at the time, and five [. . .] responded in the "other" category (Blais et al., 2018, p. 472).

As shown in the data above, women fail to speak up due to many reasons. Sometimes, victims come forward and are met with doubt and blame or are told to drop their complaints (Rabelo et al., 2019, p. 79). The inability to achieve closure or feel safe in their workplace can lead to many mental health issues down the line.

### *Issues Arising from MST*

Not being able to deal with such a traumatic incident can lead to many mental health issues such as denial, depression or even post-traumatic stress disorder. Gross et al. (2019) "found that participants who experienced deployment-related MSA had approximately six times the odds of developing PTSD compared with those who had not experienced deployment-related MSA" (p. 69).

Prior studies suggest that "MSA prevalence is high, especially among female veterans deployed in support of Operation Enduring Freedom (OEF) and Operation Iraqi Freedom" (Kearns et al., 2016, p. 419). For their survey, Kearns et al. used the Deployment Risk and Resilience Inventory (DRRI-2) to assess MSA in study participants. Their study found that combat exposure led more closely to PTSD, while MSA had a significant association with Major Depressive Disorder (MDD) (Kearns et al., 2016, p. 426).

Suicide is "the second leading cause of death for U.S. veterans," both male and female (Sexton et al., 2018, p. 357). According to Sexton et al., "PTSD secondary to personal trauma [. . .] has been most consistently and robustly linked to the development of suicidal behavior" (p. 358). They note that a past survey indicated that 22.5% of sexual and gender minorities reported a history of suicide attempts (HSA) (Sexton et al., 2018, p. 358). There were a nearly twice as many (53.6%) suicide attempts in SGMs compared to 28.1% non-SMG treatment-seeking veterans (Sexton et al., 2018, p. 359). Moreover, SGMs are more likely to experience MSA/MST due to their "actual or perceived sexual orientation or gender status" (Sexton et al., p. 358). That could explain why people in sexual and gender minorities are about twice as likely to attempt to commit suicide due to military sexual trauma.

## **CONCLUSION**

### *Issues with the Information I Found*

A major issue I found with these articles was the inconsistency of the data that was gathered. Many of these articles seem to have big gaps in just how many women in the military experience or have experienced MST. This could be due to women not reporting, reporting too late, their reports not being taken seriously, or their reports not being filed. According to Schuyler et al. (2017), veteran women have experienced MST in ranges between 3%-54% (p. 223). It seems absurd that there can be a range of over 50%. Schuyler et al. also point out that these inconsistencies can be attributed to "the methods of assessment and sampling strategies" or even "the characteristics of the sample population" (p. 223). Schuyler et al. fail to recognize that people do come forward, but are usually dismissed or held accountable for someone else's actions. What was really surprising to me was that, according to Blais et al (2018), 27% of female veterans reported experiencing MST (p. 470) while, according to Gross et al., 25% of female veterans experienced MST (p. 67). Even though Gross et al.'s article was published in March 2019, it used data from 2014; Blais et al.'s study, in contrast, was published in July 2018 and used data from 2016. Why would the newer article use outdated information?

An issue I had with the study by Kearns et al. is that it focused solely on women in the Marines and Army during Operation Iraqi Freedom/Operation Enduring Freedom. Due to its limitation to one specific group of female veterans, it is hard to be able to apply their



results to veterans who did not serve in these operations. While they had a good survey design (DRRI-2), I have yet to see another group use it to find out more about active-duty or veteran women and their MSA/MST experiences.

Another major issue is the fact that so many of these articles were either sponsored, funded by, or written by researchers with ties to the VA or other military-related organizations that clearly would not want to publicize certain information. According to Street et al. (2019) who provide information on veterans' satisfaction with MST-related patient-provider communications with the VA, an "unexpected" result was that there was a substantial amount of veterans who had experienced MST and had initiated conversations with their providers (p. 9). It is clear that their purpose was not focused on how to help those MST survivors, but how to raise the VA's provider satisfaction. Gross et al. were supported by the Veteran Affairs Office of Research and Development and stated that "the views expressed in this article are those of the authors and do not necessarily reflect the position or policy of the VA or the U.S. Government" (p. 67). They wrote a six-page article to downplay its results due to the VA or U.S. Government having a major part in sponsorship. Kearns et al. were supported by the Department of Defense and it also states that their results are solely that of the authors. These articles sway in the same direction: The U.S. Government and the VA are doing a great job at helping the people experiencing MSA/MST.

If the military cared about its women as much as they claim, its institutions would be the first to take female veterans' experiences seriously. They would not punish the women or try to sweep MSA/MST under the rug. They would create a space in which their members are not afraid to come forward. Military Sexual Assault/Military Sexual Trauma is a serious topic regardless of sex, but I cannot help but wonder what it would be like if the U.S. government took action in protecting the women in the military who risk their lives on a daily basis. The inability of the military to protect the women serving it has created a culture of covering up assaults and silencing those who would otherwise come forward. This is usually done under the pretext that such accusations negatively impacting unit cohesion. What would it be like if the assailants had to deal with the consequences of their actions? Imagine the drop in that 54%. ❖

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# GRACE DEMONTESQUIOU

## SAFEGUARDING CIVIL LIBERTIES: THE FOURTH THROUGH SIXTH AMENDMENTS

### INTRODUCTION

In the criminal justice systems of the United States, the fourth through sixth amendments of the Bill of Rights of the Constitution ensure that people's civil liberties are not infringed upon. The amendments outline the correct procedure to which criminal justice professionals must adhere. The Fourth Amendment, outlining the meaning of unreasonable searches and seizures, along with the requirement for a warrant, focuses on how officers must correctly receive evidence. The Fifth Amendment deals with the process an accused person has to undergo, and it mentions the Grand Jury, double jeopardy, self-incrimination, and due process. The Sixth Amendment focuses on the rights of the accused during the trial—such as the rights to a speedy and public trial, an impartial jury, confronting witnesses, right to counsel—and it contains the Compulsory Clause. Criminal justice professionals must understand the rights of accused persons laid out in the Fourth through Sixth Amendments. The following sections will emphasize one section of each of those amendments.

### SEARCHES AND SEIZURES

Searches and Seizures are illustrated in the Fourth Amendment. It is important to understand what search and seizure are, particularly unreasonable searches and seizures. A search and seizure is "the phrase that describes law enforcement's gathering of evidence of a crime" ("Search and Seizure"). Another definition is "the methods used to detect and punish crime that includes searching and taking property and data that can be used by the prosecution of the criminal" ("What Is Search and Seizure"). Searches include searching through someone's person, house, car, property, and effects for evidence of a crime. Seizures happen when an authority seizes or takes into authority a person, house, car, property, or effects. A search and seizure becomes unreasonable when it is done unlawfully. Thus, unreasonable search and seizure is "a search and seizure by a law enforcement officer without a search warrant and without probable cause to believe that evidence of a crime is present" ("Unreasonable

Search and Seizure"). Searches and seizures require a search warrant or probable cause. When officers do not use a warrant or probable cause to enact a search and seizure, the officer is acting unlawfully and commits an unreasonable search and seizure.

*Riley v. California* pertains to the definition of search and seizure because the court had to interpret the search and seizure component of the Fourth Amendment. In *Riley v. California*, the Supreme Court defined the procedures for the search of information on a cellphone. *Riley v. California* is an example of an unreasonable search and seizure. Previous cases have established that when a person is arrested, a search incident occurs during which the police are allowed to search the person being arrested, along with the person's immediate surroundings. The sole purpose of this is to make sure the officer is not in danger (because the arrestee might have a weapon on them) and to prevent evidence from being destroyed. In *Riley v. California*, a case that went all the way to the Supreme Court, the defendant Riley had his phone seized and searched when he was arrested. When the Court looked at the case, it ruled that officers generally cannot search digital information on a phone that has been seized from someone who was arrested without a warrant ("Riley v. California"). Even though an officer needs probable cause or a warrant for searches and seizures, an exception occurs when a person has been arrested, so that they can be searched for weapons or evidence that might be destroyed without a warrant or probable cause. Officers assumed this meant they can search a person's phone, but the Court ruled that the officer cannot search through digital information without a warrant. ("Riley v. California").

Unreasonable searches and seizures are not allowed according to the Fourth Amendment of the Constitution. The Fourth Amendment states that

The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no warrants shall issue, but upon probable cause, supported by oath or affirmation, and



particularly describing the place to be searched, and the persons or things to be seized. ("Fourth Amendment")

The Fourth Amendment states that people have the right to be free from unreasonable searches and seizures, and that includes their person and effects. A warrant must stem from probable cause and the warrant must specify the things that are to be searched and seized. This is important so that people can be secure from arbitrary searches. There are exceptions to being searched and seized without a warrant, but the Supreme Court ruled that cell phone searches do not qualify as an exception. The issue of searches and seizures is important in conjunction with the Fourth Amendment because it deals with the rights that unaccused people have before being charged so that the government does not have absolute power to search and seize who- and whatever they want.

### DOUBLE JEOPARDY

"Twice put in jeopardy" is a phrase is used in the Fifth Amendment. The modern term used is double jeopardy. The issue of double jeopardy in criminal procedure comes up in many court cases in order to interpret the rights of the accused. Double jeopardy is defined as "the subjection of an individual to a second trial or punishment for the same offense or crime for which he has already been tried or punished" ("Double Jeopardy"). Though this may seem like a straightforward right, many cases have set precedents that show that double jeopardy is not guaranteed in every case. In some circumstances, a person can be tried twice for the same crime. One example is that an accused person can be tried by a state for violating a criminal statute of that state, and then tried by federal courts for committing the same crime if it also a federal crime. Some state and federal crimes overlap, so this situation can happen. There are other instances in which there are exceptions to the right to be exempt from double jeopardy. In the case of *Blueford v. Arkansas*, the court interpreted the double jeopardy section of the Fifth Amendment to create less strict limitations on the prohibition of double jeopardy.

In *Blueford v. Arkansas*, the Supreme Court ruled that the

defendant could be retried because the jury decided on some charges but could not decide on one particular charge. The defendant, Matthew Blueford, was charged with capital murder or first-degree murder and manslaughter. After the prosecutor and defense made their cases, the jury was supposed to determine if the defendant was guilty. The jury decided the defendant was not guilty of the charge of capital murder or first-degree murder, but the it could not agree on the charge of manslaughter, so it was deadlocked. The jury still had to decide on negligent homicide. The judge ruled a mistrial, and the charges were to be retried. When the case came to the Supreme Court, the Court ruled that this situation did not qualify as double jeopardy. In this case, the court ruled on the constitutionality of a double-jeopardy situation and found that the double-jeopardy rule does not apply if a jury cannot come to a decision on a charge. This case demonstrates how the Supreme Court views double jeopardy.

Double jeopardy is important because it is part of the Fifth Amendment of the Constitution. The Fifth Amendment does not allow people to be tried twice for the same crime. The text of the Fifth Amendment states, "nor shall any person be subject for the same offense to be twice put in jeopardy of life or limb" ("Amendment Five"). The Fifth Amendment is important since it deals with the civil liberties that the accused have before and during a trial.

### RIGHT TO CONFRONT WITNESSES

The right to confront witnesses is guaranteed by the Sixth Amendment. The right to confront



witnesses is the last area of law to be discussed in this project. This is a lesser-known area of law to the general public, so it is vital to be informed about what this means. In their right to confront witnesses, "a person accused of a crime has the right to confront a witness against him or her in a criminal action. This includes the right to be present at the trial (which is guaranteed by the Federal Rules of Criminal Procedure Rule 43) as well as the right to cross-examine the prosecution's witnesses" ("Right to Confront Witnesses").

A recent landmark case that sets precedent for all U.S. courts on the right to confront witnesses is the Supreme Court decision *Michigan v. Bryant*. The Supreme Court decided in this case that the right to confront witnesses, or the confrontation clause, had not been violated. The defendant in the case, Bryant, was convicted of second-degree murder. Bryant appealed, and the Supreme Court ruled the victim's statements hearsay. The Supreme Court held that the "circumstances of the interaction between [the victim] and the police objectively indicate that the primary purpose of the interrogation was to enable police assistance to meet an ongoing emergency" ("Supreme Court"). Because of this, the victim's statements regarding the shooter's identity and location of the crime were not testimonial statements, and, therefore, the defendant's right to confront witnesses had not been violated ("Supreme Court"). The Supreme Court overturned the decision of the State Supreme Court that Bryant's right to confront witnesses had been violated.

The right to confront witnesses is spelled out in the Confrontation Clause of the Constitution, which is found in the Sixth Amendment. The clause states that "In all criminal prosecutions, the accused shall enjoy the right to [ . . . ] be confronted with the witnesses against him" ("Confrontation Clause"). This is a short statement, so courts and the Supreme Court have had to interpret it. The confrontation clause is rightfully a part of the Sixth Amendment, which lays out many rights protecting defendants during trial. The Sixth Amendment was written to ensure that people charged with a crime have the right to a fair trial. The framers knew how powerful and brutal law enforcement agencies and departments can become, so they included the rights of accused to a speedy and public trial, an impartial jury, information about the charge, ability to confront witnesses, compulsory process for obtaining

witnesses, and the right to counsel in the Sixth Amendment. The confrontation of witnesses regulates the right to a fair trial by ensuring there is impartiality.

## CONCLUSION

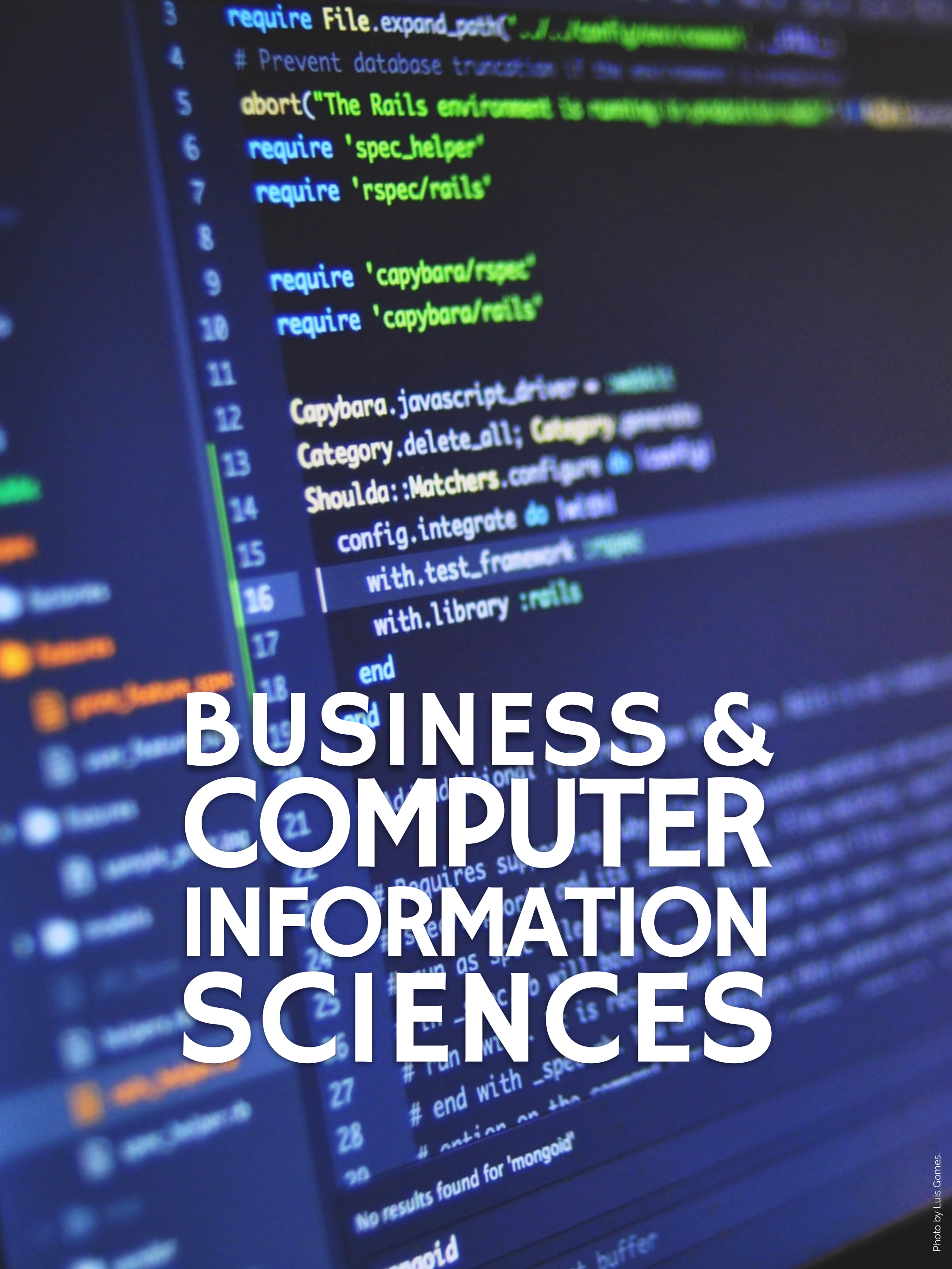
In summary, all criminal justice personnel must be educated on the rights of people that are permitted in the Fourth, Fifth, and Sixth Amendments. These rights are stated in the text, but the courts still must interpret how those rights apply to people today. The Supreme Court cases outlined in this research paper are examples of how justices in modern times have decided how these important rights are to be interpreted in their implementation. The amendments delineate the procedure of the constitutional way to move an accused through the criminal justice system. ❖

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# BUSINESS & COMPUTER INFORMATION SCIENCES



**CONNOR HAYES**

## **THE FACEBOOK DATA PRIVACY SCANDAL OF 2018: CONSEQUENTIALIST VIEWS ON THE IMPORTANCE OF PRIVACY AND MORAL STANDARDS**

The Facebook privacy scandal of 2018 was the culmination of Facebook's infringement on user information. This issue ignited when the political consulting and strategic communication firm, Cambridge Analytica, harvested personal information from 87 million people in connection with the social media platform in order to "build profiles of individual voters and their political preferences to best target advertising and sway voter sentiment."<sup>1</sup> Digging out the roots of this appalling scandal, this paper examines Facebook's privacy violations and argues for the importance of moral standards which should guide social media platforms; through this connection, it offers a consequentialist perspective on why current practices violate both.

Daniel Solove, professor at George Washington University Law School, states that privacy encompasses the "control over personal information, freedom from surveillance [. . .] and protection from searches."<sup>2</sup> In other words, this implicit right, though excluded under probable cause and legitimate circumstances, allows people to decide what information about their lives is given to the public sector. Also, it liberates everyone from the prying eyes and unwarranted searches of other individuals and organizations.

A deeper concern for this concept is depicted by William Shaw and Vincent Barry in *Moral Issues in Business*:

Both in the workplace and in general, our concern for privacy seems to have at least three dimensions to it. *First*, we want to control intimate or personal information about ourselves and not permit it to be freely available to everyone [. . .] *Second*, we wish to keep certain thoughts, feelings, and behaviors free from scrutiny, monitoring, or observation of strangers. We don't want our private selves to be on public display. *Third*, we value being able to make certain personal decisions autonomously.<sup>3</sup>

Privacy's influence can be implied directly from these dimensions. Having control over personal information is necessary; not everyone should be in the position to know all the ins and outs of others. In this sense, privacy can promote safety and eliminate bias, but without it, unlimited numbers of people can acquire and disclose

information, regardless of intent. This could potentially ruin lives and promote an unsafe and unfair environment in the workplace and beyond.

Furthermore, people wish to prevent having all aspects of their private lives on public display. A right to stay away from public scrutiny creates a fair system that supports an autonomous environment where people can be independent decision makers, free from illegitimate influences in all aspects of life.



Photo by Tracy Le Blanc.

<sup>1</sup> Hilary Tuttle, "Facebook Scandal Raises Data Privacy Concerns," *Risk Management* 65, no. 5 (May 2018): 6.

<sup>2</sup> Daniel J. Solove, "Privacy: A Concept in Disarray," in *Understanding Privacy*, vol. 173 (Cambridge, MA: Harvard University Press, 2008), 1.

<sup>3</sup> William Shaw and Vincent Barry, "The Workplace (2): Today's Challenges," in *Moral Issues in Business* (Boston: Cengage Learning, 2016), 437.



The debate over this right, however, has been fueled by disagreement over how far people or companies can go before they illegitimately violate someone's privacy. In regards to social media platforms, such as Facebook, it is important that any form of data harvesting is done with the informed consent of all users involved. This concept can be broken down into two parts: deliberation and free choice. Deliberation deals with giving out information that is readily understood by the users, and free choice is the voluntary and willing agreement to use privacy-invading procedures. With this in mind, any violation of deliberation and free choice would violate informed consent and create illegitimacy in using personal information.<sup>4</sup>

Another concept to consider are the moral standards of personality tests that online platforms can use to gain information. This is crucial because the consequences of these tests can strongly affect the well-being of humans who take the test. The concealment of facts, in particular, is an underlying issue; online platforms can potentially suppress the use and intent of the information gathered. According to William and Barry, these tests exist to "simplify the complexities of business life by reducing the amount of decision-making involved in determining whether an individual has the personal characteristics appropriate for [certain decisions]."<sup>5</sup> However, if the people taking such a test are not fully knowledgeable of how their information is being passed on and who is affected, informed consent cannot be fulfilled. Therefore, it is in the best interest of online platforms and their users to be on the same page and exchange information in a way that promotes positive results and a complete understanding in accordance to the consequentialist perspective.

When looking at the source of the Facebook privacy scandal through this theoretical lens, many red flags pop up in relation to upholding of privacy and moral standards. In particular, the two concepts were violated in the passing of information gathered

from the online personality tests that were offered to users on their platform in 2014:

[A]pproximately 270,000 people used a Facebook app to take a personality test for academic research purposes. Because of Facebook's terms of service and its application programming interface (API) at the time, however, the app's developer, Aleksandr Kogan, was also allowed to collect information about users' Facebook friends (a function it shut down in 2015).<sup>6</sup>

Even though Facebook made sure to ask users to grant permissions to apps, and the terms and conditions mentioned that the users' friends could authorize access to their data, Facebook failed to regulate what Kogan did with the information afterwards.

As mentioned before, Kogan collected information from over 80 million users and gave it to an additional party, Cambridge Analytica, for political research purposes. Not only did Facebook not know of this action, but the quiz-takers and their friends had "no way of knowing that their data was being harvested"<sup>7</sup> in this way. This issue was brought to light on March 17, 2018 by *The Guardian*, a well-known British daily newspaper. As a result, Facebook and Cambridge Analytica threatened to sue for the publication of the story and defamation. Nevertheless, the Federal Trade Commission, established to protect consumers from deceptive advertising, opened the case three days later, leading to public awareness of both parties' egregious actions.<sup>8</sup>

Clearly, the consequences of this scandal were anything but positive. As defined in *Moral Issues in Business*, consequentialist theories state that "the moral rightness of an action is determined solely by the results. If the consequences are good, then the act is right; if they are bad, the act is wrong. Consequentialists determine what is right by weighing the ratio of good to bad that an action will produce."<sup>9</sup> Since the result of Facebook and Cambridge Analytica failing to ensure privacy and informed consent to the fullest degree was detrimental to

<sup>4</sup> Shaw and Berry, 440.

<sup>5</sup> Shaw and Berry, 442.

<sup>6</sup> Tuttle, "Facebook," 6.

<sup>7</sup> Tuttle, 8.

<sup>8</sup> James Sanders, "Facebook Data Privacy Scandal: A Cheat Sheet," *TechRepublic* (July 24, 2019).

<sup>9</sup> Shaw and Barry, "Normative," 56.

everyone involved, the act itself can be seen as a wrongdoing. Moreover, utilitarians (important to consequentialism) would support this claim by adding that both companies failed to provide the "greatest balance of good over bad by everyone affected by [their] actions" and thus prevented the maximization of overall happiness in the situation.<sup>10</sup>

These views may be debatable, but they can be supported in light of the negative effects Kogan and Cambridge Analytica had on Facebook users. The users, for one, had their right of privacy taken away the second their information was handed to the political research company. There was no way of knowing that their information was being passed on to this party. Therefore, Facebook and the two other two companies failed to fulfill their duty to allow users to deliberate their options. Additionally, the users never voluntarily or willingly agreed to have their information used for political purposes. Free choice was thus abolished in the process as well.

Correspondingly, consumer outrage entered the scene, making Facebook fall to its knees and face a harsh conviction: "Facebook shares fell 7%, wiping almost \$40 billion off the company's value, and the company posted a series of subsequent losses as the scandal continued unfolding. By the end of March, Facebook had lost more than \$60 billion in market capitalization."<sup>11</sup> These events illustrate that everyone was affected negatively by the breach of users' trust. A wrong action had bad consequences and led to a minimization of happiness. The reduction in Facebook's wealth and reputation was a supporting factor. The users in the scandal were unhappy as well as others who sympathized with them, and did not want to continue supporting the social media platform.

Adding fuel to the fire, Cambridge Analytica faced "burning" consequences of their own, which led to the SCL Group (owner of Cambridge Analytica) dissolving on May 2, 2018. Two weeks later, the FBI and Justice Department investigated Cambridge Analytica in regards to the data harvesting and potential financial crimes during the scandal.<sup>12</sup> They, too, received no easy way out; their breach of privacy law and their immoral crimes needed to

be put to justice for the sake of those who had their sense of autonomy and trust destroyed.

Even though there could be many other logical theories as to what determines right from wrong, the consequentialist and utilitarian views are supported by the example of this scandal. Prior to the platform's wrongdoing, users were apparently happy with Facebook's services until their information was used in a way that extended beyond the boundaries of the terms and conditions of the personality tests in which they participated. Unfortunately, this breach of trust caused a minimization of happiness and had a negative impact on the majority of those involved. Terrible consequences followed.

Privacy and moral standards were at the forefront of this scandal, showing the importance of people's right to control how their information is used in a deliberate and voluntary fashion as well as the necessity to consider how certain actions can have a critical impact on others' well-being. Without a knowledge of these important aspects and the perspective of consequentialism, companies like Facebook and Cambridge Analytica will fail to learn from their mistakes and continue to detrimentally affect consumers in this technological age. ❖

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<sup>10</sup> Shaw and Berry, 60.

<sup>11</sup> Tuttle, "Facebook," 8.

<sup>12</sup> Sanders, "Facebook."



## **THE NEGATIVE EFFECTS OF MINIMUM WAGE POLICY**

People work for various reasons, such as to pass the time or because they love their job, but the main reason why people work, of course, is to make money. People work for money to use it in their day-to-day life and to improve their general living standards. You work and you get money, that is how business works. If an individual is not self-employed, the employer decides the amount of money they are paid. The employer cannot pay the employee below the minimum wage, which is defined as the lowest amount of money employers can legally pay their employees. While minimum wage was implemented for a good reason, it is questionable whether it is actually beneficial for workers. Minimum wage varies across different states depending on the local economy. For example, Washington, D.C. has the highest national minimum wage of 14 dollars per hour.

Students who are mostly inexperienced when it comes to supporting themselves benefit

from the implementation of rules about minimum wages, but these rules do not have the same positive effect on everyone. Based on my research, I suggest that minimum wage law has many disadvantages can be viewed as unethical.

One of the key concepts in business ethics is utilitarianism theory, which many would argue supports the idea of minimum wage. Utilitarianism argues that we should act to bring the greatest balance of good over bad to everyone (Shaw et al., 2016, p. 60). This theory also argues that we should take into consideration the long-term effects of the minimum wage, and that this is where minimum wage does more harm than good. In an article analyzing the potential impact of a raising minimum wage to 15 dollars per hour across the nation, researchers found that even though such raises would actually decrease the unemployment rate, they would make the economic situation worse for many people. Because of the higher minimum wage, employers would likely cut fringe benefits, such as health insurance, and, in the long run, this will affect workers' quality of life and motivation detrimentally (Himmelstein & Venkataramani, 2019, p. 203).

Minimum wage does not maximize happiness and is therefore not the right thing to do, according to utilitarianism. Cordero shows how the government calculates the minimum wage. It considers people's basic needs, but does not take everything else that makes a person's life worth living into account. The study shows that there is a difference between a good life minimum and the minimum wage. The good life minimum takes into account clothes, transportation, savings, and other things that contribute to a good life, while minimum wage mainly depends on the country's current economic situation (Cordero, 2010, p. 210). The article argues that the minimum wage allows you to survive—but not to live a happy or healthy life—and concluded that a sizable portion of people in United States earned less than the good life minimum. The minimum wage allows people to survive while leading a life that is not desirable. Therefore, it is not providing the greatest possible happiness. Most people earning money above minimum wage, if put in



Photo by Sebastian Stam.



the position where they suddenly earn minimum wage, would find it difficult to be happy in such conditions. Low-skilled workers earning the bare minimum often trade their own happiness for basic survival. These circumstances are worse when the employee earning minimum wage supports a family.

If minimum wage was to consider all aspects that make an individual's life's worth living, minimum wage would be higher than it is and an increase in the minimum wage would also force a tradeoff with unemployment and welfare. Research by Moore shows that an increase in minimum wage to ensure a level that satisfies more than just people's basic needs leads to greater unemployment. As a result of increasing wages, a business would have to cut back on the labor force to be able to afford to increase the minimum wage for others. While this benefits the workers who stay employed, the workers who become unemployed go back into poverty. Based on consequentialism theory which bases an action's morality on its consequences, raising the minimum wage would be unethical. If keeping the minimum wage low is unethical because it fails to bring maximum happiness to workers and increasing the minimum wage fails to account for those who would be laid off, then one can conclude that the concept of minimum wage itself is unethical and that the country would be better off without one.

Cordero also shows how minimum wage is immoral when taking into consideration Kant's universal theory. Since minimum wage is below the wage that would support a good life, it would not be universally accepted. For minimum wage to be universally accepted, everyone one would have to accept it anytime and anywhere even if it is applied to them (Shaw et al., 2016, p. 69). To most people living at or above the good-life minimum, the idea of getting paid minimum wage would not be ideal,



and this makes it unethical to some people. Some people believe that minimum wage is ethical because it prevents employers from forcing employees to work for free, but others believe that in countries where the minimum wage is very low, the law is unethical because it permits employers to pay workers too little to survive on and still be in the right in the eyes of the law.

Looking at the long run, the minimum wage negatively affects workers. Because businesses are forced to pay a minimum wage, they are likely to higher fewer employees than they would if it did not exist. According to utilitarianism, which considers everyone's well-being, this is not the most ethical action to take.



Also, implementation of minimum wage, especially if it is high actually increases the overall cost of living. Employers pay more money to workers, so the cost of production increases. Therefore, employers's profits go down and they will increase prices to maximize profit. If the people who earn the minimum wage are buying from these businesses, the minimum wage negatively affects them (Moore et al., 2009, p. 20). Overall, minimum wage policies benefit the overall economy, but people earning the bare minimum are left behind.

Another negative effect of minimum wage is that it allows for discrimination against less skilled workers. According to Friedman's shareholder theory, businesses should do what is required to ensure that the shareholders receive the greatest profit they can. By implementing minimum wage policy, lawmakers are forcing business managers to discriminate against unskilled people, especially minorities. For example, if a manager of a craftsmen shop lives in a state where the minimum wage is 7.25 dollars, then she will make sure to hire people who can produce goods that are worth more than 7.25 dollars every hour. This means that the people who do not have the skill to make products worth more than 7.25 dollars every hour will not be hired. Minimum wage policies were implemented to help low-skill workers, but instead, they make sure the people with the least skills remain unemployed. This is why the unemployment rate is higher among teenagers than adults. Most managers who focus on profit making will not hire a teenager knowing they will have to pay the minimum wage. They will instead hire someone with better skills and pay them the minimum wage. This makes the minimum wage law inefficient.

Minimum wage laws fail to benefit the people they are supposed to help in the sense that they do not allow them to prosper and increase their skills. Generally, workers are supposed to do work that is equivalent to what they are getting paid. If employers are practicing mundane morality or individual morality, then they will not let the minimum wage workers work for more than they are paid. Lee shows that this eventually limits how minimum wage workers learn in their working environment. They are unable to receive the training they need to improve their lives. Ultimately, this keeps them in a position where they continue earning the minimum wage, so their quality of life does not improve (Lee, 2014, pp. 42-43). So, in the long run, while the minimum wage has helped the

workers earn some money, it has also held them captive in a position where they continue to earn less money than they could have if they had more experience.

Minimum wage laws were implemented mainly to help those who are unable to help themselves like homeless people, teenagers without a family or support system, and other people who are unable to support themselves. Most of the people who benefit are those who have a future that is already looking bright. People studying while working benefit from minimum wage because they are acquiring knowledge and skills to land a better job in the future. Minimum wage jobs are stepping stones to better work. For the people who are struggling, minimum wage works less than its supporters believe. It provides them with some opportunities but denies them others. They find themselves stuck in low-earning jobs unable to move up the social ladder (Lee, 2014, p. 43). While the reduction in unemployment rate is good for the economy, it is not as beneficial for the people earning too little to make a living. Supporters of minimum wage laws who fail to take into account its negative effects and only consider its economic benefits are using the worker's earning a minimum wage as a means to an end instead of an end in themselves. According to Kant's theory, this makes their actions even less moral.

In addition, like the article by Lee says, minimum wage laws deny employees a chance to learn in the sense that there is no opportunity for on-the-job training. People earning the minimum wage find that their jobs require little to no skill and therefore these workers have no further training. Because employers have to pay everyone employed no less than the minimum wage, they find that they would be losing profit if they invested time and money training the employees. If minimum wage laws did not exist, employees could allow to start off getting paid an amount that is below the minimum and in turn get on-the-job training, therefore improving their skills (Lee, 2014, p. 43). This would eventually improve their skillset, and they could move on to find better jobs. This would improve the economy, the worker's quality of life, and their quality of work. In this scenario, removing the minimum wage would result in the most happiness and would therefore be the moral action to take according to a utilitarian.

Another realization that proved that minimum wage laws are not as beneficial as they seem is the fact that most people earning



minimum wage cannot afford proper health care for themselves and their family. Reburn's research shows that the origin of stress for 60% of Americans is money. The research also shows that when people earning the minimum wage face a health problem, they are unable to support themselves, and this only cause more stress (Reburn et al., 2018, p. 2). Minimum wage policies are an illusion that lead low-paid workers to believe they are okay until problems of this nature come to light. Living wages consider people's needs and foresee future problems such as illness. There exists a difference between minimum wage and living wage in all the states in America and, though it may be small in some states, it is what determines if an individual is able to pay for their health expenses and live a life that many would say is dignified. Policy makers look at the big picture—at the fact that minimum wage reduces poverty—but they fail to look at how the people it is intended to help are really affected.

Even though minimum wage is beneficial for some people, it is immoral in different ways. Unskilled workers or employees with few skills, like college students, might be said to benefit from minimum wage policy, but individuals who are skilled are taken advantage of by employers who pay the bare minimum because they can. Overall, the minimum wage ensures that people exist just above the poverty line and are able to survive but, since it does not take into account their quality of life, it is not moral.

In the future, studies about the effects of the minimum wage should contain both qualitative and quantitative data. The qualitative

data will allow the researchers to see how the policy really affects the people it is supposed to help. It will allow them to view the positive and negative effects and therefore come to a better judgement of its morality. In addition, primary research is required if a researcher is to understand what is really going on in the lives of workers receiving minimum pay. Research such as observations of and interviews with minimum-wage workers will help policymakers make decisions that result in more positive than negative outcomes. Since my research has shown that the minimum wage is normally not the living wage, the wage at which someone is said to be living a decent life, future policy should take into account the living wage deciding the amount of the minimum wage. ❖

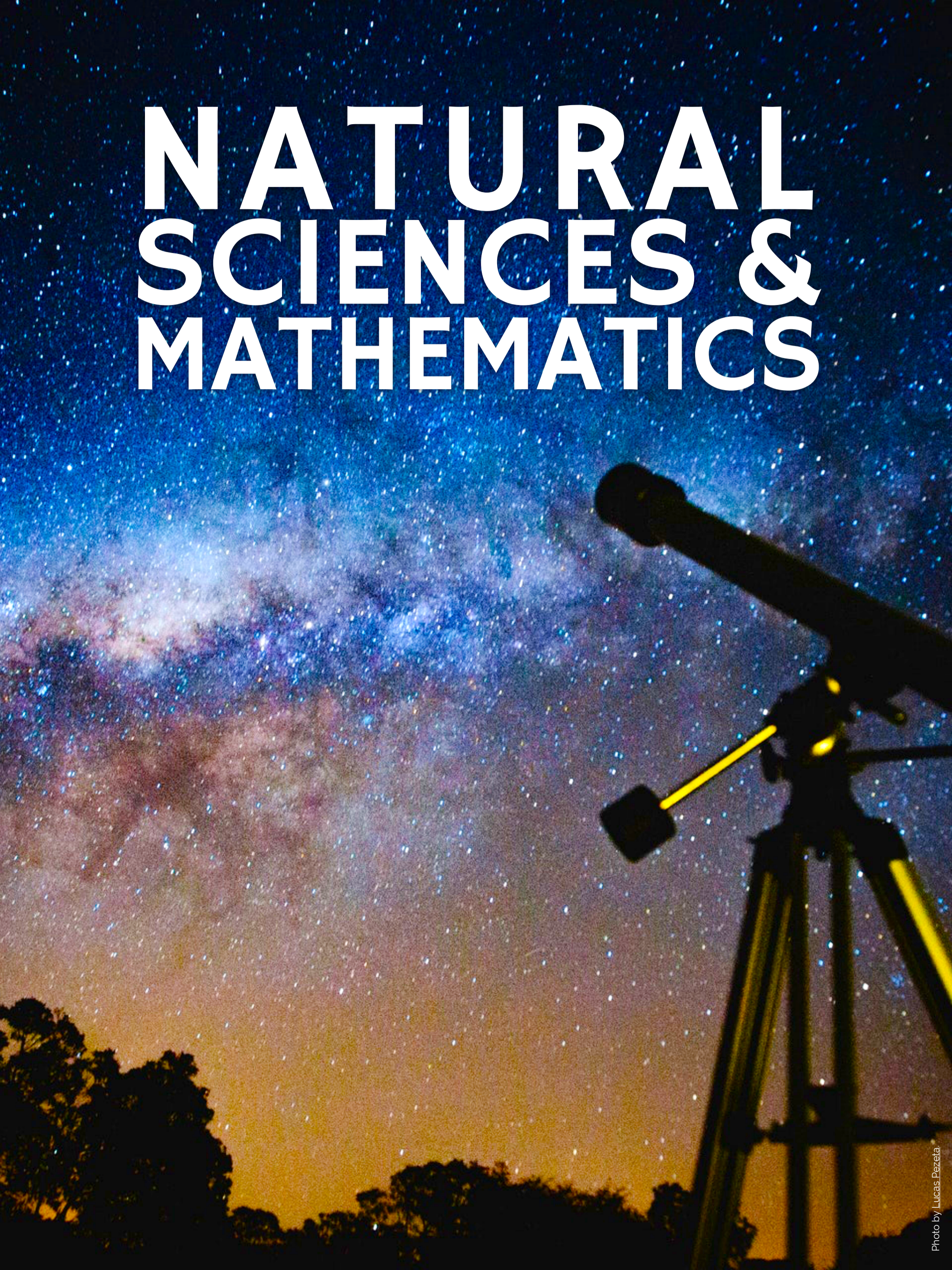
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# NATURAL SCIENCES & MATHEMATICS





# **A REVIEW ON THE EFFECTS OF BPA AND PHTHALATES ON BREAST CANCER WITH A MECHANISTIC APPROACH**

## **INTRODUCTION**

Plastics are an omnipresent part of the world today, and they date as far back as 1600 B.C. when rubber was shaped by human hands and polymerized. Since that time, plastics have evolved quite a bit and came into mass production in the 1940s (Halden 2010). Today, there are over twenty different kinds of plastics, and the plastic industry is a multi-million-dollar business. Since plastics are such a ubiquitous part of life, people are exposed to plastics every day in many forms, including food and drinking products, bathing products, medical products, and many others (Halden 2010). This abundant exposure to plastic in recent years has been correlated with various health issues, and this review will examine two ingredients of plastic that have been linked to breast cancer in particular: bisphenol A (BPA) and phthalates.

Bisphenol A was first synthesized in 1891 and is a building block of polycarbonate plastics. BPA is widely used in food containers including Tupperware, food contact paper, metal food cans, and baby bottles. BPA can also be found in thermal papers, dental materials, PVC pipes, medical devices, and personal care products (Wang et al. 2017). Phthalates have been produced in large quantities since the 1930s and are diesters of phthalic acid. Phthalates are incorporated into plastics as plasticizers to create flexibility, pliability, and elasticity in normally rigid plastic polymers (Halden 2010). Phthalates can be found in industrial plastics, paints, medical devices, children's toys, and personal care products like sunscreen and perfume (Halden 2010). Of the two plastic ingredients, BPA is produced in higher abundance annually than Phthalates, 9 million tons to 8 million tons, respectively (Gerona et al. 2020; Wang et al. 2019). Most of the BPA and phthalates produced stays in its product, but some of the BPA and phthalates will enter the body through ingestion, inhalation, and dermally. When these chemicals enter the body, they can act as endocrine disruptors which impact the function of the body's endocrine system. When the endocrine system is disrupted, many adverse health effects can follow, including carcinogenesis. A type of cancer that is

particular susceptible to endocrine disruption is breast cancer.

Breast cancer is the most common cancer diagnosis for U.S. women, excluding skin cancers, and is the second-leading cause of cancer death for women after lung cancer. Between the years 2012 and 2016, the incidence rate of breast cancer increased by 0.3% per year (Desantis 2019). These statistics show the destructiveness of this disease, and it is possible that a contributing factor could be found in everyday products including foods, drinks, cosmetics, toys, and anything that contains BPA and phthalates. The objective of this review is to examine the current literature for the potential effects of BPA and phthalates on the development of breast cancer. This review also explores some of the possible mechanisms of how phthalates and BPA have carcinogenic effects on human mammary glands.

## **REFERENCE DOSES**

In the last thirty years, scientists have realized that plastics could have a harmful effect on human health. Therefore, scientists conducted research studies to create a reference dose for both BPA and phthalates. A reference dose is the amount of a certain product someone can absorb into their body daily without a harmful effect later in life. The reference dose for BPA and phthalates are 50 g/kg and 20 g/kg respectively (Wang et al. 2017; Benjamin et al. 2017). Most of the research done to create these reference doses was created using indirect urinalysis, which estimates the amount of BPA in the body by examining the second or third metabolite into which BPA is broken down in the urine (Gerona et al. 2020). Since the early 2000s, there has been a new direct form of measuring BPA in the urine that examines the first metabolite into which BPA is broken down, and when this direct form of urinalysis is used, the results can differ greatly from the indirect urinalysis results. A recent study published at the end of 2019 showed that BPA levels were 44 times higher using the direct method instead of the indirect method which has been used for the bulk of research on BPA (Gerona et al. 2020). This study specifically examined the difference in direct and indirect urinalysis in BPA, but a



large portion of phthalate research on humans has been done using an indirect method of urinalysis, so there is a need for a direct method of urinalysis in phthalate research as well (Gerona et al. 2020). This study confirms that there is a need for reference doses to be reevaluated using modern data collection techniques, and this is a cause for concern because people may have put themselves at risk due to a possibly inaccurate reference dose.

## SOURCES AND ROUTES OF EXPOSURE FOR HUMANS

Since plastics are such an omnipresent part of life, the routes of exposure for BPA and phthalates are plentiful. The three main ways that BPA and phthalates enter the body are ingestion, dermal exposure, and inhalation. The most prevalent way is through ingestion. The European Food Safety authority showed that the dietary daily amount of BPA exposure for infants was on average 0.2-13 g/kg and 1.5 g/kg for adults (Wang et al. 2017). Another study showed that estimated exposure of BPA through inhalation was 0.00024-0.00041g/kg, and the estimated dermal exposure was 7.1-42.6 g/kg (Wang et al. 2017). **Table 1** can be referred to for the specific ways in which BPA enter the body including plastic bottles, air, contaminated seafood, and dental materials.

Contamination sources	BPA concentrations	Exposure routes	Ref.
Aquatic environment	Up to 56 $\mu\text{g L}^{-1}$	Ingestion	[67]
Soil	1-150 $\mu\text{g kg}^{-1}$	Ingestion	[68]
Landfill leachates	Up to 17.2 $\text{mg L}^{-1}$	Ingestion	[73]
Air	2-208 $\text{ng m}^{-3}$	Inhalation	[75]
Dust	0.2-17.6 $\mu\text{g g}^{-1}$	Inhalation	[79]
Contaminated seafood	13.3-213.1 $\mu\text{g kg}^{-1}$	Ingestion	[70]
Metal food cans	2-82 $\text{ng g}^{-1}$	Ingestion	[17]
Plastic bottles	0.234 $\mu\text{g L}^{-1}$	Ingestion	[82]
Thermal paper	7.1-71 $\mu\text{g day}^{-1}$	Dermal route	[88]
Dental materials	0.013-30 $\text{mg day}^{-1}$	Dermal route	[90]

**Table 1.** Routes of exposure for BPA in daily life. This table displays some of the possible ways that BPA can enter human's bodies and the concentrations that BPA was found in these routes of exposure. These concentrations are raw amounts, and the actual amount entering the human body is much less.

The average amount of phthalate exposure through ingestion is between 1.854-3.209 g/kg daily. The average amount of dermal exposure for phthalates is 0.010-0.016 g/kg and the average inhalation exposure is .004686- .945 g/kg daily (Giulivo et al. 2016). The specific mediums that allow the phthalates to enter the body can be seen in **Table 2** and include bottled water, personal care products, and fish (Giulivo et al. 2016).

Sources, pathways of human exposure, and environmental levels of Phthalates.

Sources	Pathway	Level	Reference
Personal care products	Dermal absorption	0.010-0.016 $\mu\text{g/kg bw/day}$ (infants and toddlers) PHTs	Huang et al. (2008)
Foodstuff	Ingestion	658-1610 $\text{ng/g}^{-1}$ fw PAEs	He et al. (2015)
Bottled water	Ingestion	1.196-1.599 $\mu\text{g/L}$ DBP	Otero et al. (2015)
Indoor dust	Inhalation	3.440-106 $\text{ng/g}$ Total PHTs	Tian et al. (2016)
Indoor air	Inhalation	1.246-839 $\text{ng/m}^{-3}$ Total PHTs	Laborie et al. (2016)
Wastewater	Environment	0.716-122 $\mu\text{g/L}$ DEHP	Zolghari et al. (2014)
Sludge	Environment	1340 $\mu\text{g/g}$ dw DEHP	Meng et al. (2014)
Soil	Environment	110 $\mu\text{g/kg}$ DEHP	Ji et al. (2014)
Sediment	Environment	77.39 $\mu\text{g/kg}$ to 478.9 $\text{mg/kg}$ PHTs	Chen et al. (2012)
Fish	Environment/Ingestion	129.5-253.9 $\text{mg/kg}^{-1}$ dw DEHP	Guo and Kannan (2013)

**Table 2.** Routes of exposure for phthalates in daily life. This table displays the routes and concentrations via which humans could be exposed to phthalates.

It is important to understand the routes of exposure for BPA and phthalates in order to understand how these chemicals can enter the body and cause carcinogenesis. It is also important to understand the average daily exposure to BPA and phthalates because the mechanistic studies try to mimic these concentrations in their experiments.

## EPIDEMIOLOGICAL EVIDENCE OF BREAST CANCER

Epidemiological studies have found a link between breast cancer and the plastic components BPA and phthalates. A study done in 2010 on a group of 454 women found that diethyl phthalate (DEP), which is type of phthalate, is significantly associated with breast cancer in premenopausal women. It also found the phthalates benzyl butyl phthalate (BBzP) and dioctyl phthalate (DOP) were found to be inversely associated with breast cancer (López-Carrillo et al. 2010). Another study done in 2017 showed a significant association between di-2-ethylhexyl phthalate (DHEP) and breast cancer (Zuccarello et al. 2018). All of the phthalates just discussed all have the same general structure of a benzene ring with two ester groups, but the variability comes from the R-groups attached to the esters. It is also significant to note that the mean phthalate levels in the study done in 2010 were 0.174  $\mu\text{g/kg}$  which is greatly below the reference dose, yet there was a significant association with breast cancer (López-Carrillo et al. 2010). Another epidemiological study involving BPA and phthalates found that breast density was elevated by 5% in women with BPA or phthalate levels above the median detected value compared to women with undetectable levels. Increased breast density is a risk factor for breast cancer, and a previous study suggests that a 5% increase in breast density increases breast cancer occurrence by 5-10% (Sprague 2013). Another study done on both BPA and phthalates showed that the chances of a woman developing breast cancer were doubled in women who manufactured BPA and phthalates

(Brophy et al. 2012). These epidemiological studies are significant because they prove that phthalates and BPA can cause breast cancer in vivo. Even though the mechanism of how BPA and phthalates cause breast cancer have only been demonstrated in vitro, these epidemiological studies are proof that some mechanism is occurring in vivo, but more research is needed to uncover it.

It has been proven that there is an association between the plastic components BPA and phthalates and breast cancer. Several studies have also identified the routes of exposure for these two plastic components and the BPA and phthalates doses to which humans are exposed. The next logical step in the investigation of these chemicals is to determine the mechanism of how these chemicals cause breast cancer. As stated earlier, the mechanisms have not been determined in vivo, but there are several in vitro mechanisms that have been discovered, including the c-myc, ERK1/2/ERRy, VEGF, AhR/HDAC6/c-myc, and PI3K/ATK pathways.

### **MECHANISMS OF HOW BPA AND PHTHALATES CAUSE BREAST CANCER**

There are millions of genes in the body and they all have a specific function in making sure the body is running smoothly. However, there are certain genes known as oncogenes, genes that have the capability to cause cancer if they are mutated in a certain way, and it has been found that BPA and phthalates have the capability to cause mutations to oncogenes and cause them to produce tumors.

One oncogene specifically is c-myc, an important gene in the cell cycle. C-myc promotes expression of cyclin D and CDK4 which hypophosphorylates pRb. pRb inhibits E2F1, and E2F1 is key in moving past the R-point. The R-point is in the G1 phase of the cell cycle and the R-point is the deciding point where a cell will begin to copy its DNA and proliferate or not. Once a cell moves past the R-point, it must proliferate. Once c-myc promotes expression of cyclin D, this causes an increase in cyclin E production which further phosphorylates pRb, allowing E2F1 to be released from pRb and expressed. E2F1 uses a positive feedback mechanism by producing more cyclin E, therefore pushing the cell past the R-point. The body has a normal level of c-myc production that allows for normal proliferation of cells. However, it was found that 10nM of BPA significantly increased the level of c-myc in

breast cells (Pfeifer et al. 2015). This dose of 10nM of BPA is comparable to the dose to which humans are exposed because the average adult weighing 62kg and containing 5 liters of blood is exposed to 81.48 nM of BPA daily (Quilty-Harper 2012). If c-myc is overexpressed, then cells are pushing past the R-point way more often than normal, causing excessive proliferation and the possibility of tumor formation. Overexpression of c-myc can also shut down inhibitors like p-27 and p-15 which have the ability to halt the cell cycle and stop the excessive proliferation.

C-myc was also associated with an increase in production of reactive oxygen species which can lead to DNA damage. C-myc does this by allowing the expression of E2F1 which inhibits the transcription factor NF-kB. Normally NF-kB activates the antioxidant mnSOD, which helps reduce reactive oxygen species. Therefore, if c-myc is overexpressed, then there will be fewer antioxidants and more reactive oxygen species damaging DNA (Pelengaris and Khan 2003). DNA damage can lead to carcinogenesis in hundreds of different ways, including putting a gene that increases motility under a new promoter or by destroying genes that normally cause cell apoptosis.

Phthalates can also cause the overexpression of the oncogene c-myc which increases the incidence of breast cancer. In the study linking BPA to overexpression of c-myc, a mechanism to how c-myc was overexpressed was not found; however, in the study on phthalates it was found that c-myc was overexpressed by the ahR/HDAC6/c-myc pathway. This pathway starts when phthalates cause AhR to translocate to the cell membrane and activate cAMP-PKA-CREB 1 signal cascade. cAMP activates PKA which phosphorylates CREB 1 at serine 133. CREB-1 is transcriptional factor that promotes the expression of HDAC6. HDAC-6, in turn, helps with the assembly of the B-catenin- LEF1/TCF4 transcriptional complex which expresses c-myc (Hsish et al. 2012). As stated earlier, c-myc increases cell proliferation by modulating the cell cycle and allowing it to move past the R-point. The overexpression of c-myc is caused by both BPA and phthalates which can increase the incidence of breast cancer.

Another mechanism of how BPA can cause breast cancer is the ERK1/2/ERR pathway. A study initially found that 1nM and 100nM of BPA significantly promoted the proliferation of MCF-7 and SkBr3 cancer cells, so researchers investigated how the proliferation was occurring.



They found it was occurring through the ERK1/2/ERR pathway. The mechanism begins with ERK1/2 being activated. ERK1/2 are kinases that phosphorylate DNA, RNA, and other proteins in normal cell proliferation and growth (Song et al. 2015). However, BPA can cause the ERK1/2 to malfunction and phosphorylate serine residues 51,81, and 219 on the ERR receptor which prevents it from ubiquitination (Heckler et al. 2015). Normally ERR receptor levels are kept in balance by ubiquitination, but if this cannot happen due to certain serine residues being phosphorylated, then there will be more ERR receptors than normal (Heckler et al. 2015). ERR receptors have a structure similar to that of ERK receptors, and they are both endocrine-related receptors which play a role in normal mitochondria production and function; however, they can be taken advantage of by cancer cells to produce extra mitochondria for energy (Heckler et al. 2015; Song et al. 2015). Therefore, having more ERR receptors allows cells to proliferate more rapidly because they are supplied with the excessive metabolic needs of rapidly proliferating cancer cells.

Another common carcinogenic pathway that has been discovered to be caused by phthalates is the PI3K/AKT pathway. The PI3K/AKT pathway mediates the effects of a variety of extracellular signals in various different cellular processes, including cell growth, proliferation, and survival. When these cellular processes are mutated and modified, they can lead to tumor formation. A study done in 2014 demonstrated that concentrations of phthalates between 10nM and 1000nM can induce cell proliferation, and these concentrations were associated with significantly higher levels of PI3K and AKT (Chen and Chien 2014). The mechanism behind this pathway is that PI3K is a kinase that phosphorylates PIP<sub>2</sub> to PIP<sub>3</sub> which then recruits AKT to the cell membrane and activates it. The activated AKT inhibits GSK3B. Normally, GSK3B degrades myc and cyclin D which stop the cell cycle. However, if GSK3B is inhibited by elevated AKT levels, then proliferation can be increased. AKT also inhibits "BAD" which is a pro-apoptotic protein that is turned on when the cell is damaged beyond repair to stop mutated cells from continuing to proliferate. If BAD cannot be turned on, this allows tumorigenic cells to continue to replicate.

The last mechanism of carcinogenesis involves VEGF. VEGF normally helps in the formation of new blood vessels during embryonic development and during the wound

healing process. However, both phthalates and BPA can cause elevated VEGF levels. The results of a study on two breast cell lines showed that 1000 nM doses of phthalates and BPA significantly increased VEGF secretion by the breast cells. If VEGF is being produced in abundance, this allows the cells that are proliferating at a high rate to produce more blood vessels in order to supply the cells with extra nutrients (Buteau-Lozano et al. 2008). As cancer cells proliferate and a tumor begins to form, the cells begin to move away from the blood supply, but if high levels of VEGF are present, new blood vessels can form near the new cells away from the normal blood supply. This is essential step in the carcinogenesis of breast cancer cells.

The above mechanisms of how BPA and phthalates cause breast cancer are just a few of the prominent ones that have been discovered so far. There are more mechanisms in the literature, and more will continue to be uncovered. It is also notable that these mechanisms may not be occurring exclusively, and that a few of these mechanisms may be working at the same time in order for tumorigenesis to occur. All of the mechanisms above cause proliferation of cells, but they differ in how they help with proliferation. The c-myc mechanism helps the cells replicate DNA, the VEGF mechanisms helps the proliferating cells continue to move away from the normal blood supply, and the ERR pathway helps with the energetic needs of proliferating cells. All of these mechanisms work towards the common goal of tumorigenesis.

## CONCLUSION

This review examined the current literature on the potential effects of BPA and phthalates on the development of breast cancer and explored some of the mechanisms that BPA and phthalates use in carcinogenesis. Epidemiological studies done on BPA and phthalates prove there is a link between BPA, phthalates, and breast cancer. Moreover, the routes in which BPA and phthalates enter the human body have been discovered. However, the dosage at which BPA and phthalates are safe to absorb inside the human body needs more examination based on updates in urinalysis and recent research. Also, further longitudinal studies are needed on the effects of BPA and phthalates because all of the epidemiological studies have been completed using a cross-sectional method. Some of the

mechanisms behind BPA and phthalate breast cancer carcinogenesis have been discovered in vitro, including the c-myc, ERK1/2/ERR $\gamma$ , VEGF, AhR/HDAC6/c-myc, and PI3K/ATK pathways, yet these mechanisms have not been examined in vivo. Therefore, there is more research needed to uncover new mechanisms of BPA and phthalate carcinogenesis and to figure out if these mechanisms occur in vivo. BPA and phthalates have only been around for roughly a century and only in the past few decades have scientist begun to dive into the effects of these plastic components on human health. There is still an abundance of research to be conducted on BPA and phthalates in order to fully understand their effects on human health, specifically on their link to breast cancer. ❖

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**PARKINSON'S DISEASE AND EXERCISE****ABSTRACT**

Parkinson's disease (PD) is thought to affect six million people worldwide. It is a complex, multifaceted neurodegenerative disease whose developmental causes are not yet fully understood. Treating symptoms of PD is all that can be done to help those since there is no cure. Medicinal treatments have been proven to be effective but can cause many side effects after long-term use, causing more issues or exacerbating symptoms. Exercise has been a proven source of treatment for many cardiovascular diseases as well as neurological diseases on the basis that it requires a full-body physiological response. No part of the body remains unaffected by exercise. A negative association with exercise is that it is not as easy as taking a pill. It takes consistency and determination to reap the benefits of exercise as a treatment for PD, but the lower cost, decreased likelihood of side effects, and overall increased quality of life are worth the effort as a long-term treatment.

**INTRODUCTION**

Parkinson's disease is a neurodegenerative disease that can cause a myriad of symptoms that slowly develop over multiple years. According to de Lau and Breteler (2006), it is the second most common neurodegenerative disease behind Alzheimer's Disease. The most common symptoms are tremors, bradykinesia (slow movement), limb rigidity, as well as gait and balance problems. The main cause of PD is not yet fully understood, but it appears to involve degeneration in the area of the brain known as the substantia nigra (SN). This area is responsible for producing dopaminergic neurons, which are important for releasing dopamine which plays an important role in voluntary movement, mood, reward pathways, and stress (Chinta and Andersen 2005). Thus, degeneration of the SN causes a lack of dopaminergic neurons, resulting in the aforementioned symptoms (tremors, bradykinesia, rigidity). The degeneration of the SN, and associated PD symptoms, occur at different rates with PD. There is no known cure for PD, but it can be treated with medication and exercise prescribed as medicine.

van der Kolk et al. (2019) studied how exercise could be used to help treat symptoms of PD. They found that exercise can attenuate some symptoms of PD, which was illustrated by reduced scores on the Movement Disorders Society-Unified Parkinson's Disease Rating Scale (MDS-UPDRS) which measures various aspects of PD, including non-motor and motor experiences of daily living and motor complications, and it also characterizes the extent of the burden of PD for daily life (Goetz et al. 2008). Thus, there is potential for exercise to be helpful in mitigating the negative symptoms of PD.

**PARKINSON'S DISEASE***Epidemiology*

A study done on behalf of the Parkinson's Foundation Group (Marras et al. 2018) aimed to measure the prevalence of PD in North America, Alaska, and Hawaii. This study covered many different demographics and regions of North America, including parts of Canada. Population cohorts ranged in size from 8,006 persons (Honolulu, Hawaii) to 5,525,787 persons (Ontario, Canada). Using different agencies, the researchers combined and standardized their data to find a prevalence rate of PD in people older than 45 years to be 572 per 100,000 with a 95% confidence.

According to a different, more famous study done in Copiah County, Mississippi, a standardized prevalence rate for the U.S. population would be 301 per 100,000 (de Lau and Breteler 2006). The prevalence rates in different geographic regions tends to differ, and the reasons for these differences are still not fully understood. In 2018, it was estimated that there would be 680,000 cases of PD in the United States. It is also estimated that there will be an increase to 1,238,000 by 2030. This study found that African Americans had the smallest prevalence rate compared to other ethnicities, according to Medicare databases. Whites had the highest prevalence of PD compared to Hispanic, African American, and Asian individuals. Men tended to have a higher prevalence compared to women as well, but only by a small margin. To obtain accurate data collection on the prevalence of any disease, a well-established and consistent criterion for

diagnosis must be agreed upon. According to de Lau and Breteler (2006), this is the main difficulty in reviewing accurate meta-analyses when looking at prevalence for PD.

Geographic differences have also played a role in increasing the difficulty of narrowing down who is most susceptible to develop PD. This correlates to the various findings of Marras et al. (2018). Genetic differences are studied intensively as well for determining who may be susceptible to develop PD. In a study completed by Heckman et al. (2013), genetic variances in the leucine-rich repeat kinase 2 gene (LRRK2) were studied across 23 different sites in 15 different countries. This study focused on 121 rare and common coding variants in the LRRK2 gene and susceptibility to PD. Three total ethnicities (Asian, Arab-Berber, and Caucasian) were observed through 8,611 PD cases and 6,929 controls in this case-control study. The LRRK2 gene was found to be a risk factor connected with Asian and Caucasian people, creating more mutations than in the Arab-Berber population. There are other loci on specific genes that could possibly cause mutations in different populations.

Genetic complexity in humans makes this problem extremely difficult to study, but it can be worthwhile if definitive answers on which specific genes make someone more susceptible to develop PD can be identified. Ascherio and Schwarzschild (2016) also support the difficulty

of determining the prevalence and incidence of PD across the world. They note the increase in prevalence for older populations in high-income countries (160 per 100,000 for ages 65 and older) compared to 14 per 100,000 in median-aged individuals. They also found very similar prevalence rates in the Americas, Europe, and Asia. However, Africa, when age-adjusted, had lower prevalence, incidence, and mortality compared to the Americas and Europe.

Ascherio and Schwarzschild (2016) also address the inconsistencies of data on incidence in the US. They note that in New York, African Americans had a higher incidence compared to Caucasians. A data set for an unmentioned U.S. health organization found the highest incidence among Hispanics (16.6 per 100,000), non-Hispanic whites at 13.6 per 100,000, Asians at 11.3 per 100,000, and then African Americans at 10.2 per 100,000. These numbers correlate to other sets of data already presented by general aspects (non-Hispanic whites and Asians being more susceptible), but there is inconsistent accuracy in these sets of data. Their data also supported men having a higher percentage of prevalence compared to women. For this to improve, there needs to be an agreed-upon diagnosis criterion for PD. This is most difficult because of its nature of being late-onset and its symptomatic variability.



Photo by Mathias Zomer.



## *Pathophysiology*

The degeneration of the SN, the deficiency of pars compacta (SNpc) neurons, along with dopaminergic neurons produce someone who is unstable and motor deficient, as stated by Kaur et al. (2019). The substantia nigra is part of the basal ganglia located in the midbrain. Again, it is vital to voluntary movement and the reward pathway. The pars compacta of the substantia nigra is formed by the dopaminergic neurons. Kaur et al. (2019) state that increased alpha-synuclein accumulation, mitochondrial dysfunction, oxidative stress, excitotoxicity, and neuroinflammation are crucial in the further development of PD. The exact reason for the death and depletion of the dopaminergic neurons is not yet fully understood.

Alpha-synuclein is a neuronal protein, mainly involved with neural function, that plays a role in many physiological aspects of the heart, muscles, and tissues. In general, alpha-synuclein helps regulate vesicle fusion and neurotransmitter release by interacting with the presynaptic complex. Over-accumulation and mutation of it can cause neurotoxicity. This can be described as Lewy bodies, which are tangles or clumps of proteins inside the neural tissue. This occurs in many neurological diseases, mainly Alzheimer's. Thus, if there is a mutation to alpha-synuclein, it can cause difficulty in voluntary muscle contractions and slow movement which are two hallmark symptoms of PD. With the presence of Lewy bodies, other non-motor symptoms (memory loss, lack of ability to focus, and confusion) can be caused. Excitotoxicity can be associated with the excess amount of alpha-synuclein because of its association with neurotransmitter transfer. If the negative feedback system in the body is not working correctly, there will be an influx of neurotransmitters like glutamate. When there is an excess of these neurotransmitters, and they are not cleared by reuptake, diffusion, or transported through vesicles, excitotoxicity will occur and cause further neuronal damage to the surrounding cells (Kaur et al. 2019).

Neuronal cells are highly dependent on mitochondria and their optimal function in producing needed energy. If there is a dysfunction in the mitochondrial fission/fusion cycle, then there can be dire consequences for the needy neuronal cells, causing major damage and neurodegenerative diseases like PD, Alzheimer's disease, Huntington's disease, amyotrophic lateral sclerosis (ALS), according to Kaur et al. (2019). In relation to mitochondrial

dysfunction, Kaur and colleagues mention the development of oxidative stress due to this dysfunction. Mitochondrial respiratory complexes are proteins that are composed of multiple subunits that generate and maintain the proton gradient in the inner mitochondrial membrane. Those transfer electrons can act as free radicals that are usually catabolized by enzymes, but if there is overproduction, too many free radicals can cause oxidative stress and lead to neuronal damage and neuroinflammation, an inflammation of the nervous tissue. Neuroinflammation has many causes, including aging. Free radicals have been known to cause inflammation to a chronic level in the body, including the brain. Aging, paired with increased oxidative stress due to poor diet and mitochondrial dysfunction, could create an environment perfect for an increase in neuroinflammation (Kaur et al. 2019).

## *Risk Factors*

Risk factors for PD are somewhat unclear, but most studies show that there is a combination of genetic and environmental exposures that can lead to the development of PD. The LRRK2 gene is one of the most common genetic predisposing factors that is agreed upon, and it has been linked to the development of PD in many studies, mainly in those of Caucasian and Asian descent. Pesticides are another common risk factor that can lead to development of PD. Traumatic head injuries that involve losing consciousness can also be linked to PD according to the PD Foundation. The main risk factor for developing PD, however, is age. Those at the highest risk for PD are 60 and older. The older a person is, the more likely they are to develop PD. Men also have a greater risk for developing PD.

## *Symptoms and Early Signs*

The symptoms of PD develop and progress at different rates for all of those who are afflicted. There are motor symptoms and non-motor symptoms. The most common motor symptoms are bradykinesia, tremors, and rigidity according to the Parkinson's Disease Foundation (PDF). These three motor symptoms must be present for PD to be considered in the diagnosis. Other, more variable, motor symptoms include cramping, drooling, dyskinesia (involuntary or erratic movement), shuffling gait (short choppy steps), or freezing in place where they are unable to move or navigate areas. Many of these symptoms increase the risk of falling.

Considering that adults over the age of 60 develop PD, their risk of falling and hurting themselves increases exponentially. These symptoms are very dangerous and can make those with PD dependent on others to complete normal daily tasks which is mentally debilitating.

Non-motor symptoms can either be cognitive or affect other regions of the body besides the brain. The PDF states these symptoms involve cognitive changes (similar to dementia), constipation, fatigue, hallucinations, mood disorders (anxiety, depression, or apathy), erectile dysfunction, sleep disorders, or urinary incontinence. These symptoms can compound each other and create a terrible quality of life for those suffering with PD.

Early signs of PD are fairly similar to the normal symptoms but can be inconsistent in occurrence. Tremors, trouble sleeping, a masked or blank face, loss of smell, and decreasing size of handwriting is an early sign listed by the PDF. Keeping track of these signs can be highly beneficial for getting treatment for those symptoms and mentally preparing for the journey ahead when being diagnosed with PD.

## TREATMENT OF PD

Currently, there is no standard of treatment for those with PD because patients are treated based on the severity of their symptoms. PD has no cure and can only be treated based on the symptoms. The American Parkinson's Disease Association (APDA) lists many common medicines on their web page, the most common of which are dopamine agonists and dopamine precursors. This is because of the depletion of dopamine in the body which causes the variety of symptoms seen in PD. This dopamine enhancement does improve the symptoms of patients and is currently the most effective drug treatment. Specifically, Levodopa or L-DOPA, which most people with PD take at some point to help with symptoms, is a combination of an enzyme inhibitor that breaks down dopamine known as dopamine decarboxylase and a dopamine precursor. The most common side effects of this drug are nausea, dizziness, anxiety, orthostatic hypotension (decreased systolic blood pressure when standing compared to laying down or sitting), dyskinesia, confusion, hallucinations, and somnolence or hypersomnia. L-DOPA is taken in a capsule or tablet form and typically has a controlled sustained release. It can be available in an inhalable powder as well. Other medications taken alongside L-DOPA help reduce the

breakdown of L-DOPA or enhance its effects. These medications come in a variety of forms including tablets, skin patches, and injections. Interestingly, these medications can sometimes exacerbate other motor and even non-motor symptoms of PD, such as constipation, sleeplessness, confusion, memory impairment, dyskinesia, and urinary retention, according to the APDA. Deep brain stimulation (DBS) is a common treatment for those who have advanced motor symptoms that are no longer affected by L-DOPA or other prescription drugs. This has been more effective for those with more severe symptoms, but is much more expensive.

Other therapies like gene inhibitors for LRRK2 specifically only work for those who exhibit those gene mutations or are susceptible to those mutations. Gene inhibitors will not work for everyone and they can be very expensive, costing hundreds of thousands of dollars. Kaur et al. (2019) mention treatments with ginkgolide K (GK) which can induce phosphoinositide 3-kinase (PI3K), brain-derived neurotrophic factor (BDNF), and postsynaptic density protein 95 (PSD-95). GK also promotes the clearing of alpha-synuclein and reduces neuronal cell death. Radak et al. (2010) state that administered BDNF to rats and primates has been proven to reverse synapse deterioration and normalize aberrant gene expression as well as improve memory and learning. This has not been proven to have the same effects in human trials but could have the same or similar results with the proper dose. BDNF would be most effective in treating the non-motor symptoms of PD that are more similar to Alzheimer's disease.

Crucially, BDNF can also be naturally produced by moderate to vigorous physical activity unlike the other drugs or treatments previously listed. Exercise is also free, and moderate to vigorous exercise can be accomplished by most people, whether they are healthy or have developed PD. Exercise has a myriad of health benefits when it is utilized effectively and consistently. Exercise is known to dampen overactive inflammatory responses in the body, improve circulation, decrease risk of cardiovascular disease, increase work capacity, as well as increase overall quality of life. There are no real negative side effects if training is carefully overseen by professionals and if the patient has been cleared by their physician. Proper exercise prescription can be used as a treatment and prolong the onset of PD in most individuals.





## THE ROLE OF EXERCISE AND PD

Many recent studies have shown how critical exercise and physical activity are in the prevention of cardiovascular disease, heart attacks, and stroke. In fact, they decrease all-cause mortality. Aaseth et al. (2018) state that PD and its symptoms can be attenuated by regular and safe physical activity. Again, moderate to vigorous physical activity as well as balance strength and aerobic training are essential to receiving the greatest health benefits. Having an increased level of endurance, strength, and flexibility creates a larger buffer region for the effects of PD and will slow the onset of severity of those symptoms. Exercise has been proven to improve the body's inflammatory response in that it decreases it. This can directly impact the oxidative stress and neuroinflammation associated with the development of PD, delaying onset. Aaseth et al. add that dopaminergic neuron damage is reduced when exercise is paired with intermittent fasting. Starting physiotherapy as soon as possible after being diagnosed with PD is another great recommendation. Consistent exercise before diagnosis would be better in an ideal situation, but some physical activity is always better than none.

A study done by van der Kolk et al. (2019) utilized a stationary bike for at-home exercise to attempt to treat motor and non-motor

symptoms of PD in an experimental study. Those in the intervention group were to cycle on a stationary bike at home for 30-45 minutes, which included 15 minutes for warm-up and cool-down at least 3 days per week. Study participants were to exercise in a predetermined heart rate reserve (HRR) zone from 50%-70%; the cap for exercise HR was 80% HRR. This achieved the goal of moderate to vigorous exercise. In the nine months that this exercise intervention lasted, the intervention group scored lower (better) on the (MDS-UPDRS) at 1.3 and the control group measured at 5.6. The only other main observation was an increase in VO<sub>2</sub> max in the intervention group 2.0 mL/kg per min while the control group decreased -0.4 mL/kg per min. Again, the MDS-UPDRS measures various aspects of PD, including non-motor and motor experiences of daily living and motor complications, and it also characterizes the extent of the burden of PD for daily life. van der Kolk et al. (2019) were successful in finding that exercise can have drastic positive effects on the symptoms of PD while having a minimal cost and side effects compared to prescription drugs. Increased physical strength, balance, and coordination all help prevent falls as well for those with PD and the older population in general. If a patient feels self-sufficient and empowered from exercise, they are less likely to develop depression or other mental disorders associated with PD. Decreased fatigue due to





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increased  $VO_2$  max will allow them to be empowered and capable of living a somewhat normal life with PD.

Exercise is not a cure for PD, and there is no current cure. In weighing the cost-to-benefit analysis between prescription drugs and exercise, comparing side-effects, cost, and overall effectiveness, exercise is the better treatment for PD. The main drawbacks for exercise are that it is not immediate, that it may not be effective for those whose PD is well-advanced (exercise modifications could be made), and that it takes more effort and determination than just taking a pill. Often, those who are much older may not have the means or desire to exercise which can make introducing exercise difficult. Some may also be afraid of starting an exercise program because they are afraid of injury. There is a level of learning that must take place for those beginning an exercise program to exercise safely and effectively. This is especially true for older populations who have been susceptible to sedentary lifestyles. A basic understanding of why they are doing specific exercises, HRR in correlation with intensity, as well as understanding the benefits of exercise are crucial to the effectiveness of an exercise program.

Exercise testing for those with PD is warranted on the basis that their symptoms are always accounted for when testing. The *ACSM's Guidelines for Exercise Testing and Prescription* (ACSMGETP) recommends that screening for cardiovascular disease should be done considering the age and decreased activity levels of the affected population. General strength testing is generally recommended to establish a baseline for exercise prescription. This can be completed with a chair-sit-to-stand

test. This can also help evaluate functional fitness of the patient. Maximal testing with treadmill protocol is considered to be safe for those between a one and two on the Hoehn and Yahr scale. Submaximal testing is recommended for those at a three or above on the Hoehn and Yahr scale. This scale has seven stages (0.0, 1.0, 2.0, 2.5, 3.0, 4.0, and 5.0) to describe and define the severity of PD in an individual. Being a 0.0 means that an individual is showing no signs of disease, while 5.0 means they are bound to a wheelchair or bedridden. Modalities for submaximal testing include recumbent bikes, stationary upright bikes, and arm cycle ergometers. It should be expected that those with PD will fatigue faster compared to the general population due to the increased effort it takes for moving voluntarily, especially if the previous lifestyle has been sedentary. Rate of perceived exertion (RPE), blood pressure, and heart rate should be monitored closely like any other protocol. Those with PD may have altered cardiac responses due to damage to the autonomic nervous system. In general, exercise testing for those with PD is safe as long as they are carefully monitored and have their max or submaximal tailored to their symptoms and abilities.

Prescribing exercise for those with PD can be influenced by the Hoehn and Yahr staging scale for PD. Exercise will be more beneficial to those who are lower on the scale because they are more capable of exercising at optimal intensities. Those who are higher on the scale are less capable of exercising at moderate to vigorous intensity. According to the ACSMGETP, the main goal is to delay disability, prevent secondary complications, and improve quality of life. The main fitness goals defined by ACSMGETP are to improve walking gait,



transfers (getting up and down), balance, joint mobility, and muscular power. Exercise prescriptions need to be re-evaluated according to the progression of PD because of the likely increase in physical limitations. General fitness guidelines apply to those with PD while making accommodations to their mode of exercise for safety and effectiveness. Many with PD use stationary or recumbent bikes as well as arm ergometers if they have advanced PD. Those with less advanced should always do what they are physically capable of doing in a safe manner to get the most health benefits possible. 150 minutes of exercise per week is the goal for those with PD. This can include three days of aerobic exercise, two to three days of resistance exercise, and two to three days that include flexibility. ACSMGETP recommends prolonged rhythmic exercises like walking or cycling. Again, the mode of training needs to be tailored to the individual. Flexibility training is much more important for those with PD compared to the general population of healthy people. Decreasing rigidity is vital for continued effective exercise, increased quality of life, and safety while walking. Strength training should begin with learning correct form of the exercises. High amounts of repetitions and low resistance should be utilized to help learn the form and prevent injury.

## CONCLUSION

PD robs those who are afflicted of their normal functional abilities such as walking, normal bowel movements, mental fortitude, and self-sufficiency. PD begins to develop for most people after the age of 60 and continues to worsen as time goes on, but it does not progress at the same rate for all patients. The causes of PD are not fully understood but a combination of genetic susceptibility and environmental factors seem to correlate with the onset of PD. There is currently no cure for PD, but the symptoms are treatable with medication and exercise. Exercise has been shown to delay the onset of symptoms as well as decrease the effects of symptoms with proper prescription. Exercise also has fewer side effects compared to the most common prescription drugs for treating the symptoms of PD, making it a more reliable treatment for those with PD in the long run. Therefore, with proven effectiveness of exercise through research, healthcare professionals can prescribe exercise as medicine to patients suffering from PD earlier or recommend it to those who are genetically

susceptible to PD. Beneficial future research in this field could look to the best way in prescribing exercise to patients earlier, especially those with a genetic predisposition to PD. ❖

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# A BRIEF REVIEW OF PFAS ANALYSIS

## INTRODUCTION

PFAS—per- and polyfluoroalkyl substances—are a large family of fluorine-containing organic molecules. They are a subset of fluorinated substances, distinguished by their carbon chains having some or all carbon atoms bonded to a fluorine atom rather than the usual hydrogen atom.<sup>1</sup> Perfluoroalkyl substances have had all hydrogen atoms replaced with fluorine, while polyfluoroalkyl substances have some hydrogen remaining.<sup>1</sup> These compounds are persistent and ubiquitous in the environment.

The persistence of these substances is due to the strength of the carbon-fluorine bond, one of the strongest covalent single bonds possible.<sup>2</sup> They are highly resistant to environmental degradation processes and have the potential to last years in the environment.<sup>3,4</sup> Their ubiquity stems from both their widespread usage in industrial applications<sup>1,2</sup> and their mobility in aquatic systems.<sup>5</sup> Industrial applications for PFAS include upholstery protectants,<sup>2</sup> firefighting foams,<sup>6,7</sup> non-stick cookware, and waterproof clothing.<sup>3</sup> Their water- and grease-repelling properties, along with their ability to lower aqueous surface tension,<sup>1</sup> made them ideal for such uses. Further, their persistence made them appear biologically inert, and therefore unlikely to impact human health or the environment.<sup>2</sup>

In spite of this, health impacts have been discovered since studies began in earnest. At least one analysis of existing studies showed decreased birth weight due to fetal exposure to PFAS.<sup>8</sup> There is also evidence linking PFAS exposure to kidney malfunction.<sup>9</sup> Further studies have linked PFAS to decreased immune response, neurotoxicity, and endocrine disruption.<sup>4</sup> The PFAS that have been most closely linked to these health problems, perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA), have been largely eliminated from usage in the developed world.<sup>1</sup> Other PFAS have taken their place and are far less studied.<sup>10</sup>

Major obstacles to studying PFAS are the difficulty in effectively measuring the concentrations of PFAS<sup>11,12</sup>, as well as distinguishing between the large number of PFAS moieties that are now moving through the environment.<sup>10</sup> Reviewing the history of PFAS

detection in order to show the difficulty of this task is the primary purpose of this paper. In addition, examining some of the techniques for breaking them down reinforces the need for further study of these compounds.

## TERMINOLOGY AND STUDY LIMITATIONS

Giesy and Kannan, in the first major study on the environmental impacts of these chemicals, used the more general term fluorinated organic compounds (FOCs).<sup>2</sup> The more commonly used term PFAS came into use shortly thereafter, though only in reference to perfluoroalkyl substances.<sup>1</sup> Acronyms quickly proliferated in a non-standardized manner, leading to confusion when comparing results.<sup>1</sup> Buck et al.'s hierarchical treatment of the compounds was an attempt to harmonize the terminology used in order to make communication between scientists working on the substances easier. Their paper was widely influential, having been cited by over 1,200 articles, according to Google Scholar.

PFAS	Per- and polyfluoroalkyl substances
PFC	Perfluorinated compound
PFCA	Perfluorinated carboxylic acid
FOC	Fluorinated organic compound
SPE	Solid phase extraction
LC	Liquid chromatography
HPLC	High performance liquid chromatography
GC	Gas chromatography
ESI	Electrospray ionization
MS	Mass spectrometry
MS/MS	Tandem mass spectrometry
MS <sup>2</sup>	Tandem mass spectrometry (used by de Voogt and Sáez)
ESMSMS	Electrospray tandem mass spectrometry (Giesy and Kannan)
LOD	Limit of detection
LOQ	Limit of quantitation
<i>m/z</i>	An ion's mass/charge ratio in mass spectrometry
HDPE	High-density polyethylene
PTFE	Polytetrafluoroethylene
PEEK	Polyetheretherketone

**Table 1.** Glossary of acronyms, excluding PFAS species which can be found in **Table 2**. When possible, the original term used by the authors was maintained in order to better demonstrate the historical advancement of the field.

Many studies focus on PFAS in aquatic and biotic matrices, yet the ubiquity of the substances, along with their adsorptive and surfactant properties, means that they can also be found in soil and air. The reason for the imbalance in research is unclear. Methods for testing soil and air have long been established.<sup>11</sup>



The lack of study surrounding air concentrations may be due to experimental bias towards the higher concentrations found in water, though advances in testing methods have been made.<sup>10,13</sup> Testing of soil seems to be concentrated around sites where large quantities of PFAS have been used, such as air bases and firefighting training facilities.<sup>6,7</sup>

PFOS	Perfluorooctane sulfonic acid
PFOA	Perfluorooctanoic acid
6:2FTS (THPFOS)	1H,1H,2H,2H-Perfluorooctane sulfonic acid
HFPO-DA (GenX)	Hexafluoropropylene oxide dimer acid
11Cl-PF3OUds	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid
ADONA	4,8-Dioxa-3H-perflurononanoic acid
PFBS	Perfluorobutane sulfonic acid
PFDA	Perfluorodecanoic acid
PFDoA	Perfluorododecanoic acid
PFHpA	Perfluoroheptanoic acid
PFHxA	Perfluorohexanoic acid
PFHxS	Perfluorohexane sulfonic acid
PFNA	Perfluorononanoic acid
PFUnA	Perfluoroundecanoic acid
4:2FTS	1H,1H,2H,2H-Perfluorohexane sulfonic acid
8:2FTS	1H,1H,2H,2H-Perfluorodecane sulfonic acid
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid
PFBA	Perfluorobutanoic acid
PFEESA	Perfluoro(2-ethoxyethane) sulfonic acid
PFHpS	Perfluoroheptane sulfonic acid
PFMBA	Perfluoro-4-methoxybutanoic acid
PFMPA	Perfluoro-3-methoxypropanoic acid
PFPeA	Perfluoropentanoic acid
PFPeS	Perfluoropentane sulfonic acid
NEtFOSAA	N-ethyl perfluorooctane sulfonamidoacetic acid
NMeFOSAA	N-methyl perfluorooctane sulfonamidoacetic acid
PFTA	Perfluorotetradecanoic acid
PFTTrDA	Perfluorotridecanoic acid

**Table 2.** List of the 29 PFAS species that can be tested in drinking water in accordance with EPA Methods 537.1 and 553.<sup>20</sup>

## EARLY HISTORY OF PFAS STUDIES

The first paper to make note of the potential ecological consequences of PFAS was published in 2001. The paper, by Giesy and Kannan, focused specifically on PFOS in animal tissue.<sup>2</sup> Tissue samples were acquired from earlier monitoring studies at Michigan State University, from stranded dead marine mammals, and from archived tissue held by federal agencies. Tissue types analyzed included liver, egg yolk, muscle, and blood plasma. All samples were spiked with THPFOS as an internal standard. After sample preparation, analyte was separated by liquid chromatography with the eluate feeding into an electrospray tandem mass spectrometer. An unknown interference from some of the matrices made using the ideal quantitation transition unworkable and a reduced transition range necessary. The large variety of matrices, both in terms of species and tissue types, made

the limit of quantitation (LOQ) variable for all analytes. Quality assurance and control was maintained through matrix and surrogate spikes, surrogate matrix blanks, and laboratory blanks. Though four PFAS (FOCs in the paper) were analyzed, only PFOS consistently tested above the LOQ. The discovery of PFOS in animal tissues from regions as widespread as the Norwegian arctic and Midway Atoll revealed the global reach of the chemical.

Prior to the standardization of the liquid chromatography-electrospray ionization-tandem mass spectrometer (HPLC ESMSMS) employed by Giesy and Kannan, the methods for determining PFAS levels were imprecise. The Wickbold method, which involved burning the sample in an oxy-hydrogen flame to convert the organic fluorine to hydrogen fluoride, then measuring the total amount of fluorine, gave no insight into the structure of the organic fluorine.<sup>11</sup> Nuclear magnetic resonance with <sup>19</sup>F was able to reveal the presence of PFAS, but the numbers differed significantly from analysis performed on the same sample with liquid chromatography-tandem mass spectrometry and also suffers from the inability to determine the nature of the original organic fluorine due to only detecting final concentrations of CF<sub>2</sub> and CF<sub>3</sub>.<sup>11</sup> Gas chromatography was also attempted to measure PFOS in aquatic matrices, but yields from derivatization reactions can be difficult to reproduce due to its low vapor pressure and the instability of its derivatives.<sup>11</sup> While the most commonly used method for detection was LC-ESI-MS<sup>2</sup>,<sup>11</sup> it was perhaps not the best suited. A review of the literature conducted by de Voogt and Sáez determined that ion-trap MS was better at qualitative analysis and determining the identity of PFAS moieties, while laser desorption electron attachment time-of-flight MS (TOF-MS) had the lowest limit of detection.<sup>11</sup> Their paper also discusses the interference of organic matrices on detection discovered by Giesy and Kannan. When PFOS (*m/z* 499) is fragmented, SO<sub>3</sub><sup>-</sup> (*m/z* 80) is the most abundant ion produced.<sup>2,11,14</sup> However, there is a unknown mass interference at this transition in samples from animals, especially birds.<sup>2,14</sup> For this reason, the *m/z* 99 transition, to FSO<sub>3</sub><sup>-</sup>, is often used instead.<sup>2,11,14</sup> An international conference in Hamburg in 2003 recommending testing at multiple transitions to increase accuracy.<sup>11</sup>

In addition to the struggle to determine the best methods for measuring PFAS, there were also issues with the analytical standards.<sup>11</sup> Variable purities introduced systematic error.

Different methods of production lead to different isomeric compositions which have different response factors. Though quality assurance was increasing, the presence of trace amounts of other organic fluorine substances was often detected in even the highest quality standards.<sup>11</sup> Further, some of the early standards used, like THPFOS, were found to be lacking in accuracy due to having a lower acidity and surface activity than PFOS and PFOA.<sup>14</sup>

The de Voogt and Sáez paper also addresses the growing awareness regarding sample collection and handling. The use of non-fluoropolymer-containing equipment for sample collection and storage was recommended, as was avoiding filtration due to the strong adsorption potential of PFAS.<sup>11</sup>

### STANDARDIZATION OF METHODS

In the early days of PFAS testing, these limitations on measurement contributed to low interlaboratory precision. A study mentioned by Nakayama et al. discovered that only 31% of international labs agreed on their analysis of an aqueous PFOS sample.<sup>5</sup> In an attempt to correct for these errors, Nakayama's team set out to construct a more rigorous method of sample collection and preparation. Samples were collected by means of PFAS-free collectors and stored in HDPE bottles rinsed with methanol.<sup>5</sup> Samples were stored no longer than three days prior to analysis. A 1 L HDPE bottle of deionized water was carried into the field to act as a field blank. Quality control samples spiked with known levels of the perfluorinated compounds (PFCs) were also carried into the field. These quality control measures were analyzed along with the field compounds. The method of analysis was LC coupled to a triple-quadrupole MS by ESI. Analytical standards for each PFAS investigated were used to construct 6-point calibration curves and ranged from 93% to 99% purity. Isotope-labeled varieties were used for internal standards in the creation of these curves, PFOS with <sup>18</sup>O and PFOA with <sup>13</sup>C. The quantifiable range for the curves was 1-500 ng/L, with  $r^2 > 0.99$ . The instrumental quantitation limit was 0.5 pg, and the lower limit of quantitation was 0.2 ng/L. Precision was determined to be  $\pm 15\%$  with an accuracy of  $100\% \pm 20\%$ .

To minimize loss due to filtration, a positive-pressure dual-piston pump was used to force large amounts of sample water through the solid phase extraction (SPE) cartridge and then eluted with methanol.<sup>5</sup> The resulting eluate

was then run through a Fluofix-II column to remove interfering organic materials. Potential contamination from polytetrafluoroethylene (PTFE) parts in the HPLC was eliminated by flushing the system with 100% methanol for more than three days. It was noted that for ultralow-level determination, it may be necessary to replace PTFE fittings and parts with stainless steel or polyetheretherketone (PEEK).

### BACKGROUND NOISE

All of these papers acknowledge the difficulty of measuring PFAS in the complex matrices found in the natural environment. The interference of organic compounds in the matrix presents an issue,<sup>2,5</sup> but this can be solved with more thorough analyte preparation techniques.<sup>5</sup> Of greater concern is the possibility of measuring levels that are either higher or lower than the actual concentrations at the field sites. Nakayama et al., for example, found higher concentrations of PFOA and PFOS in the Cape Fear Basin than a team studying the Rhine River.<sup>5</sup> That experiment on the Rhine, conducted by Skutlarek et al., however, used glass bottles for sampling and storage,<sup>15</sup> and the EPA now recommends avoiding glass due to the adsorption potential of PFAS on that substance.<sup>3</sup> This may have resulted in systematic errors producing lower than actual results. A study conducted on the Rhine by Möller et al. several years later, well after the EU phased out their usage, actually found higher levels of PFOA in the water than those found by the earlier study.<sup>16</sup> The team still filtered their samples with glass fibers, however, so even their number may be too low. Despite this issue, glass continues to be used for sample collection and storage.<sup>10</sup>

Falsely inflated numbers are perhaps even more difficult to control. Cross-contamination from fluoropolymers in scientific equipment can easily produce results that are too high.<sup>5,11</sup> Greater accuracy can be achieved through the robust use of field and method blanks. The ubiquity of PFAS means that there is always a chance for background signal to infiltrate the results. As early as 2010, an experiment found that all method blanks tested above the LOD for PFOA.<sup>16</sup>

Many commercial items, from aluminum foil to insect repellents can also contaminate samples.<sup>17</sup> With increased precision in analytical laboratories, reporting limits continue to drop and even very small amounts of cross-contamination can result in false positives.<sup>17</sup> While many state government agencies



recommend complete avoidance of materials that contain PFAS when collecting samples, Bartlett and Davis advocate for allowing their limited use in the staging area, as many of the prohibited items, such as Sharpies®, are useful to scientific work and will not contaminate samples provided they are kept away from the sampling area.<sup>17</sup> They further propose testing specific items that may be useful in the sampling area, such as insect repellent, to determine whether specific brands do actually contain PFAS.<sup>17</sup> Their research determined that the three insect repellents they tested were PFAS-free for all 17 PFAS they investigated and thus suitable for use in tick- and mosquito-infested sites.

### **CURRENT STATE AND FUTURE RESEARCH DIRECTIONS**

SPE followed by LC-ESI-MS/MS is the most commonly used method for analyzing PFAS in aqueous matrices<sup>10</sup> and is the standard method mandated by the EPA.<sup>18</sup> For PFAS that are not easily protonated or deprotonated, GC/MS with chemical ionization in the positive mode yields high sensitivity and specificity.<sup>14</sup> Shortcomings remain, however, especially in matrix separation. The EPA method is optimized for drinking water and must be adjusted somewhat for environmental samples with high organic loads, resulting in a proliferation of sample preparation techniques.<sup>12</sup> Lipps et al. attempted using a preparation that did not involve solid phase extraction, instead solubilizing PFAS in a methanol-water mix, with a high degree of success.<sup>12</sup> Working with the EPA methodology, Parry and Anumol focused on refining SPE to increase recovery from the matrix to make low-level detection easier.<sup>18</sup> Nakayama et al. report extensively on the advances in matrix separation, listing methods ranging from the use of novel biofibers in SPE cartridges to sorptive stir bars.<sup>10</sup> Although this aspect of testing is constantly advancing, the use of HPLC-MS/MS to analyze the eluate has remained relatively consistent.<sup>10</sup>

Even with advances in instrumental techniques, the problem of testing for all known PFAS remains a problem. The Giesy and Kannan paper tested for four different PFAS, with only PFOS found above the LOQ.<sup>2</sup> The de Voogt and Sáez paper contains an extensive list,<sup>11</sup> yet Nakayama et al. only evaluated 10 perfluoroalkyl compounds.<sup>5</sup> Buck et al. enlarged the list yet again by schematizing the compounds,<sup>1</sup> but a 2013 study only analyzed the 14 perfluorinated

acids listed under EPA Method 537.<sup>19</sup> The EPA added four more emerging PFAS to the list in 2018 with Method 537.1,<sup>18</sup> and instituted a new method, 533, at the end of 2019 that added another 11.<sup>20</sup> Still, the limited number being tested for is likely related to the large number of PFAS currently manufactured, over 4500.<sup>18</sup> The problem with testing for all PFAS is directly related to the difficulties in developing analytical methods that are capable of covering wide ranges of PFAS species.<sup>10</sup>

Major needs in future research are non-targeted and non-specific analysis. Most PFAS analysis looks for known compounds. Non-targeted analysis is needed to discover the novel compounds that are constantly being created from either manufacturing processes or the breakdown of longer PFAS chains.<sup>10</sup> Nakayama et al. note, for instance, one recent study where four new classes of over 165 different PFAS were discovered in fish downstream from a fluorochemical manufacturing site.<sup>10</sup> The discovery of these compounds requires altering sample preparation techniques, another reason research in this area is needed. Research into non-specific analysis is still in its infancy, with few published papers using novel techniques to determine multiple PFAS with a single analysis.<sup>10</sup> Total oxidizable precursor (TOP) techniques have shown some promise, as have particle-induced gamma ray emission (PIGE) and renewed interest in fluorine-19 nuclear magnetic resonance (<sup>19</sup>F NMR).<sup>10</sup>

### **CLEANUP AND FUTURE**

Even with advances in measuring PFAS, the problem of their clean-up remains. Their resistance to biodegradation, once touted as a benefit<sup>2</sup> has become a disadvantage. Their ubiquity in drinking water has also become a concern. While the EPA has not set Maximum Containment Levels, several states have implemented their own standards.<sup>3</sup> The most common method of treating drinking water is by filtration through activated carbon.<sup>3</sup> Nakayama et al. note, however, that conventional activated carbon was ineffective at removing PFAS from drinking water in a Japanese study.<sup>5</sup> Other filtration media, such as carbon nanotubes, have been considered and show promise.<sup>3</sup> The problem of ultimate disposal remains, however. The same problem holds with regards to cleaning up contaminated soil. It is possible to partially remediate a site by amending the soil with sorbents such as clay.<sup>7</sup> This process,

however, simply keeps PFAS from leaching into groundwater.

Artificial oxidation reactions are difficult to catalyze, even with advanced techniques, due to the strength of the C-F bond.<sup>21</sup> Supercritical water can be effective at degrading PFAS, especially when powdered iron is introduced, but the reaction releases a large amount of CF<sub>3</sub>H, a potent greenhouse gas.<sup>21</sup> Electrochemical reactions have also shown mixed success, with longer chain PFAS simply breaking down into smaller chains.<sup>21,22</sup> Direct current plasma has been shown to achieve 100% PFOS degradation and 98% PFOA degradation, but also results in short-chain PFAS in the form of PFCAs.<sup>23</sup> Incineration has the ability to degrade PFAS, but the process releases the extremely potent greenhouse gases hexafluoroethane and tetrafluoromethane.<sup>21</sup>

Taking a different direction, a forthcoming study by Yamijala et al. used computer modeling to demonstrate the possibility of PFAS degradation by reduction reactions.<sup>24</sup> In the presence of excess electrons, their model shows the formation of C=C bonds along the backbone of PFOS and PFOA which has been linked to easier dissociation of fluorine from the molecule. The most common expected byproduct is HF, which could make PFAS degradation a useful industrial process in its own right. Since this is a new technique which has yet to be tried in practice, it remains to be seen whether it will be as effective as anticipated. Progress is obviously being made in degrading PFAS, but there are currently no practiced methods that are entirely effective or safe.

## EPILOGUE

In spite of the likely dangers of PFAS exposure, as well as our inability to clean them up, the question of whether society could function without them remains. Their usefulness in fire-fighting operations and wire insulation make them nearly indispensable to modern life. While alternatives to non-stick cookware and water-proof clothing exist, there are some uses for which better options currently do not. As analytical methods continue to advance, however, the need to replace these products will likely become more obvious. Unfortunately, the compounds are already everywhere in our environment, and there are no good ways to remove them. ❖

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