

Neurosexism:

The Extent to Which Sex and Gender Differences in Mental Illness are Neurologically Explained
versus Socially Constructed

By

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ABSTRACT

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In the growing age of neuroscience, we are rapidly churning out answers to questions about the mind and mental illness that have always evaded us. While increased neurological understanding is valuable to mental illness, our current understanding of mental illness comes with historical baggage that has negatively shaped society's beliefs connecting females to illness. Our definitions of mental illness and its association with women came out of a history of stigmatization against women, disease, and Otherness. This has manifested into the pathologization of female experience as mental illness. The onset of new brain science had a similar agenda to make female inferiority scientifically true, and neuroscience thus made room for neurosexism, the sexist assumption that all differences perceived between men and women are a direct result of neurological difference. While sex differences do exist in male and female brains, it is the neurological aspects along with social constructs of gender imbalance that account for these differences in mental illness between men and women today. An experiment was conducted on perceptions and reactions towards those with mental illness and found that the gender of the individual with mental illness did impact responses, highlighting gender discrepancies in our understanding of mental illness and further supporting that neurological and social factors together sustain difference. Increased understanding of the female to illness connection can help us reduce the pathologization of female experience, improve our current approach to neurological research, and reshape the conversations around sex and gender differences in mental illness.

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PROLOGUE

Part One

On Women, Illness, and Neurosexism

Throughout history, women—especially “mad” women—have rarely been given a voice, and even when they shared the truths of their lived experiences, they were often not believed, but instead belittled, maligned, or marked as “Other,” as deficient, different, and diseased. Women were written into history, a history marked by misogyny, as well as mistrust and misunderstanding of women, and into the grand histories of medicine and early neuroscience, as men saw them, as men wanted to see them, and as men decided they should be seen—an inferior version of themselves. Men, in turn, often wrote themselves into these histories with vested self-interest, often presenting themselves as heroes and rescuers, usually appearing strong, intelligent, and worthy of authority. The emphasized difference between men and women enabled an ideological dynamic of ingroup bias and outgroup antipathy to develop, whereby men could justify the social order and their dominance over women. Hence, out of sex differences heavily prescriptive and socially policed gender roles were born. These socially-constructed norms were quickly internationalized as inferiority not only by men, but also women, who were convinced of their own worthlessness, even though these very norms have harmed women, and nowadays also adversely affect men.

Historically, women who did not or could not conform to societal expectations of them were considered “mad” and unmanageable. Unable to write their own stories until recently, many of these bright and capable women lived in maddening circumstances, within heavily prescribed gendered roles and routines, deprived of the opportunity for self-expression and

independence typically granted to men with power and privilege. Melancholia and madness threatened the social order and conformity to the status quo. Keeping women healthy and happy in their subjugated place was paramount. Perhaps these women were indeed suffering from mental illness but it is difficult to determine the source of their 'madness.' Was it perhaps that they had become mad at the injustices they saw and experienced in society and their daily lives because they were women? Or perhaps they were driven mad as their expressed anger and frustration was used to pathologize them, silence them, and marginalize them as "hysterical."

Seeing women as 'weak' and 'sick' allowed men to keep women at a distance and under their expert 'medical' and scientific control, even when their treatment methods and diagnoses were often highly problematic. The men went down in history as giants of medicine and science, while most of the women, considered to be suffering from mental illness, remained nameless and forgotten in the annals of time. And so the opinions of men, the dominant majority, enforcing the inferiority of women grew, with little resistance, as there was little opportunity for any opposition. Even today, women have not been able to completely shake off the yoke of mental illness attributed to their sexual difference and its lasting effects. The correlation between women and weakness and illness has also carried over as a stigma to men, who when struggling with mental illness, have little desire to seek out support for fear of appearing weak. *How did we not give women a voice for so long? How did we come to so blindly follow the infallibility of science? How could we justify social inequalities with neurological difference?*

These were the questions running through my head as I strolled into Barnes and Noble last summer looking for my next read. I walked straight to the science fiction section, my go-to part of the store, chose a book, and headed to the cashier. On my way to the register, a book with a bright yellow cover caught my eye. Its title was *Delusions of Gender: How Our Minds, Society,*

and Neurosexism Create Difference. The book, written in 2010 by Cordelia Fine, criticizes scientific claims that there are innate biological differences between women and men's brains, debunking this idea of neurological hardwired differences and pointing to literature that describes how socio-cultural values, perceptions, assumptions, and expectations contribute to different gendered behaviors and responses.

As a double major in Neuroscience and Gender, Sexuality, and Women's Studies, I was convinced that this title called out to me and that this topic was my calling. Neurosexism? I was intrigued, and as I learned more, I loved everything about it. I read the book and began to develop my ideas about the history of sex difference and how this shapes how we understand sex differences today, a time in which neurosexism still plays a significant role. Our connecting of women to illness stretches back farther than we think and has permeated all aspects of our society. I was inspired to write about what I see and have experienced today in terms of associations of women to illness and to inferiority, noting the ease with which we associate women to mental illness in particular, especially when compared to men.

I wanted to undertake a double major thesis because of the exciting connections I could already envision. At first, I didn't know the exact approach to take, and that's because these intersections are not well paved and haven't been heavily explored. All I knew was that neuroscience and gender studies needed to have a space created where they could come together.

It is also less about *how* I wanted to write on this topic, and more that I *needed* to—to connect two different worlds: one science, one humanities; one of the past, one of the present; one of my mother and grandmothers, one of mine to show how intertwined and interdisciplinary our lives really are. We do not live in isolation, and I felt I needed to explore and share these connections. I sensed that something as important as understanding female lived experience and

(her)stories in the context of science, neuroscience, and mental illness specifically, had to be interwoven to be more fully explored, revealed, and understood. And it was, it is, with so much more literature emerging in response to this topic than I had expected. We are at the forefront of science and at the forefront of a social movement to overcome the socially-constructed barriers erected to keep women, deemed “Other,” disempowered and marginalized because of argued and arguable gender and sex differences. Nonetheless, this is and remains a novel topic and still is in the early parts of its own conversation, and I am thrilled to be adding my work into the greater collective. While I know this only begins to scratch the surface of a much more complex issue, this is my little offering to the world. My vision has shifted throughout the process, and my journey has been arduous, but at the end of the day, it was all worth it.

PROLOGUE

Part 2

On Storytelling, Shared Suffering, and Gender Studies

Lived experiences and the sharing of our stories, especially stories of overcoming obstacles and suffering, are what drive our individual and collective lives, and our societies forward. Sharing our own stories can bring us together, while prescriptive stories of societal expectations forced upon us can stifle us and tear us apart. Storytelling is fundamental to our individual lived experience, and we look for narratives and stories in order to shape our experiences and bring them into clarity. There is a wisdom to be gained from making meaning of personal experiences and of shaping our individual experiences into stories we can share with others. Indeed, sharing such stories often brings rewards and benefits. Such stories point out

places of commonality and difference, as well as of suffering and sorrows that might otherwise elude us, especially if we only try to live our lives according to prescriptive storylines. Our lived experiences and shared stories, especially for women, are what create some of the most beautiful harmonies and fierce dissonances in our lives. Thus, it would be foolish to ignore or invalidate the insights gained from such experiences as storytelling can therefore be a great source of creating community.

When a group of people is denied the power to create and share their own stories and forced to take on other people's mistaken stories as their own, it can cause great alienation and suffering. Unfortunately, this is and has been common practice in modern society and the practice of medicine in neuroscience, where we often discourage and discount a sharing in the individual's lived experience of illness, inequality, and perceived Otherness in order to accommodate the preferred collective and objective. Often this means subjugating the personal to the collective, and when it comes to discussions of how individual women are and have been linked to 'madness' and 'mental illness,' much can be lost.

As feminists, we recognize that "the personal is political" and remember how the tremendous changes brought on by American second-wave feminism emerged from such 'consciousness-raising' exchange of personal stories and individual experiences, which forever changed and shaped how we view sex and gender in our society.

Critical feminist literature questions such assumptions and deconstructs conventional and historically academic concepts of illness and otherness, as well as of women's "madness" and mental illness, exposing socio-cultural, historical, and political roots and reasons for maintaining misleading categorizations and classifications. Often such criticism illuminates the mistaken assumptions within the system or society, not necessarily the individual. Feminist theory has

actively challenged misogynist assumptions that subjugate women as ‘inferior’ to men, undermined the master narratives and authoritarian histories forced upon women and other marginalized groups, deconstructed traditional concepts and definitions of illness and madness as linked to women, and questioned our most basic assumptions in the fields of the arts and sciences.

Nevertheless, when it comes to our society’s love of modern medicine and neuroscience, we are often unaware of our own blind spots. We often get so caught up in our science or in “fact”—even the facts that often are not actually factual but rather so clouded by our need to be right in the name of science—that we can tend to lose sight of the importance of these lived experiences and stories. We have to put value not only in the lives of those who share their stories and experiences, but also in raising our collective awareness about our blind spots and in moving our society and collective wisdom forward. Neuroscience often has little interest in the rich expression and unique content such individual stories offer as “data.” Women’s personal experiences have so often not been validated or valued solely because of the difference of their sex and gender and despite scientific explanations attempting to strip away context in an attempt to create a universal truth, no one can take personal experiences away from the people who experience them, be it from you or from any woman everywhere. It is the neuroscience behind the processes and functionality of storytelling, and the interplay of the two that is of most interest to explore. This is not to deny the importance of neuroscience in understanding sex difference in mental illness, but merely to emphasize the social components and personal experiences that serve to augment our understanding.

INTRODUCTION

History follows and shapes us. We're malleable beings, who inherit historical legacies, viewpoints, and numerous, unexamined assumptions about life. We are frequently unaware of such an inheritance because the thoughts that determine our lives happen one at a time, slowly shifting our perspectives without realizing they are not our own but ones prescribed to us to internalize, believe, and live by. Associations we have made often just seem to make sense, and we do not question who or what put these thoughts into our head because the assumption is that they have always been there, and given this assumption, such thoughts tend to remain uncontested. It is not even reality that matters in society but our *perceptions* of reality and of truth. We readily attribute abilities and qualities to validate our perceptions because it is who we are, yet we have little evidence to actually back up our justifications for making such value judgements. We typically do not question such behavior because we do not think we need to. However, when we begin to engage in feminist thinking and recognize the inequities in our society, we find we must question our most basic assumptions that form the bedrock of institutions and societal foundations because they are often skewed in nature, and upon thorough investigation, reveal misinformed, misleading, and mistaken (not to mention misogynist) tendencies. And it is these skewed assumptions within the very structures of our society's cultural ethics and thinking and our reactions towards them that are dynamic and strengthen over time. There is no way around it. Our history shapes our current reality, as do our unexamined societal assumptions and cultural contexts.

One of the most prominent associations in our society and in societies all over the world is the linking of women to illness, and in particular, to "madness." The broader connection is of woman as "Other," i.e., as different and negative and vile and non-male. Even in the times of

Aristotle, who proposed and developed a one sex theory, there were noted differences in man and woman that sought to privilege the dominance of men over women. Women were viewed as an inferior version of man, with not enough heat in their bodies to thrust out their reproductive organs, so they remained lodged inside. In the development of the two sex theory in the mid-18th century, the sexes were pitted against each other—everywhere biologically and socially, there was difference. Everything man was, woman was not. And it existed like that, hierarchically—one existed, while the other was an absence of, a shortcoming and defilement of the original one, man. Society shaped our science, and science shaped society, so if women were biologically inferior, they must also be intellectually inferior, only suitable for procreation and later on, perhaps for small talk at dinner parties. Conversely, if women were seen in the home, then that must be where their God-given talents lie, proving biologically they are better for home duties and child raising than any duties they would be doing outside the home, like attending school or pursuing a profession.

As women are increasingly seen as an inferior version of man, naturally illness becomes tied to their very nature. Illnesses of the body and mind were attributed to their ‘differences,’ for instance to the uterus, and men naturally did not have such diseases. Even today, if you heard the word “hormones,” you typically think of women. We seem to forget that men have hormones, too. Madness, or mental illness, was commonly understood as female hysteria in the Victorian Age, and again, such a malady only occurred in women, thanks to their ‘wandering womb’ that tainted their entire moral being. What does this connection do? Proving biological inferiority justified social inequalities, because of our connection and our uncontested, shared assumptions that science is an infallible truth.

What even is this truth? If science reflects society and vice versa, we can't objectively separate science from our societal views, which is why the connection was so easily strengthened over time. We have the general understanding that science is trustworthy because of the robust system it provides to prove or support a given hypothesis through its rigorous methods of careful observation and unbiased experimentations. But if our hypotheses are gendered or grounded in socially constructed and unexamined shared opinions, our approach might not be as objective as we assume. This is a concern amongst many scientific fields that are impacted by sex and gender difference, but I would argue the most fascinating connections of science and sex lie in neuroscience. The science of difference between males and females within the fields of psychiatry, psychology, and neuroscience has been an ongoing source of interest and intrigue for centuries but it is only in the 20th century that we have gained a better grasp of the intricacies of the brain and mind and whether sex or gender matter in the cultivation of the mind. The short answer is yes, there are sex differences. The longer answer poses another question—*does it matter?* What do these sex differences prove? What does difference even mean or signify? Human beings love to talk about difference but the definition remains vague. How “different” is different?

The point to make here is that neurological findings suggest sex differences in the brain, and while these differences may be statistically significant, are they socially significant? We must place them within their societal and cultural contexts. Our expectation is that science shows us what is right and wrong, and disproves fallacies in order to pave the way for accuracy. In the case of neuroscience, for instance, it would reveal whether there are sex differences in the brain or mind that give rise to the sex differences we see today. And it has; but maybe it is because we searched for difference. Perhaps our expectations of difference shaped our abilities of

observation and set up our expectations. What came out of a substantial amount of neurological research was further evidence that the sexes were more different than ever, confirming the existing age-old assumptions that there were significant differences between men and women in order to maintain and validate this difference within society. This seems a bit one-sided, and chances are, if you're searching for difference, you'll find difference. Gina Rippon, a leading writer in neurosexism argues that "the research assumes the differences it's trying prove" (2012). This is what I have begun to call the "neurosexist agenda."

Since neurosexism is the assumption that the sex differences we see in society are attributed to neurological difference, it is a one-sided argument that seeks to establish and confirm that the sex differences in the brain exist. I am not suggesting that a group of individuals or scientists are out for women and trying to prove female biological inferiority. Neurosexism is rarely done deliberately, much like covert racism. So while I may seemingly be accusing researchers of having a one-sided neurosexist agenda, I realize it probably was not something they did deliberately. Indeed, they might not have been conscious of their own biases. Thus, writing about this topic is my attempt to raise awareness and make people conscious of the deeply-engrained cultural and societal assumption that views women as linked to notions of "otherness," deficiency, and illness. This awareness does not mean we must scrap all of our neurological research on sex difference. What it does suggest, however, is that we must look more closely at how we've conducted this research and what we can do in the future to combat the continuous promotion of dividing the sexes, as well as encourage the dissociation of women to mental illness. The research is there, no doubt, but social factors, such as the current climate and inherited views that link women to illness and inferiority, shape our brains much more predominantly than how strictly our biology does (Phelan & Brasow, 2007). This means our

understanding of neurological aspects, mental illness in particular, is neurologically supported, but more importantly, socially rooted.

These social roots and effects of history, which have tied women to illness, continue to play out in our current lives in other ways, more so than just infiltrating our science. The most prominent modern manifestation of this historical baggage is the pathologization of female experience, which literally means “to treat or regard someone as psychologically abnormal or unhealthy” (Merriam Webster Dictionary). The continuous reinforcement of woman as Other or woman as diseased has led us to more readily associate women with illness, specifically mental illness, which historically was often difficult to diagnose and treat and was treated simply as “madness” and social deviance, and so we tend to notice mental illness in women more than in men. There are behaviors associated with mental illness that are more identifiable in women than in men even if they are the same behavior (Sowislo, 2017). It simply is a faster association. This has had numerous negative effects on all aspects of women’s lives, including women’s work in the home, where even women who were completely satisfied with their domestic lives were often put on anti-depressants. Controlling and ‘taming’ women has a long history, and the medicalization of female experience has occurred for centuries. It is only now that we have begun to realize and acknowledge that these shared experiences are not necessarily ones that should be deemed as illness or problematic or even antithetical to the female experience.

Experimental Study: Capturing Gender Difference

To further understand how our society has perpetuated difference between men and women in mental illness and the subsequent stronger association of women to illness, I conducted an experiment on campus, hoping to capture this difference. The experiment was in the form of a survey that consisted of a vignette describing an individual with mental illness who

either had a female, male, or gender neutral name. Based on the respondents' answers to five scales on social distance, willingness to engage, and potential causes and cures, we sought to get an understanding of whether there are gender differences in how people understand mental illness. Certain answers are typical of female. Previous research has shown that certain answers are more typical of female name vignettes than male name vignettes (e.g. for potential cures, pulling oneself together, talking it over with a confidant versus drugs and psychotherapy) so we can see if these stereotypes are still pervasive in our society, specifically in an undergraduate student population. Including the gender neutral name vignette adds an additional level to the male-female dichotomy with mental illness and associations thereof because the literature would have us assume the female to illness connection to be so strong that gender neutral name vignette answers would resemble female name vignette answers more so than male name vignette answers.

Our results showed that there were specific rating scales that showed significant difference between male and female vignettes. The participants had an increased desire for social distance from men with mental illness compared to women, and there was more willingness to engage with women than men. This disadvantages men in society with mental illness because they are navigating a more hostile environment to seek help compared to women. An under-diagnosis of mental illness in males could be a result of this, with the opposite also occurring of an over-diagnosis of mental illness in women because there is so much in our society set up for outsiders and the person themselves to notice when things are going awry.

This is difficult to measure because there is no way of knowing how much of a role implicit bias plays out amongst physicians, but the results from this survey and this work do bring about important questions about being aware of gender discrepancies in mental illness

understanding, diagnosis, and treatment. With a better understanding of the societal differences between men and women, the more specifically and individually we can properly treat them. The same is true on the neurological side—research on sex difference, while having the potential to have a sexist agenda, has done amazing work to understand functional differences between males and females and through specialized medicine, we can better treat mental illness in one sex compared to the differing hormones of another. Neurological research is crucial to our understanding of mental illness, as long as we also highlight the detriment of neurosexism and instruct people to be aware of the ways that our society still shapes our science. And at the same time, while our neuroscience is important, we must highlight the impact of society in creating sex difference, as it would be naïve to believe that neuroscience could explain away all difference. The last long term continuous goal is to redefine mental illness—how we talk about it, what we talk about, and how it is defined, with an understanding of women and their validated experiences. It is imperative that we do not merely continue to dictate our future from our past.

Chapter Overview

Chapter 2 provides a historical overview of sex differences between men and women up until the onset of neurological research and modern science of the 20th century. I included prior history because before mental illness was mental, it was female. All neurological diseases were simply seen and understood as diseases of women as all illness was tied to the female body.

What is most interesting about our understanding of mental illness at this time is that sex difference we now know as fallacies had scientific backing. I briefly discuss the infallibility of scientific thought and how the moment we attributed a behavior or trait to women and enforced it through science, there was little questioning its validity. Not only is this an issue because of its infallibility, but the science was reflective of society and its prejudices. It promoted sex

difference because society was promoting sex difference, and this dug a deeper wedge between the sexes and wove women and illness together.

Chapter 3 contains the neurological background to sex difference. From decades of research, individuals have found neurological differences between males and females. While there are some robust differences, much of the research suggests a more fluid understanding of sex characteristics in the brain. Female rats, for example, have higher levels of stress than male rats, but increasing certain hormones in male rats elicits a more female typical response of higher stress (Zuloaga, 2018). The understanding of neurological sex difference is incredibly important in understanding sex differences with mental illness in today's society, but it does not tell the whole story. Our social culture, as will be discussed in Chapter 1, is pervasive to our science, and so neuroscience has developed neurosexism, which uses neuroscientific practices and results to promote sexist conclusions (Hoffman and Bluhm 2016). This neurosexist agenda taints the significance of the conclusions about sex difference.

Chapter 4 explains previous research done on perceptions and reactions towards mental illness. In this experiment, college students read mental illness vignettes with either male, female or gender neutral names and rated their emotions, willingness to engage, and potential causes and cures. Results reflect the public's opinions about desiring fewer interactions with men with mental illness than women, supporting the argument that men are not receiving the focus they need with mental illness, and women are more accepted in society than men with mental illness.

Chapter 5 looks to the future- where do we go from here? We've analyzed the results of the survey and have identified critical issues within neurosexism and the female to illness connection, and now we have to address future directions. Normalization of mental illness in women is a positive, but could go too far and be detrimental in encroaching on female

experience with increased pathologization. We need to redefine how we talk about and think about mental illness, and whether women experiencing certain emotions and behaviors need to be tagged with illness instead of a less extreme label. Having an increased importance on the symptoms of the individual, taking time to listen to the patient will promote more individualized medicine void of stereotypes. There is also potential in neuroscientific research to rid itself of a neurosexist agenda, and recognizing that while our society has certain views on male-female difference versus sameness, it can't infiltrate science. Neurological research is vastly important to the future of individualized medicine as well in the form of sex specific (really hormone specific) medicine. In conclusion, this work I have done has merely scratched the surface, but it has critical future applications in properly understanding sex differences in society in relation to mental illness and beyond.

CHAPTER 2

A History of Sex Difference

Society's understanding of mental illness in women was attributed to physical difference long before it was mentally and neurologically attributed. The connections of women to illness stem from the physical inferiority of women. I am including this history of sex difference in general so that I can properly set the stage for the lingering inferiority of women today. This timeline goes through certain phases of how we have understood mental illness and the connections of females to illness in general. Male scientists and scholars have voiced their opinions about the female body and mind for centuries, and it began by being rooted in the physical. Hysteria and wandering womb solidified assumptions that illness was linked to all things female, especially illnesses of the mind. As time passed and scientists' experimental abilities expanded, society turned away from linking female illness to the physical and moved towards the psychological. Female inferiority was now defined by one's mental quality, more of a female essence. The last chapter of history introduces brain science in which differences in mental illness between males and females is rooted in neurological understanding.

Where does one begin? I turned to Christian creationism and the story of Adam and Eve. Many scholars argue that this is the origin of our gender difference because church teaching was the science of the time (Bleier, 6). The teaching is that woman came from man, made from one of his ribs. Looking more closely, the Hebrew word Adam is not a name, it is the word for human being which means Adam had no gender (Poole, 1994). It wasn't until Eve, who not only introduced woman into the world but introduced genders that from gender neutral human beings came man and woman. And so man (male) became equated with man (humanity).

350 B.C. Aristotle first argued the one sex theory. To him, women were inferior versions of men, imperfect males. They had the same generative organs, but didn't have enough heat to bring them to perfection to be thrust out of the body, so they remained lodged inside. This theory was anatomically supported by Galen in 200 A.D. believing that "women have exactly the same organs as men but in exactly the wrong places" (Laqueur, 4). He supported Aristotle's views but believed that both men and women provide seed for generation, not women as a mere vessel for the male seed. Andreas Vesalius in 1543 as the father of human anatomy, used scientific anatomy to prove the one sex theory (Laqueur 10). The uterus was the scrotum, ovaries were the testicles and the fallopian tubes were the spermatic ducts (although the language specific words weren't used until late 1700s). Vesalius however did emphasize female distinction with the uterus, and the recovery of Hippocratic gynaecological texts in the 1520s further defined disease to the female uterus (Laqueur 11).

Endocrinal processes like lactation or menstruation were seen as only belonging to women to carry a child, not the result of a certain combination of hormones that both males and females had (Kassell 62). Menstruation was the releasing of blood from the body, the male equivalent of a bloody nose or hemorrhoids. Women's health and wellbeing was tied to menstruation, which released foul humours from the body to remain balanced (between blood, black bile, yellow bile, and phlegm). The womb was "an organ of excretion, a sink or drain through which bodily waste passes. If it becomes blocked, health is compromised" (Hrdy 21). Hysteria ensued if there was a buildup of noxious humours or if the uterus was displaced within the body, known as wandering womb (Kramnick, 48). Remedies included removal of uterus or other female organs, coercion (tying down the woman), attraction (putting sweet smelling herbs between her legs) and expulsion of blood or seed (bloodletting or orgasm). The etymology of

hysteria is Greek in its origin, literally meaning uterus. So the idea of any mental illness or craziness was directly linked to the uterus and all things female (Kassell 60).

In 1603 Edward Jorden published *Brief Discourse of a Disease called the Suffocation of the Mother*. Mother was womb and suffocation of meant hysteria. By producing noxious humours or wandering from its natural place in the body, it restricted the function of the mind, which is why the woman seemed to lose her senses (Kassell 49). Regardless of the end result, the inquiry of disease was centered on the womb. The womb was the source of disease, or malignancy and because it could communicate with other parts of the body, the disease would spread from the womb to the heart and brain as if the womb had carried it there (Laqueur 28). Women had more diseases than men because the womb is subject to diseases, and the womb corrupts the whole body. Jorden and Crooke did speculate that there could be something psychological connected to the illness, but that was not further explored (Kramnick 43).

For the next 350 years, the uterus and womb were linked to all things female. Disease and mental illness were feminine in nature because they were a result of a wandering womb or imbalance of fluids in the body. *So before mental illness was mental, it was female*. Charlotte Perkins Gilman wrote about her hysteria that her doctor (and husband) coined “temporary nervous depression” and the cure was to sit in the house and do nothing, as work and exercise would give her tonics, despite her arguments that engaging in an activity would make her feel better and more useful. Women’s opinions were simply not legitimized, as they weren’t believed to be as intelligent as men’s (Kramnick 185). Christine de Pizan, known as the first feminist, wrote about her incompetency as a woman back in 1405. She believed herself to be intelligent and thought that God would never make an imperfect, evil being, yet all of the scholars told her women are the living proof. “I finally decided that God formed a vile creature when He made

woman and I wondered how such a worthy artisan could have designed to make such an abominable work which, from what they say, is the abode for every evil and vice.” She writes the City of Ladies, claiming that women were so competent that men are jealous and angry, and so they speak ill of women (Kramnick 87).

Marie de Gounray’s *The Equality of Men and Women* in 1622 shocks the public, where she argues that biological difference in sex do not account for the spirit of the human being. The human spirit is neither male nor female meaning that your sex has very little to do with anything, except as a means of procreation (Schrupp 21). Francois Poullain de la Barre in 1674 is the first person to argue that one’s mental capacity is not linked to physical inferiority. We should instead take the time to study differences of the mind if we want real results on one’s intellectual capability. Unfortunately, that’s not entertained again until the 20th century when the brain becomes the focus of sex difference.

In the 18th century, the body is still the focus, but now the two sex theory emerges. This now places women as the complete opposite of men. Doctors found difference in every muscle, every bone, every physical characteristic. A woman is a series of contrasts to men, which also means in terms of intellectual ability. Philosopher Jaques Louis Moreau argued that:

“Not only are the sexes different, but they are different in every conceivable aspect of body and soul, in every physical and moral aspect. To the physician or the naturalist, the relation of woman to man is a series of opposites and contrasts. All parts of her body present the same differences: all express woman; the brow the nose the eyes the mouth the ears the chin the cheeks. If we shift our view to the inside and lay bare the organs the tissues the fibers we encounter everywhere the same difference” (Laqueur 15).

This is also when social Darwinism is on the rise, so there is a survival of the fittest mentality. If men are in the public sphere as scholars that means they biologically are better in those positions than women are (Ehrenrich, 12). Women are instead better at house related

things, like interior decorating and cooking. With gender norms being backed by “science” not much is questioned due to the infallibility of scientific thought. Biological determinism is used to limit women’s capabilities without women being given an opportunity to disprove those limits because the Woman Question- the debate over the essence and status of women- was conducted by men.

Male led Feminism

“To be pleasing in his sight, to win his respect and love to train him in childhood to make his life pleasant and happy, these are the duties of woman” -Rousseau (Kramnick 218).

The conversation with women’s equality is split- there are groups of scholars claiming that women are fundamentally different and inferior, as has been the conversation for centuries.

Paul Julius Moebius, a German neurologist writes *On the Physical Idiocy of Women*.

Interestingly enough he is one of the first scientists looking at the psychological causes of disease, yet still viewed women and hysteria as inferior. In response to *On the Physical Idiocy of Women*, Johanna Elberskirchen publishes *Feminism and Science* in 1903 saying, “the truth is that when scholars make opinions concerning females, they are too much man and too little or not at all scientifically reasoning human” (Ehrenrich 36).

The second side of the conversation is a new theory emerges that women are different, but not necessarily inferior. They praise women for having talents that men will never have, placing them as equals in terms of worth but still divided in terms of ability.

Famous scholars such as Immanuel Kant, Jean Jacques Rousseau and Thomas Gisborne speak adamantly about a woman’s true purpose of pleasing man and not entertaining scholarly endeavors because that is against female nature. Gisborne argued that women are different, but for good reason; they have unrivalled virtues of beauty and feelings of the heart which make up

for their lack of strength and intelligence (Gisborne 6). Men were given so much comprehensive reasoning that God gave this sparingly to women. But to women He gave “sprightliness and vivacity, quickness of perception, and the enlivening and endearing smile of cheerfulness. The female mind is unrivalled in those things” (Kramnick 219). This was early feminism –separate and different, but equal. Gisborne adds “men, you want to rejoice that this inquiry is in your favor? Think again” (Kramnick 220). He glorified the female sex. “Examples of the most amiable tendencies and affections implanted in human nature, of modesty, delicacy, of sympathizing sensibility, of prompt and active benevolence, of warmth and tenderness of attachment. These endowments form the glory of the female sex. They give to civilized society its brightest and most attractive lustre. Men try to appear superior in fortitude but women are hardly the inferior sex” (Kramnick 220).

Auguste Comte goes even further to suggest we will enter a time of worship of woman because she is the basis of all humanity.

“Woman’s function in society is determined by the constitution of her nature. As the spontaneous organ of feeling, on which the unity of human nature entirely depends, she constitutes the purest and most natural element of the moderating power; which while avowing its own subordination to the material forces of society, purposes to direct them to higher uses. First as mother, afterwards as wife, it is her office to conduct the moral education of Humanity. They must be relieved from outdoor labor, and other means must be taken to secure due weight to their moral influence” (Comte, 2)

Immanuel Kant also believes in the separate but equal nature of male versus female status. Women have a beautiful virtue and to focus on anything scholarly will distract them from focusing on your beauty. Besides, they do not care that men have more noble qualities. “A woman is embarrassed little that she does not possess certain high insights, that she is timid, and not fit for serious employments, and so forth; she is beautiful and captivates, and that is enough”

(Kramnick 329). Women like Constantia are quick to attack this argument that of course women notice they're inferior; "she feels the want of a cultivated mind" (Kramnick, 356).

And to anyone who wants to argue that these are male opinions? Rousseau argues this inequality is not man's making or the result of mere prejudice, but of reason. They had no reason to think otherwise because their understanding of truth was shaped through male opinion.

"Woman is worth more as a woman and less as a man; when she makes a good use of her own rights, she has the best of it. When she tries to usurp our rights, she is our inferior. So to cultivate masculine virtues in women and have them neglect their own virtues would do them injury" (Kramnick 262). For if they try to be masculine they are doing the duties of men and women imperfectly so they fall below their own level as women and the level of men.

Female Voices

"Women may no longer pass for those little useless and impertinent animals which the ill conduct of too many has caused them to be mistaken for. If God gave us the capability to think why not use it." –Mary Astell, *A serious Proposal to the Ladies of England*, 1694

In the early 1800s, French historian and sociologist Phillipe Buchez is one of the first males to say that gender specific characteristics aren't natural but rather a result of unequal socialization (Schrupp 23). Olympe de Gournes argues that superiority of the male sex is custom, not nature. However custom becomes second nature, and can even replace nature altogether to form a new truth (Freedman 191). Female voices begin to enter this scene as well, arguing that women have much untapped potential and if given the opportunity to prove their intellectual abilities, scholars would change their minds about female inferiority. Interfering with human capability through arbitrary limits, as Elizabeth Cady Stanton writes, "is an injustice to the individual and a detriment to society." She also echoes what Marie de Gournay proposed three

hundred years earlier that God created human beings not male and female essential beings (Schrupp 24).

In 1792, Mary Wollstonecraft writes *A Vindication of the Rights of Women*. She is one of the first to notice that sex differences exist because women were raised and socialized to be dependent, not because they were born that way. Inferiority stems from gender, not biological sex. The only reason men have reigned supreme is because women were told to spend time focusing on their looks rather than exercising their minds. She is not denying physical superiority, but men use their physical superiority as a prerogative to be superior in every sense of the word. “I am not content with this natural pre-eminence men endeavor to sink us still lower, merely to render us alluring objects for a moment” (Freedman 217). The praising that men give women is not genuine- you can’t fool women into thinking that strengths of the home like knowing how to sew is equal to an intellectually stimulating conversation. Women have untapped intellectual potential, if only men give them the opportunity. Constantia writes that yes women’s duties are to be wives and mothers, but why stop there? Are men really going to make it so that women “are allowed no other ideas than those which are suggested by the mechanism of a pudding or the sewing the seams of a garment?” (Freedman 440). Women were angry, and for good reason. Following the arguments of Christine de Pizan, arguably the first feminist, what gives men the authority? They’re realizing it is not biology, but merely a social construction for control.

“Men, tell me, what gives you sovereign empire to oppress my sex? Your strength? Your talents? Search and probe all you want; everywhere you will find the sexes mingled; everywhere they cooperate in harmonious togetherness in this immortal masterpiece.” –Olympe de Gouges (Freedman 609).

You would think that once we understood the intricacies of the brain and the mind and hormones that things would head towards equality because it would provide clarity. However,

the onset of new science only seemed to reinforce female inferiority. The focus of sex difference turns to the brain in the 20th century and we understand hormonal differences and the implications of X and Y chromosomes, but society uses this knowledge to further justify that men and women are meant to occupy different spheres; biological determinism is still very much alive. This will negatively impact how neurological research is conducted, with hypotheses being generated under a gendered lens that was assumed to be universal. Out of neuroscience comes neurosexism.

CHAPTER 3

The Neurosexist Agenda: Neurological Sex Differences in Mental Illness

Neurological research has proven to be invaluable knowledge in understanding mental illness in that it ties a previously psychological understanding of the concept to the biological. We now know about structural sex differences that effect how individuals develop mental illness as well as the differences in manifestation between men and women. These neurological differences can have implications for behavioral differences between men and women, but they do not necessarily correlate to a direct or isolated causal relationship to behavioral gender differences. Societal influences also play a significant role in our thought processes of how we understand mental illness. There are differences in how society erects barriers between men and women and in how societal norms and expectations shape men and women, which in turn shape how our brains process and express mental illness. It is important that scientific research reflects or at the very least acknowledges the interaction of social and neurological factors in addressing sex and gender differences in mental illness.

As much as we understand our brains to be output machines, a significant amount of input is involved in order to produce that output, and the input typically comes from our understanding of our external world. Mental illness is a perfect example of the interplay between our external and internal worlds, and when a person's experiences of the external and internal worlds aren't in unison with each other, i.e., when there are significant discrepancies between how one's life is versus how one's life ought to be, then illness can develop and change our brain chemistry ("Onset of depression," 2017). If, for instance, one is continuously engaging in self-deprecating behavior, activated chemical processes activated will continue to strengthen, which

is known as long term potentiation, while less utilized pathways in the brain atrophy (Sheynikhovich, Otanu & Arleo, 2013). This is the case for males and females, demonstrating that what we project onto the world turns around and projects back onto us, with lasting neurological effects.

It should come as no surprise that men and women are diagnosed with mental illness at very different rates (Riecher-Rossler, 2018). Women are twice as likely to be diagnosed with an anxiety disorder than men, while alcohol or drug abuse related disorders are more prevalent in men than women (“Anxiety & Depression,” 2010). While there are dozens of possible reasons why this is the case, women’s experiences with mental illness are different than men’s, whether it be through their own perceptions or through society’s perceptions of men and women. For women, mental illness could be more emotionally driven, in part because society has taught and encouraged women to be more in tune with their emotions, more engaged in care giving, and more aware of their own perceived weaknesses in society. Or perhaps their emotions stem from a point of inferiority of being a woman in today’s society, and so these complexes in the brain will play a role in how one develops the illness, as well as how one copes with it.

One difference that has been measured is in stress levels and the cortisol/corticoid arousal system, whose differences give us insight into depression and anxiety in both women and men. Where do these hormonal differences arise? Typically, hormonal differences occur during prenatal and postnatal development and continue all the way until one has reached full adulthood (Zuloaga, 2017). Developing females receive low brain estradiol levels, and it is not until puberty that high estradiol and progesterone levels occur. In males, high peripheral testosterone, which turns into high brain estradiol, exists in high amounts between prenatal and postnatal time periods. The high estradiol turns into high testosterone, and not only are these high

concentrations but the way in which they are sent through the body matters. Testosterone pulses are much more frequent and intense in men than in women. Testosterone pulses masculinize the brain early in development. Females do not have this high hormone surge (Lenz et al., 2012). Estrogen and glucocorticoids also help us understand how males and females process stress differently. Females have higher levels of glucocorticoid receptors, leading to a faster and stronger stress response. Knocking out this ability in female rats results in a corticosteroid binding globulin deficiency, so that female rats displayed lower levels of corticosterone after stress (Minni et al., 2014).

Our brain's stress response operates through the Hypothalamic-Pituitary-Adrenal Axis (HPA). As a quick explanation, HPA axis activity is initiated by the release of corticotrophin releasing factor (CRF) from neurons in the hypothalamus, more specifically the hypothalamic paraventricular nucleus (PVN). Many PVN neurons project directly onto the anterior pituitary which release adrenocorticotropic hormone (ACTH). ACTH is what travels through our circulation to the adrenal glands which release glucocorticoids, otherwise known as cortisol, a term we're all familiar with. The release of cortisol helps regulate our stress response, and actually initiates a negative feedback loop to decrease the release of CRF from the hypothalamus which helps us cope with the stress threat (Jiang et al., 2018).

Females show a greater HPA axis response, which is activated by greater levels of stress (Rosinger et al., 2017). Increased corticosterone levels are also a result of HPA axis response. When hormone levels increase, their receptors also increase and so corticotrophin releasing factor increase during stress also increases corticotrophin releasing factor receptors (CRFR). Research has shown that females have more CRF and thus more CRF receptors in the hypothalamic PVN. What's interesting is that CRFRs at day 0 (birth) is higher in females than

males but still very much present in males. Around day 4 postnatal, CRFRs surges for females but remains stagnant for males. By the 21st day, CRFRs in males are nearly absent and females have reduced levels (Rosinger et al., 2017). These are a result of the estradiol and testosterone levels mentioned earlier. What also occurs by this time is a sexually dimorphic expression of CRFR1 in the PVN. Not only are these receptors present in higher levels in women, but these cells highly co-express/localize estrogen and glucocorticoid receptors, which makes sense of a region known to regulate ovulation, reproductive and maternal behaviors (Rosinger et al., 2019). It is already known that high CRF levels are associated with anxiety and depression disorders, and Rosinger's findings suggests a group of cells in the PVN that is unique to female and can help us understand sex specific stress responses in mental disorders.

These are examples of evidence about sex differences in stress responses leading to mental illness in men and women. The next question of interest that follows every discussion after the results is what does this all mean? Is there validity to this? Having just presented all of this evidence for you, now I am going to ask the meaningful question, does it matter? Sex differences exist—*but do they matter?*

You're possibly thinking, of course they matter, they have to. And they do. But do they matter to the scale that we making them out to be? I do not think so. So, the answer to the question of whether sex difference matter for the most part, is no. Understanding neurological difference is very useful. We must be very careful what we do with it though. Extrapolation is a dangerous poison.

Let us dissect this further. The reason I state that sex difference does not really matter is because neurological difference does not exist in isolation. They do not matter alone. It is

complex. So why would we pay attention to the neurological sex differences if that's not the only thing at work here creating difference in society?

Another thing to note is that the research presented above was done on rats, not humans. Our human brains are similar to the brains of rats, yes, but our experiences are not. We should keep that in mind in terms of how relevant the neurological research is, given humans' exposure to life and societal influences. Society shapes our science. Nothing is objective. We can be as objective as possible but what one decides is objective versus subjective is in and of itself subjective because it is still shaped by the norms and culture one lives in.

So here is the thing –I am also talking about the sex differences we see in society. The claim that our sex differences are neurological are still shaped by how we view sex differences from our society and its societal lens. It is like taking food and exposing it to a flame so that it burns, and upon eating it, expecting the food to taste the same and be the same it was before you exposed it to the fire. It does not matter now if your food wasn't burnt before; it happened and will not be the same after it has been burned. Likewise, even if there are robust differences in male and female brains, the moment humans enter this world and begin to think for themselves, they get burned by the realities of society. Thus, it is silly to speculate about what the food was like before it was burned because it is already been burned, and one can't unburn it. Similarly, one can't talk about sex differences in the brain through society without having the brain be affected by that very society and its gender norms. We are tainted, we are burned, and we can't talk about the brain not being shaped by society or sex difference being explained only neurologically, because it is not our reality. Right now, we have a brain influenced by the world it lives in. Therefore it is impossible to say that all sex difference stems from neurological reasoning, because it is not the only thing that has impacted the brain. Our society has, and it is

perhaps a much stronger influence than any of the neurological explanations because of how pervasive it is. We are deeply enmeshed in our society's gender norms and socio-cultural expectations.

Society not only shapes how we view sex differences in mental illness with men and women. It also shapes our science. It shapes how we study and hypothesize and learn about the world. It shapes the questions we ask and the assumptions we make. It shapes our research and our research agenda.

The Neurosexist Agenda

Neurosexism is best defined as the sexist assumption that all difference between males and females is neurological. Neurosexism posits that there is a flawed reliance and belief in inherent neurological and biological sex differences that cause and account for differences in women and men's behavior and character. Such beliefs are problematic because neurological differences do not fully explain sex difference, yet they risk providing scientific "proof" that endorses a framework for treating people differently on the basis of gender. It is sexist because historically such claims of fixed differences between female and male brains have been used to explain women's inferiority or unsuitability for specific tasks and behaviors. We know that neurological differences cannot fully explain societal difference between men and women, yet we believe the validity of such neurological evidence anyway.

One of the key arguments of neurosexism is that insular scientific research, which doesn't take neurosexism into account, risks creating a circular logic or self-fulfilling prophecy. The explanation behind the neurosexist agenda is that when you search for difference, you'll find difference (Rippon 2017). It is a post hoc argument, in which you already anticipate and know

what you're looking for, so you are a) more likely to find it and b) more likely to ignore opposing information. The latter is known as self-serving bias, in which you pay attention to information that's relevant to the specific hypothesis you assume will be true, and you do not pay attention to information that disagrees with your hypothesis. (This is why trying to convince an individual of an opposing standpoint on politics is often so difficult, as they will refuse to believe it, even if it is a good argument. They are much quicker to believe even the smallest, most questionable fact that supports their own ideas and their political party.)

In relating this to neurological research, an agenda and hypothesis testing that focused on finding difference probably did, and the insignificant findings highlighting similarities were discredited more readily and more quickly. Reporting insignificant findings on neurological sex differences many times are just as important as significant ones (Hewitt, Mitchell & Torgerson, 2008). However, such studies are not typically shared, as studies are more likely to be published if results are significant. Furthermore, when results are statistically significant, their significance sometimes is increased and played up in the discussion, especially if these results are to be published. In this small way, neurological sex difference is strengthened.

One of the most well-known cases of a neurosexist agenda is by Ingalhalikar et al. (2014). This study looked at the brains of over 1000 males and females ages 8-22 using diffusion tensor imaging, which allowed for analysis of white matter tracts. When looking at connection weight in males and females, males had more unihemispheric connection weight and cross hemispheric connection weight in females (Ingalhalikar et al., 2014). Put more simply, men have more intrahemispheric connections, suggesting they are better at perception and coordinated action. Women have more interhemispheric connections, suggesting they are better at analytical and intuitive processing methods.

Now might I add as a disclaimer that this study didn't actually test perception abilities or analytical processing abilities. Instead, the researchers looked at the connections within the brain, knew what those connections meant, and concluded that because men have more of these connections, then they're better at specific behaviors (Daphna & Ricardo, 2014). I do not think a good neuroscientist can and should imply causation like that. As neuroscientists have quickly discovered, the brain is infinitely more complex than we could have ever imagined. So, taking two connecting studies and connecting them together is not sound science, and it certainly is not sound statistical significance. Regardless, the connection was made, and the paper was published, but quickly received backlash. The language in this published paper is also strongly determined and very directed at one hypothesis, so it clearly reveals that the researchers were expecting to find difference.

Another criticism of this research was the figure Ingalhalikar used to support her main findings. One brain image showed many interhemispheric connections and the other intrahemispheric connections, but we know from previous research both occur in males and females. It seemed the researchers played down the significance of the other connections that didn't match the right sex so that it looked like a larger binary split between how male brain are wired and how female brains are wired (Fine 2013). It is also important to note that male and female brains may have different organization because of size. It is possible that male brains being physically larger results in a different organization than a smaller female brain because a larger brain does not equal a smaller brain sized up (Fine 2013). Brain size was not controlled for in this study.

A third overemphasized component is significance. To give a sense of the huge overlap in behavior between males and females, of the twenty-six possible comparisons, eleven sex

differences were either non-existent, or so small that if you were to select a boy and girl at random and compare their scores on a task, the “right” sex would be superior less than 53% of the time (Daphna & Ricardo, 2014).

So, the question of sex difference is not whether neurological differences exist, but are they meaningful? What are we trying to prove? Is proving difference all we care about?

It is all about perspective and the lens, with which we understand the world. The word ‘difference’ has become laden with social, cultural, and political significance, and thus is perceived as being harsh and deterministic. Also our perception of how much this difference represents is larger and more significant than the mere definition of difference itself. Difference doesn’t have a percentage attached to it. It just means not the same. Yet we assume a greater difference and distance, when we talk about difference. I am not advocating to change the definition of difference here but I am encouraging us to be mindful and cautious of how neuroscientific research looks at gender. If you see difference, perhaps recognize that it might not be as significant as it appears or is framed in published form. No one can identify the percentage of how much male and female brains differ, but I still propose this: *If male and female brains are different by 1 degree, are they 1% different? Or 99% the same?* It depends on how you want to look at it. But do you notice the emphasis on difference when I say different, and does it influence the distance you sense between them? For instance, perhaps you do not focus on how small 1% out of 100% is, but rather you image this difference to be something larger and more significant because of the framing of the statement. Indeed, this is how our society understands and employs difference as a means to emphasize the distance and distinctions between us.

A much more realistic approach is understanding that difference can be both exaggerated and arbitrarily labeled. Sometimes a simple manipulation of hormones can change the male versus female behavioral outcome in which case difference becomes obsolete. Girls who have congenital adrenal hyperplasia have increased levels of testosterone and androgens exposed during development and as a result have a higher preference to play with male toys, despite their gonadal sex as being female (Zuloaga, 2017). The nucleus of CRFR1 expressing cells is present in females but not in males in the rostral anterior PVN starting from the early postnatal period and remaining dimorphic through adulthood; however, the higher level of CRFR1 response in women can be changed. A single injection of testosterone or estradiol on the day of birth doesn't create this increased nucleus of CRFR in the AVN in females.

Gonadectomies (castration of male or female sex organs) in mice change their stress response to be more uncharacteristic of their sex. In male rats, a gonadectomy enhanced stress-induced corticosterone secretion and did the opposite in female rats, where corticosterone was decreased after an ovariectomy. Both changed from their baseline by two-fold meaning corticosterone pulses either were cut in half or doubled after gonadectomies were performed (Rosinger et al., 2019). Sham-gonadectomies were used as the control to suggest that changes in corticosterone were solely a result of hormonal changes and not the castration itself. In addition, hormones that are associated with females at high levels such as arginine vasopressin and corticotrophin releasing factor and glucocorticoid receptors in the paraventricular nucleus were present in higher amounts in both the females and the castrated males, whereas ovariectomized females exhibited lower levels that resembled normal males (Rosinger et al., 2019).

In nematodes, there are similar neurons but their connection patterns are different depending on what brain they occupy. Before sexual maturity, their neurons are mixed in male

and female arrangements and upon sexual maturity those neurons serve different functions. And if they swapped neurons, behavior changed (Seale, 2004). This is only for instinctual behavior, given they are only nematodes, but further research hopes to find out if this occurs in humans as well.

The science is definitely complicated. Some studies show an effect if you change hormones at birth but no effect after puberty, and whatever differences formed won't change, even if given a gonadectomy (Rosinger et al., 2019). The CRFR1 levels won't change. Others show that even as adults behavior will change when hormones change. Yet others find the middle ground, with castration affecting CRFR levels in the PVN but not in the AVPV, suggesting this is established prenatally.

Interestingly enough, the most relevant, new research explores the non-binary mosaic model, in which brains are a random mix of hormones and do not fit into a dichotomy mold of male/female. This research is not denying sex differences, but serves to highlight the integrated nature of the human brain- nothing is clear cut. Daphna et al. (2015) conducted an fMRI analysis on over 1,400 human brains looking at the similarities in male and female brains, rather than with a hypothesis searching for difference. The data revealed an extensive overlap between the distribution of gray matter, white matter and subsequent connective tracks between male and female brains. In addition, brains with features that would be considered strongly male versus strongly female are hard to come by. What is most common is a mosaic of male and female features, with male or female brains falling somewhere in the middle of the spectrum, rather than at the ends (Daphna et al., 2015).

One common argument is that male and female brains are cut from different molds, and another as was just mentioned is a mix of hormones, and we can fall anywhere on that spectrum

(Fine, 2015). To say two people are different on a spectrum doesn't really make sense. This research shows males and females perform a certain way. It also reveals that if you manipulate this, males will perform like females, which reveals how precarious this research is, as the only thing one is doing is manipulating hormones, or one aspect, and observing behavioral changes or shifts that are then said to form a typically male to a more typically female person.

Not only is the brain neurologically following a mosaic model with a mix of hormones, there is also the mix of experiences. Neurology alone can't create a gendered brain because it preexists societal influence. Our brains are shaped from our experiences through life, which arguably are more important than our neurology. Women may be biologically predisposed for mental illness because of their high corticotrophin release factor but if they are raised under other circumstances, for instance, to not be as emotional or to healthily share their feelings, they might not develop an illness, or it will be less severe. Boys may be biologically predisposed to be better at math but if you teach a girl how to multiply and this is not fostered in boys, you can bet the girl will be better, and it has nothing to do with her biology and everything to do with how she's socialized (Rippon, 2016). Sex differences in society may be projected onto us, so that we believe there are differences and accept these fallacies and all.

Our external experiences can seriously shape our brain structure, to the point where the differences we see biologically between men and women are not biological but are social, and the result was a biological change. Our brains change our associations when we process stereotypes and if society has stronger associations of women and illness those stereotypes will more readily be primed in a given situation (Hinton, 2017). Another example is with our fusiform face area (FFA). It is strengthened with reinforcement, for example when you spend a lot of time looking at one thing. This is not just for faces interestingly enough, and a study done

by Peele et al. called the Greebles study had individuals study the difference in Greeble figurine faces. Sure enough, when participants became good at it and were asked to identify which figurine they were looking at, their FFA lit up. Maybe the reason women are believed to be better with socialization compared to men is because we look at dolls all day as children instead of at cars. As a result, our FFA gets better at recognizing faces because it is reinforced looking at real people and our toys, which is perhaps why women are said to never forget a face. It is because they got good at it, and their brain adapted. Whatever you spend a lot of time looking at because you've deemed it valuable will result in a stronger neurological and subsequently behavioral response. Whatever socialization you're part of will be strengthened neurologically, thus *a gendered world will create a gendered brain* (Rippon, 2016). That's what we're exposed to. It would be so foolish to ignore our gendered experiences in explaining neurological sex difference.

Neurologically speaking, despite the neurons or hormones present in male or females but not the other sex, this is not a guarantee. It is much more beneficial to understand gender on a fluid scale because our hormone levels operate on a non-binary scale. There's no x amount of estrogen and x amount of testosterone that makes you a woman. It is the combination of hormones and socialization factors that defines your gender identity. Reis (2014) conducted a literature review to see if sex differences could be classified as taxa or dimensions. Their results supported the latter because our brains are less categorical, more dimensional. The human brain is not meant to fit into boxes; we exist as overlapping dimensions, explaining as much of our sex difference with neurological factors as we do social factors.

The social component of differences in mental illness is thus as important if not more important than neurological understanding because of how much it infiltrates our perceptions.

Tackling the neurological aspects of sex difference with mental illness needs to be done alongside highlighting the social aspects, and I chose to personally take on this question by conducting an experiment with the population I surround myself with to gain a better personal and societal understanding of gender differences with respect to mental illness.

CHAPTER 4

Modern manifestations of the female to illness connection: Perceptions and reactions towards mental illness gendered experiment

Introduction

The associations of women to mental illness are much stronger than associations of men to mental illness (Seedat, Scott, & Angermeyer, 2009). While neurological sex differences exist and are important, much of our understanding of sex difference has been shaped by history, society and its prejudice. It is of utmost importance to highlight the social emphasis on the female to illness connection to show that neurological research alone will not explain away sex differences in mental illness. Our society has created difference in how we understand men versus women with mental illness, and this experimental study was done in an effort to capture this difference.

The methodology of this experiment was based on previous experimental research assessing attitudes towards males and females with mental illness through the use of vignette scenarios followed by self-rating assessments. Phelan and Basow (2007) conducted a study using vignettes with either male or female names depicting depression, alcohol abuse and common stress, and participants answered questions afterwards assessing their attitudes as well as their own levels of social dominance, empathy and adherence to traditional gender roles. Participants who labeled the individual in the vignette to be mentally ill saw them as more dangerous and desired increased social distance. Participants were more empathetic to individuals who they did not feel were a threat, and so did not desire increased social distance. Looking at willingness to socially engage with the person described in the vignette, individuals also rated female vignettes as less dangerous, thus more willing to interact with them compared to male vignettes

(Schnittker, 2000). One study looked specifically at what caused perceived dangerousness and male vignettes were significantly higher on the dangerousness scale than female vignettes (Sowislo et al., 2017). A pattern emerges from this research that individuals regardless of age perceive males with mental illness to be more dangerous, desiring increased social distance.

Conducting research on mental health stigma in college age individuals specifically has shown that this age cohort has less mental illness stigma compared to older generations (Truett, 1992) and that stigma is higher in men than women (Eisenberg et al. 2009). Yet even though college-aged students may show greater destigmatization of mental illness and higher levels of understanding and acceptance, society nonetheless still has its prejudices (Watson & Corrigan, 2002). A recent meta-analysis of 95 studies on gender differences with depression found that perception of gender differences and stigmatization actually peaked in adolescence before declining and stabilizing into adulthood (Salk & Abramson, 2017). With college age students, a mix of adolescence and adulthood are captured in which case this is an opportune population to find gender difference. Because the mores of society are pervasive at all ages, it seems plausible that there could be a difference in how college students react to men and women with the same mental illness. Studying a college age population helps to evaluate the extent to which gender priming betrays their sense of gender non-bias or push for gender equality.

The goal of this experiment was to investigate whether participants respond differently to the same mental illness vignette based on if the names in the vignettes are male, female, or gender neutral. The broad purpose of this experiment was to provide support for the extent to which we understand and stigmatize mental illness in society. Up until this point, studies have been shaping their experimental design with respect to a gender binary, men and women. With the design of this experiment I hope to expand upon our understanding of gender differences in

mental illness by adding a gender neutral vignette condition. Gender was made obvious without telling participants so that the study was explicitly examining gender difference and so it went unnoticed. The name was continuously used throughout the survey in each of the scales to gently remind the participant who they should be imagining. A gender neutral name was included to determine if participants responded in such a way that suggested they believed the gender neutral name to be a female. This allowed for an additional examination of the connection between femaleness and mental illness.

Hypotheses

There will be a significant difference in participants' perceptions of and reactions to the mental illness vignettes based on the gender identity of the individual referred to in the vignette.

Specifically I hypothesize:

- Compared to the male vignettes, participants reviewing female vignettes will desire more social distance and a lower willingness to engage.
- Compared to male vignettes, participants reviewing female vignettes will report higher attributions of illness causes to intrapsychic factors or psychosocial stress compared to socialization factors or deviant behavior.
- Compared to male vignettes, participants reviewing female vignettes will report greater endorsement of non-medical cures such as meditation or talking it over with a confidant and lower endorsement of cures that are biologically rooted.

Responses for gender neutral vignettes will lie between female vignette and male vignette responses, but will likely resemble female vignette responses more so than male vignette responses.

Method

Participants

Eighty-four undergraduate students volunteered to participate in this study. Sixty-six students were women and eighteen students were men.

Procedure

This study was approved by the Union College Human Subjects Review Committee. Participants were recruited to complete the online experiment through word of mouth and public campus emails, advertising a study looking at one's perceptions of and reactions to mental illness. Those willing to participate in the study were given a link to the online experiment, which was completed individually through Zarca Interactive. Through the specific links provided to participants, each person was randomly assigned to one of three conditions: male, female, or gender neutral. Participants were not made aware of this independent variable manipulation until the debriefing at the end of the online experiment. In all three conditions, participants read three mental illness vignettes: depression, schizophrenia, and no mental illness. The order in which the mental illness vignettes was presented was counter-balanced across participants. After providing consent to complete the experiment (see Appendix A), all participants were presented with a mental illness vignette followed by five Likert-scale questionnaires relating to their emotions after the vignette, their willingness to engage or interact with the individual, or what they think causes and cures would be for the individual's mental illness. This was the same procedure for the other two vignettes. At the end, students completed an experience with mental illness measure, a demographic survey, and a debriefing survey. The whole survey ended with a debriefing form (see Appendix B), which detailed the independent variable manipulation and main hypothesis. Finally participants were given an external link to fill out their information to

receive compensation for their participation. Participants were either compensated \$5 or received credit towards a psychology class requirement for completing the 25 minute experiment.

Materials

Mental Illness Vignettes. Based on the methodology of Pescosolido et al. (2010) and the vignettes available in the General Social Survey Archives by the National Opinion Research Center (2006), participants read a case summary of a person with mental illness, with the patient's name, symptom profile and diagnosis (in lay terms per the DSM-V; see Appendix C). The vignette scenarios described major depressive disorder, schizophrenia, and no disorder. No disorder was added to assess whether responses from female vignettes would reflect a disorder condition, despite the fact that the vignette did not include symptoms of a disorder. The male, female and gender neutral names were selected from the 200 most popular names of the 2000s from an online database of the Social Security Administration:

<https://www.ssa.gov/oact/babynames/decades/names2000s.html>.

Social Distance Scale. This scale is the most common method to study attitudes towards mental illness, created by Bogardus (1925) and further developed by Link et al (1987). The exact social distance scale used in this experiment was by Pescosolido et al (2010). This 4 point scale assesses one's desire for distance in various situations. The more unwilling you are to engage with the individual (greater social distance) the higher your score. Definitely unwilling to engage was scored at a 4 and definitely willing to engage received a 1.

Causal Attribution Scale (Angermeyer and Matschinger 1998). This scale is a modified version of the original 1996 scale known as the MacArthur mental health module; it has been continuously reformatted in more recent literature. The causal attribution scale was broken into seven subcategories: Intrapsychic factors, deviant behavior, biological factors, socialization,

psychosocial stress, state of society, and supernatural powers. The results from each category were averaged, with a rating of 6 equating to “very much” believing the given item is a causal attribute of the individual’s illness and 1 equating to “not at all” believing the given item is not a causal attribute of the individual’s illness.

Emotional Reaction to Mental Illness Scale. Developed by Angermeyer et al. (1996) this scale assessed participants’ emotional reactions to the person described in the vignette. The scale used in this experiment is a more elaborate version, reformatted by Wirth and Bodenhausen (2009). This scale was split up into three subcategories: prosocial reactions, anti-social reactions and aggressive interactions, with a rating of 6 equating to experiencing this reaction “very much” and a rating of 1 equating to “not at all” experiencing this reaction.

Willingness to Support measure. Also developed by Wirth and Bodenhausen (2009) this scale assessed one’s willingness to help the person in the vignette both physically and emotionally. The willingness to engage scale was coded in the opposite manner as the social distance scale, with 6 equaling a high willingness to engage (“very willing”) and a 1 equaling a low willingness to engage with the individuals (“not at all willing”).

Mental Illness Management Scale. This scale looks at potential cures (e.g. drug treatment, psychotherapy, pulling oneself together) for the person in the vignettes, based on the methodology of Angermeyer and Matschinger (1998). A score of 6 meant “strongly agree” that this is a potential cure for the individual and a score of 1 meant “strongly disagree” that this is a potential cure.

Personal experience survey. The survey used in the experiment was from Angermeyer and Matschinger (1996) who concluded that personal connections caused individuals to be more prosocial and more sympathetic to mental illness in general. This scale had nine illnesses listed,

with a rating of 6 equating to “I have experienced this” and 1 equating to “I don’t know anyone who has experienced this.”

Demographic questionnaire. This included questions of sex, gender, age, race, and prior exposure to neuroscience or gender studies classes (see Appendix D).

Debriefing questionnaire. This questionnaire asked questions about participants’ perceptions regarding the purpose and design of the study (see Appendix E).

Results

A 3-way ANOVA was conducted comparing the ratings of the all-male, all-female, and all-gender-neutral vignettes on the sixteen outcome measures: social distance, willingness to engage, attributions (seven subscales), and illness management/cures (seven subscales). Emotional reactions were not analyzed due to a programming error, which failed to collect data for the gender-neutral vignettes. There was no significant difference between the male and female vignettes at the 0.05 alpha-level. There is no singular p value for this finding as sixteen outcome measures were assessed. Two of these outcome measures showed significant differences overall between the three conditions. The first was in the social distance scale (SDS). There was a significant difference between an individual’s desire for social distance from a man with mental illness ($M = 2.61$) than from a woman with mental illness ($M = 2.21$) at the $\alpha < .05$ level $F(2, 76) = 4.76, p = 0.011, R^2 = .11$ (see Figure 1). The second significant difference was with willingness to support a male or female with mental illness. There was a significant difference between an individual’s willingness to support a woman with mental illness ($M = 2.38$) than a man with mental illness (1.90) at the $\alpha < .05$ level $F(2, 79) = 3.69, p = .029, R^2 = .085$ (see Figure 2). In addition, contrast tests between male and female vignettes found a Bonferoni

corrected significant difference at the $\alpha < .017$ level. Again, there was a significant difference in the SDS scale ($t(76) = 3.03, p = 0.003, d = .787$) and Willingness to Support ($t(79) = 2.47, p = 0.016, d = .490$).

The 3-way ANOVA incorporated the third condition of gender neutral vignettes and a planned contrasts measure found that the gender neutral condition did not significantly differ from the all female and all male vignettes at the $\alpha < .017$ level. Looking specifically at the outcome measures, two had a significant difference in the ratings from the gender neutral vignettes and the all-male vignettes at the $\alpha < 0.017$ level: desired social distance ($t(76) = 1.986, p = .051$) and willingness to support ($t(79) = 2.19, p = .031$). No significant difference was found between gender neutral names and all female names.

Discussion

In this study, participants reported their reactions toward and perception of individuals with mental illness. In order to test the hypothesis that the gender identity of the person depicted in the scenarios would affect such reports, participants were randomly assigned to one of three conditions with the three vignettes using all female names, male names, or gender neutral names. These gender-manipulated names were also used when describing each of the scales as well. This was so that the gender of the individual in the vignette was obvious to the participant, even though they were unaware of this manipulation until after the experimental debriefing. The main hypothesis was that there would be a difference in the ratings between the all-male vignettes and the all-female vignettes, but fourteen out of sixteen outcome measures showed no significant difference in how individuals rated their reactions between the male and female vignettes. The two outcome measures that were significant were SDS and willingness to engage. In previous research on mental health literacy with respect to gender, respondents were significantly more

likely to indicate that a male did not suffer from a mental illness compared to the same vignette with a female name (Swami, 2012). In this experiment, it was likewise assumed there would be a sizable difference between how participants perceive men versus women with mental illness.

One of the reasons that could have potentially led to these results not being significant is because of the population sample of undergraduate volunteers. This has a twofold implication. The first is volunteers, as those who are more interested in mental illness in general may have been more likely to voluntarily complete this survey (Strassberg & Lowe, 1995). These individuals usually will have less stigma towards men or women with mental illness compared to the average college student who had no interest in taking this survey about mental illness (Weiderman, 2010). Because of this, the questionnaire responses from Willingness to Engage Measure for example could have a floor effect, since a rating of 1 means very willing to engage, and the mean for this scale in this experiment was 2.08. It is also possible that questionnaire responses from Causal Attributions scale will have higher responses for biological factors because this population is more knowledgeable about the scientific understanding of mental illness (Pescosolido et al., 2010). This was in fact the case, with biological attributions and intrapsychic factors having higher means than other attribution types. This could have led to an absence of difference between male and female vignettes because individuals are going to choose biological factors regardless of which gender vignette they evaluate.

The second implication with the population from which I sampled is that college students are the most liberal age cohort (Truett, 1992) and are thus also less likely to fall into stereotypes or hold albeit persistent norms of how women with mental illness should be treated compared to men (Phelan & Basow, 2007). What is important to note is that life experience is the more important predictor of liberal or conservative views regarding mental illness and stigma, rather

than age (Lynnott & McCandless, 2008). Although college students represent a more liberal, higher educated, and less biased population, it is possible that college students are aware of the general attitudes of the time period they live in. Thus, the use of this sample may still provide an accurate representation of the perceptions and reactions towards mental illness today amongst emerging adults.

Gender Differences

Two out of the sixteen measures showed a significant difference between the male and female vignettes. Specifically, compared to women with mental illness, greater desired social distance and greater unwillingness for interaction was reported toward the men with mental illness. This could be because individuals in American society are used to interactions with women with mental illness, partially because women are more vocal and open about their condition than men (Kulkarni, 2017). Individuals feel safer around women because their condition, albeit a serious issue, may not be a threat or a danger to another individual. The results suggest that men with mental illness on the other hand seem to have more stigma, in that individuals may be more fearful for their safety, thus desiring social distance (Phelan and Brasow, 2007). Another explanation for this is that men may be seen as deviating farther from the norm compared to women, whose norm is strongly connected to illness. Because past research has shown that people desire increased social distance from things that deviate from what is known and familiar (e.g., Bronson, 1972), it may be that the general public's lack of familiarity of men with mental illness contributes to this observed effect. Future work would benefit from examining such perceptions of norm deviation and how this might contribute to reactions toward men with mental illness. Such work can be applied to attempt to understand

how men and women who are openly advocating for mental health awareness may be viewed differently and why there may be gender differences in openness regarding mental illness.

The results suggest that there was a significantly greater unwillingness to support men with mental illness compared to women with mental illness. One possibility for this finding is that people may not be primed to think that men have a mental illness; that association is stronger in women, as is evident not only in scientific findings but in the public's general understanding when they think about mental illness. Implicit bias tests have revealed the strong associations of women to various qualities present in mental illnesses (Zawisza, 2016). A greater unwillingness to support goes along with social distance, in that men with mental illness evoke more negative emotions that coincide with male mental instability such as viewing the individual as more dangerous (Sowislo et al., 2017). If there's more willingness to engage with women experiencing mental illness, then it seems possible that women are more likely to receive the help they are seeking, as physicians may be more open to engage with women who have such illnesses. In a study with undergraduate students and male/female vignettes, participants lacked mental health first aid skills more so when dealing with men than when dealing with women (Davies, 2016). In this viscous cycle, not only are men not seeking treatment but the physicians might not be noticing their condition due to a stronger association of women with such illnesses (Gattuso, 2018).

This greater distance and unwillingness to engage with men experiencing mental illness might cause such men not to feel accepted, causing them to stop seeking treatment or to not seek it at all. A study of 5,000 undergraduates by Eisenberg et al. (2009) found that there is greater personal stigma in men than women, and the more stigma you have the less likely you are to recommend a clinical route for treatment. This starts at a young age, with a study by Chandra &

Minkovitz (2006) on adolescent teens that found girls are twice as likely to report willingness to use mental health services than boys. There is an overall greater willingness to engage with women with mental illness compared to men with mental illness, which might help to explain some of the variance in gender differences in treatment-seeking behavior and the general connection that some make between women and certain forms of mental illness.

What does all of this mean? It means we may not be reacting the same to mental illness in men compared to mental illness in women. Male vignettes elicited reactions of greater unwillingness to support compared to female vignettes which could result from differences in how we pay attention to men and women experiencing mental health issues, or our automatic reactions of comfort interacting with men and women with mental illness. The stronger association of mental illness seems to lie with women, and less so with men. On the one hand, this is wonderful, because we are increasingly valuing the female condition and paying attention to female experience. On the other hand, it is merely reinforcing my main argument about the connections we have of women with mental illness. Perhaps it is because of our long history of female illness association that we are more willing to accept women with mental illness into everyday society.

This can lead to over-diagnosis of mental illness in women because the association is a little stronger, and subsequently an under-diagnosis of mental illness in men. This may not seem like a big deal, but if a physician sees a woman and a man with the same symptoms but has a stronger female illness understanding, they might tell the man to go home and try to deal with it. When assessing symptoms in women, they might think the woman is entering menopause soon so might as well put her on anti-depressants from now because she might need them in the future and it is common for women in general to have these symptoms. In addition, this association

could lead to a misattribution of physiological illness to neuropsychological issues (Davidson 2017). Perhaps the woman coming in has a different condition or ailment, but because the doctor associated those symptoms with women and mental illness, they will be quick in labeling the symptoms as a mental illness and the woman may not get the correct treatment right away. By reinforcing the female-illness connection, society is more aware of mental illness in women compared to men, so much so that even the normal female experiences are pathologized.

Additional findings

This experiment failed to support the hypothesis that men would be more likely to be treated with drugs and instead showed a greater agreement for women to be treated with drugs compared to men. I believed it to be the opposite, that women would have to deal with their illness by themselves (“pulling oneself together”) or talking it over with a confidant rather than more medical based management practices. On the other hand, lingering effects of the machismo complex in men could lead to individuals thinking that men do not need drugs as much as women because they can handle it themselves and it would be de-masculinizing if they had to seek out a doctor or go to therapy (Gattuso, 2018). I also believed that participants in female vignettes would attribute causes to a personal reason, like lack of willpower, and in the male vignettes attribute mental illness to something external, like a societal factor. From other research it is well known that women will attribute more of their mental illness symptoms to internal factors or personal character flaws, whereas men will more likely attribute these symptoms to external factors like work stress, or social behavior (Eaton et al., 2012).

Despite the connection of women to illness, I anticipated less willingness to engage and less sympathy for women in the vignettes because if mental illness is more normalized, these behaviors and symptoms are more or less expected of women. I had expected men with mental

illness to garner more sympathy and participants would have decreased desire for social distance. Participants might not see a male with mental illness as threatening because his “hysteria” is probably less severe and doesn’t have the same connotations as hysteria in women, causing participants to be less willing to interact with them. However, these expectations were not reflected in the experiment, as unwillingness to engage was higher towards men in addition to increased desired social distance.

It was also hypothesized that participants who received the gender neutral vignette condition would associate the gender neutral name with women more so than men, which would be evident based on how they answered the questions on the five scales. This was not supported, as the gender-neutral vignettes were not found to significantly differ from the male or female vignettes. This could be because individuals did not interpret the gender neutral names as female names, which was expected based on the social climate associating women with mental illness. A few participants after completing the survey shared that they associated the gender neutral names with real people they knew with that name. It is possible that the individuals who happened to take this version of the survey associated the gender neutral names with an equal number of male and female individuals that they already knew, resulting in no significant trend towards the all female or all male vignette results.

Information on personal experience with mental illness was also gathered in the experiment to see if this had an effect on the participant’s answers. Personal experience was significantly correlated with several outcome measures, including unwillingness to engage, $r = -0.22$, and social distance, $r = -0.37$ with women having more personal experience than men. What is interesting is that when controlling for personal experience in the analysis, the three gender-named vignette conditions were no longer significantly different from one another in

these reactions, emphasizing the importance of personal experience in individual's perceptions of others with mental health issues. Further research could investigate if those with more personal experience with mental illness are as affected by society's female to illness connection, or if their own experiences decrease their likelihood of supporting normative beliefs on gender. If female participants have more personal experience, it would be interesting to investigate whether female participants have a greater understanding of an individual's mental illness condition and thus exhibit less stigmatization. This was the case in Chandra and Minkovitz (2006) where girls and women exhibited more knowledge about mental health and treatment than boys and men and less stigmatization. A study by Swami (2012) with a similar experimental design found that male respondents with less personal experience rated the female vignettes as significantly worse off than the male vignettes, which may suggest that less personal experience increases the female to illness connection.

While gender differences in the participants are certainly worth exploring in the future, this study focused on the differing gender of the individual in the vignettes (male, female or gender neutral) to see if this affected the participants' perceptions and reactions towards that individual. This study measured reactions involving willingness to engage with the mentally ill individual, their desired social distance, and potential causes and cures of the illness. There was no overall significant difference between the three vignette conditions, but two of the sixteen outcome measures were significantly different, SDS and Willingness to Engage. The lack of significant difference could have been because college age individuals are more aware of mental health issues and the detrimental effects of stigmatization (Corrigan & Watson, 2002), so participants are actively trying not to strongly associate women with mental illness over men, resulting in nonsignificant differences based on gender of the vignette. However, the significant

differences in this study did suggest a greater unwillingness to interact and increased social distance from men with mental illness, resulting in potentially detrimental effects on men seeking treatment and being accepted in society. This study provided insight into gender differences with mental illness, showing that the gender of an individual with mental illness elicits different reactions and perceptions, which aids us in understanding the importance of gender dynamics in mental illness.

CHAPTER 5

Where do we go from here? Future Directions and Conclusions

Looking to the future at the intersections between neuroscience and gender studies is both exciting and incredibly daunting. With so many unanswered questions, how does one even begin to face them all? Our understanding of neurosexism is still in its infancy, with the majority of the research literature being from the past 5-10 years. It takes a while for an idea to take hold and ruminate in society until it's ready to be addressed more broadly, and even longer until there are practical solutions offered to address the problems. Nothing happens overnight, and especially not with a topic that's controversial and critiques deeper institutional structures and frameworks. Thus, the future directions for discussions of neurosexism and the questions about how to navigate our gender differences in mental illness are by no means easy, clear cut, or concrete.

With multiple ways of approaching an issue comes multiple ways of solving the problem, and in this work, I've begun to raise issues of concern and identify potential solutions from the neuroscience side and the gender studies side, although I realize there are still many more perspectives that need to be included in order to gain a fuller perspective of the problem. These future paths are by no means extensive but they do provide some insight into how we might go about changing the culture and increasing awareness of neurosexism in science and in society.

The results of the experiment also provide valuable suggestions into how our perceptions of mental illness can become a detriment to our mental health wellbeing, not only for women but also for men, since participants had an increased desired social distance for men with mental illness compared to women, and less willingness to engage with them. This area provides much more attainable realities of how we understand and treat mental illness, taking into account sex and gender differences. However, even though a solution might be relatively easy and present, if

the concept of recognizing sex and gender differences isn't valued, then these solutions won't be put into effect.

Before any practical solutions are offered, we must increase awareness—about gender bias, about privilege and power dynamics, about historical and structural societal inequities, and about our own blindspots. Raising awareness is a simple concept but it has so much potential to change how we view and understand sex and gender differences in mental illness, which might well be far more complex than we anticipate. At her confirmation senate hearing, Supreme Court Justice Sonia Sotomayor was asked whether her menstruation would affect her judgment. “Let’s hope that the key conferences aren’t when she’s menstruating or something, or just before she’s going to menstruate. That would be really bad. Lord knows what we would get then” (Deluca 13).

These thoughts permeate our society on a regular basis, which is why raising awareness will reshape the conversation. Relying solely on quick solutions, common associations, stereotypes, and gender norms can have detrimental and long-lasting effects to the individual and to society, so the more people become aware of the problems of perpetuating inherent biases in stereotypes used to understand the world, the better. Such a change can begin with something as simple as responding differently to common situations. For instance, the next time a woman comments that she'd never be good at math because she isn't wired that way, one might respond by noting that although sex differences do exist in the brain, they don't necessarily amount to working against one's math abilities. Or the next time you experience symptoms of depression, don't jump to the conclusion that you have a mental illness. What you might be experiencing is the frustration of encountering a societal or cultural limitation society has put in place against you. In that case, what you're experiencing is a similar experience many women and

marginalized people have had, and that's not a disorder. Remember, we are our worst critics, especially when we compare ourselves to idealized social norms, and we also contribute to perpetuating this connection of women to illness much more than we think.

As the results of the survey showed, there is a more adverse reaction to men with mental illness than women. It also reinforces the argument that women with mental illness are more accepted in society than men with mental illness. The female to illness connection is there and is so strong and pervasive in society that it isn't questioned anymore. It's also clear this correlation isn't going to change unless we do something about it. As a disclaimer, normalization of mental illness is a positive but correlating mental illness to traditionally feminine categories of "weakness" and "illness" are problematic. Women being more accepted in society than in the past is a victory in and of itself. However, this does not mean that the deeper structures and social values have necessarily disappeared or even changed.

Gender studies recognizes that men also suffer from patriarchal structures and expectations, and the preferred social distancing from men with mental illness continues to reinforce associations of women and disease. A man with a mental illness is perceived as being "weak" or "unmanly," unable to control himself and his emotions in many of the ways "mad" women were traditionally described. Because the association of women to mental illness is so normalized in our society, it's become accepted as an uncontested societal association. We are quick to make the normal female condition seem weaker and diseased and that is not only detrimental to women who are internalizing this inferiority but to all of society, especially vulnerable populations, including men.

In this work, I have attempted to shed light on the ways and the reasons why we pathologize and privilege one group vis-à-vis another, in this case women versus men, and how

we tend to prioritize the treatment and well-being of one group over another. What the research from the experiment suggests is that our policing of traditional male values, i.e., of men being strong, heroic, and healthy, also works against men. When it comes to mental illness, we are not effectively recognizing that it can affect both men and women equally, and both men and women deserve equally good treatment. The preferred social distance to men with mental illness suggests that our social norms do not accommodate the combination of mental illness and men well. We are more comfortable with women having mental illness than with men having mental illness. This remains problematic for women, but it is also detrimental for men, especially if they do not conform to societal expectations. So, by raising awareness of the socially-constructed nature of this gendered discrepancy in mental illness, we can begin to address the deeper ideological structures that have caused such imbalances. We can begin to recognize how the valuative judgements of being weak have disempowered both women and men. Education is always a good place to start. So, a potential avenue striving towards a better understanding of gender differences in mental illness could be very successful and reduce differential reactions to men and women with mental illness.

If society paid more attention to women when it comes to mental illness, barriers would need to be taken down to allow for this same attention to be given to men. We often don't pay attention to such issues because many times we don't even realize something is wrong, i.e. the limitation is invisible to those with privilege. As mentioned before, this societal ignorance vis-à-vis men with mental illness and their needs isn't necessarily purposeful, or deliberately malicious. "It is simply a product of a way of thinking that has been around for millenia and is therefore a kind of not thinking" (Perez, 2015). We've been so accustomed to not notice men with mental illness and to over notice women, hyper-analyzing every time they step out of the

box. Swami et al. (2012) argues that we do not notice these symptoms in men in the same way we do women, saying:

To the extent that mental illness is inconsistent with notions of hegemonic masculinity that stress toughness and strength, respondents may be less likely to view men with symptoms of depression as suffering from a mental health disorder and, consequently, may adopt less positive attitudes toward such persons. In this view, hegemonic masculinities leave men with few resources with which to construct healthy attitudes toward mental health behaviors.

Increasing these resources would be absolutely beneficial to changing the conversation about mental illness, making sure it's not only tied to women and that it's no longer regarded as a social stigma.

Another way to provide more opportunities for men with mental illness is to not fall prey to assumptions about women and mental illness and pay attention to the individual's needs regardless of the stereotypes or groups they fall into. The goal is to take into account biological differences but more importantly also social differences. Gendered medicine, also known as gender medicine, is being discussed more and more as we are realizing how crucial it is to understand the individual within societal contexts. Because our biology dictates so little about how we behave, knowing other stress factors and what it means to be a man or woman in today's society plays a significant role in how the individual handles and copes with mental illness. Gendered medicine involves taking into account the needs of the individual, with considerations of sex and gender as being one factor but not the sole differentiating factor.

There is a difference in the course of disease, understanding of the disease and therapy that can be tailored to men or women based on their gender and how they were raised to lean into that gender. The Canadian "Gender Lens Tool," for example, was developed to be used to guide medical student curricula in addressing gendered medicine. The Gender Lens Tool was also

adapted into German in 2016, and students learned about gender differences in reference to biological disposition, family and social networks, attitudes and behaviors, occupational circumstances and relationship with the health care system (Wyers 2017). The online program allows student to look into a certain disease or condition, and students are probed with questions and information regarding perceived gender differences. In addition, the Institute of Gender in Medicine in Berlin developed a database for gender medicine to collect literature and information to enhance understanding of sex and gender differences. Similar databases were developed in Sweden (Miller 2016), and these all serve to increase awareness on gender differences in medicine and when dealing with mental illness.

A study by Chapman et al. (2013) looked at gender disparities in COPD diagnoses, which supports the benefit of individuation in reducing the influence of implicit bias in medical practice. In the study, the initial gender differences in diagnosis were eliminated when physicians were provided with spirometry data consistent with COPD. Their study discovered that “individuated patient information prevents physicians from filling in partial information with stereotype-based assumptions” (Chapman & Katz, 2013). A disclaimer with gendered medicine is that it does not seek to highlight a dichotomy between men and women, and the end goal is not to separate the genders. Ideally, it seeks men and women to be treated equitably, effectively, and fairly. But we are not yet at that point in society. And so, noticing that some groups of people have different stressors and need a different course of treatment allows for a more accurate representation of the individual, without running the risk that a physician will diagnose a woman with mental illness with the common stereotypical response that as a woman and because she’s a woman, she is bound to get it anyway.

To take this one step above personalized medicine, sex specific medicine can also improve treatment of mental disorders. Our brains react differently to hormones like estradiol or testosterone, and we should use this to our advantage to specialize in finding a drug that works well with estradiol, for example (Fine, 2017). Again this isn't a male/female thing, this is a hormone thing typical of males or females. We have the neuroscience to be able to address this effectively and be more specific in the drugs we develop and administer, so it is about time we make that happen.

Being aware of sex and gender differences with mental illness is of course practical and important, but we do have to get to the root of the problem, which is how we conduct our science. With science in general, we have an issue with statistically significant results. A failed significance for sex differences is seen as a failure, not a success for similarities in sex difference. No one writes about it not being there but the words are expressed in such a way that it's emphasized that one should do an experiment with the hypothesis that men and women are the same and then those will be significant. But when we deal with significance, we're dealing with things that are different. There's no statistically significant findings for similarities. If they're similar, there is no statistical significance that they're different, so it seems the system is set up against such findings to begin with.

Studies that do not show sex differences if the hypothesis was to show differences means these studies might not be reported because no one likes reporting results that fail to support the hypothesis (Guest, 2019). Many people are quick to publish, especially without paying much attention to effect size. This isn't always the case, but unfortunately it happens way more than news articles are willing to report. In Gina Rippon's book, *The Gendered Brain: The New Neuroscience that Shatters the Myth of the Female Brain*, she shows this hunt for brain

differences “has been vigorously pursued down the ages with all the techniques that science could muster,” and it has exploded in the past three decades, since MRI research joined the fray (Eliot, 2017). Research on sex difference is looking for sex difference—that’s the bottom line. As Rippon notes, “the research assumes the differences it’s trying to prove.” Even Mary Wollstonecraft said in 1792, “what a weak barrier is truth when it stands in the way of an hypothesis!” (Freedman 480).

Connected to significance is the narrative you tell in your study. It’s all about the agenda you have in proving difference. If you’re looking for difference, that’s what frames your perspective and your narrative, and that’s where you’ll find it. In an effort to get her study on sex differences with white matter tracts out early, Ingalhalikar et al., (2014) did more disservice to the field. It was noted that some statistics were inflated. When this happens, things can quickly cycle out of control. For instance, when news outlets hear a different version that might offer insightful and simple insights into neuroscience, they extrapolate too much, saying, for instance, that because of this pattern in the brain, women are best suited for this particular task. We need to think and respond with greater interdisciplinarity and with understanding of inherent biases in societal structures in order to identify and change our neurosexist agenda and reshape our language and understanding to reflect this.

I want to challenge us to not only look for practical solutions as previously mentioned but to change the way we talk about mental illness in general. I’m calling for a redefining of the term mental illness. I think too much of illness is still just the pathologization of female experience. The modern manifestations of creating a strong female to illness connection pathologized female experience, making normal emotions, situations, and health conditions abnormal or diseased. We should reevaluate how quickly we assume the normal female condition or understanding of the

feminine in our society is considered “diseased.” Minor difficulties that women experience are hyper-analyzed and obsessed over, which emphasizes that women’s natural processes are a sickness that require treatment, rather than their way of life. Women in the home in the 1950s who didn’t feel as fulfilled being mothers were diagnosed with depression when in reality they just were unhappy within the confining social structures that limited them. “Miltown [drug] could make a psychotic woman return to her household responsibilities.” It was quicker to diagnose them with mental illness than to look at society as causing such issues. Before Betty Friedan began to speak of the “problem that has no name,” there were thousands of women walking around their homes thinking themselves to be crazy.

We need to change this perspective. Maybe re-categorize mental illness into multiple or different levels, so that when someone goes to the doctor when they are not feeling well mentally, they aren’t immediately suspected or diagnosed as having a mental illness, they are told this is part of life, and they aren’t immediately be labeled as diseased, as weak, and as inferior. Positive change has already begun to take shape--the DSM IV labeled PMS as a disorder which, with little evidence to support it, erroneously labeled women as having a mental illness (DeLuca 36). This natural reproductive process is simply not in need of a medical scientific validation. The updated DSM V does not have PMS as a disorder and narrowed the condition so that only severe symptoms are classified as a premenstrual dysphoric disorder.

Current statistics show that 1 in 4 women are classified as having a mental illness (Riecher-Rossler, 2018). If we are saying that 25% of women are diseased or abnormal, this statistic should strike us as alarming and problematic. It should make us rethink whether this high of a percentage of women are actually suffering from mental illness, or whether they are responding to highly-problematic societal demands, expectations, and limitations. Do they

deserve to be labeled as having mental illness? Are we labeling them because we have overmedicalized female experience and do not take into account other factors? If an individual does actually have a mental illness, this is not to say they shouldn't be taken seriously or be told their symptoms are just female experience. If it's a disease, then it's a disease but sometimes it isn't, and we need to be able to recognize that we are susceptible to making that mistake. Greater awareness and consciousness of the role sex and gender differences play in society can assist us on more clearly understanding such differences.

Providing a scientific explanation for a disorder or labeling symptoms doesn't always adequately address and fix the problem. One of the speculations as to why numbers of diagnoses in mental illness is increasing is not necessarily because more individuals are developing symptoms but because of an overdiagnosis of mental illness disorders (Frances 2010). It seems that once we've begun to use this label so readily, as a label that is gendered, we stop questioning and fully taking into account the role gender imbalances play in society. It is an easy fix to argue that biology is responsible for all differences in men and women, which is what neurosexism argues neuroscience must guard against. If neuroscience does this, then we no longer have to worry as much about gender inequity. However, if we have certain standardized perceptions of a woman struggling with her life as being mental illness, chances are she will be diagnosed as such, and we can write off her difficulties with simple explanations, such as, "Oh, she just anxiety," and move on instead of fixing the institutional shortcomings of why she has anxiety in the first place. Offering such simple explanations is a passive stance, chalking up sex and gender differences to neuroscience and not to social constructs of gender, and that is not an effective nor an informed way to move forward. Understanding why women more often develop mental illness, what societal barriers are up against women and men with mental illness, and even just

being aware of the long historical influence of the connection of women to illness, and mental illness in particular, is and can no longer be simply a biological argument; it gets at deeper societal perpetuations that need to be addressed. We owe it to ourselves and to those who come after us to get to the roots of the matter and offer more nuanced, informed, and interdisciplinary perspectives and solutions.

Concluding Thoughts

Women, inferiority, and illness have long been tied to each other. It is not only neurological difference we are talking about. This problem is social and pervasive, and it has shaped our science in how we frame and understand sex differences in mental illness. Women are depressed not simply because biologically they are depressed, but because of the conditions they live in. Simply saying this is mental illness, a biological link, misrepresents the complexities of these women's lives and leaves more women thinking they're mentally ill, when they are not. We must reduce the pathologization of mental illness and let women be the masters of their own bodies, emotions, and lives. We must do this for women but we must also do this for men, too. For too long women have suffered under patriarchal standards and expectations. Now men are also beginning to feel its constraints.

We have had a "male unless otherwise indicated" view of the world which permeates our thinking so that what is male is universal. This came to be because other voices weren't given the opportunity to be heard. My advice? Listen to them. Validate them. Understand them. This is the future of successful gendered medicine, and hormone specific medicine, listening to the body's biological chemical balance. There is great value in our neurological knowledge of sex difference, but when wrongly applied, it can have detrimental effects on society. But if we harness this power and increase awareness that neurological explanations, along with social

constructs of gender imbalance, work together to sustain differences between men and women with mental illness, we have the potential to revolutionize medicine, rid our society of its pervasive neurosexist agenda, and reshape the conversations around sex and gender differences in mental illness

I don't know when we will make this happen but all I know is that we can. Because we have to. These concepts are complex and difficult for society to grapple with, so it might take a little while to settle into our collective consciousness, but it is through writing and the sharing of experiences, mentioned at the very start, that we will continuously improve in our understanding of sex and gender differences in general, and especially in relation to mental illness. And so, this is my little offering to the world, one I hope, like a seed, will grow and expand until it blossoms and becomes so big that someone is bound to notice and benefit from it.

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FIGURES

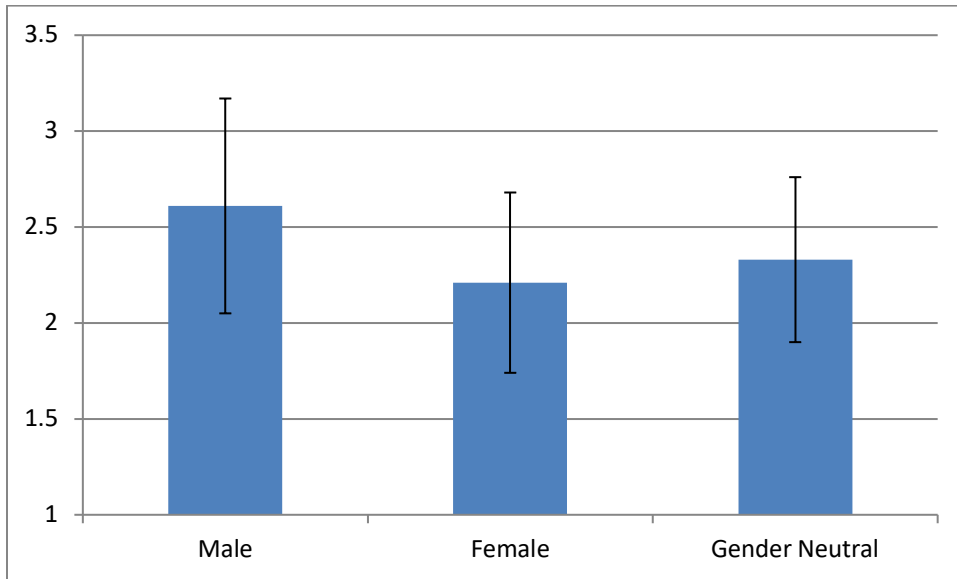


Figure 1. Social Distance Scale means of male, female and gender neutral vignettes.

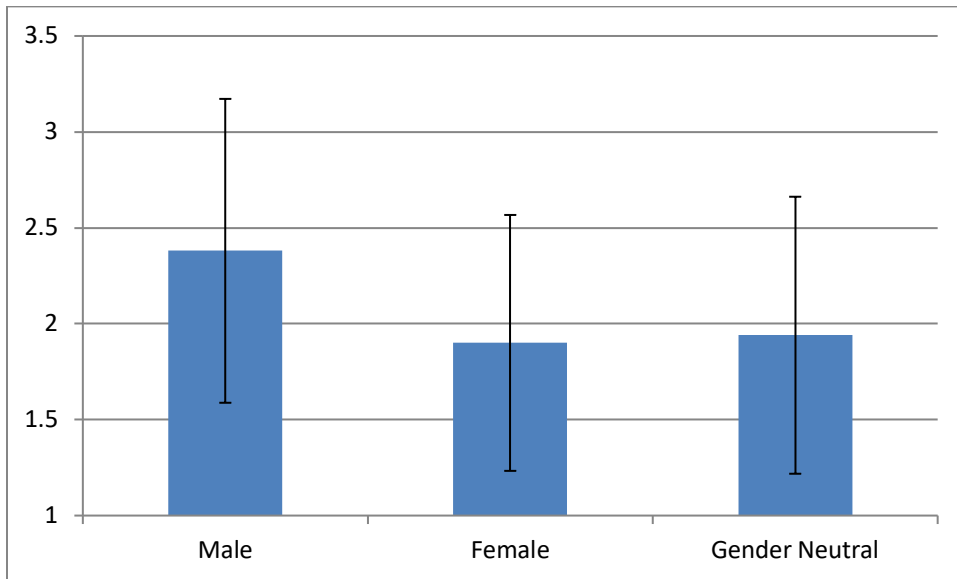


Figure 2. Willingness to Support Measure means of male, female and gender neutral vignettes.

APPENDIX A

Consent Form

Principal Investigator: Christie Dionisos, Senior Thesis Student – Neuroscience; Gender, Sexuality & Women’s Studies, Union College

Faculty Advisor: Lindsay C. Morton, PhD, Department of Psychology, Union College

My name is Christie Dionisos and I am inviting you to participate in a survey for my senior thesis, which will ask you questions regarding your perceptions of and reactions to mental illness.

This survey will take approximately 25 minutes to complete. Participation in this study is completely voluntary, and your responses will be anonymous, such that it would be impossible to link your name with any of your responses. After completion of all parts of the survey, participants will be provided with a final link where they will be required to enter their name, union.edu email address, and preference for compensation: \$5 cash or 0.50 out-of-class activity/SONA credit for PSY100/300. Participants selecting SONA credit will be granted the 0.50 credits within 1 week of completing the survey. Participants selecting cash payment will receive cash in their mailbox, funds permitting.

Even after you agree to participate in the research or agree to the informed consent, you may decide to leave the study at any time without penalty or loss of benefits to which you may otherwise have been entitled. Also, you may leave blank any questions or refrain from completing any tasks that make you feel uncomfortable. While there are no foreseeable risks in participating, the presentation of information regarding mental health concerns and personal experiences could be uncomfortable to some. If you have any discomfort or concerns after completing this survey, you are encouraged to contact Counseling Services at the Wicker Wellness Center (518.388.6161).

Even though all aspects of the study may not be explained to you beforehand, there will be a debriefing session, during which you will be given additional information about the study and have the opportunity to ask questions.

Thank you in advance for your participation!

Christie Dionisos

1. If you have read this information and consent to participate, please select the response option on the computer that states: “I have read, or been informed of, the information about this study. I hereby consent to participate in the study.”

- I have read, or been informed of, the information about this study. I hereby consent to participate in the study.
- I do not consent to participate in this study

APPENDIX B

Debrief Form

Project Name: Perceptions and Reactions towards Mental Illness

Principal Investigator: Christie Dionisos, Senior Thesis Student – Neuroscience; Gender, Sexuality & Women’s Studies, Union College

PLEASE READ ALL THE WAY THROUGH

Thank you for your participation. The purpose of this study is to examine the ways in which Union College students might view and possibly stigmatize individuals with mental illness.

Participants received three scenarios depicting mental illness and were randomly assigned to read about men only, women only, or gender neutral persons whose gender identity is open for interpretation. Participants were then asked to give their opinions through a variety of scales as to their feelings and beliefs given the scenario of someone with a specific mental illness. It was mentioned at the beginning that this survey was for understanding perceptions of and reactions to individuals experiencing various mental health issues. We predict that these views will be influenced by the gender identity of the person depicted in the scenarios.

Please keep information about this study confidential and do not discuss this study with anyone else. In social scientific research, it is important that study participants answer questions honestly and accurately. Preconceived notions about the specific study purpose may change the way in which study participants approach and complete the study and will jeopardize the validity of study results.

The findings of this study may help to advance scientific endeavors to understand particular factors involved in the stigmatization of mental illness. In addition, others may ultimately benefit from the knowledge obtained from this research, if it is applied to interventions focused on reducing mental illness stigma.

Please click [here](#) to provide us with your information to receive course credit or \$5 cash. This is an external link and your personal information will not be connected to the responses from this survey in any way.

DON'T FORGET TO CLICK SUBMIT AT THE BOTTOM OF THIS PAGE

If you have any questions or concerns in the future, feel free to contact Christie Dionisos at atdionisoc@union.edu or Professor Lindsay Morton at mortonl@union.edu.

Because this research involved consumption and questions regarding mental illness, we would like to provide you with the following resources:

1. Eppler-Wolff Counseling Center for Psychological Services

a. Phone – 518-388-6161

b. Address – 807 Union Street, Schenectady, NY 12308

(2nd Floor Wicker Wellness Center)

c. Website – <https://www.union.edu/counseling-center>

2. Ellis Hospital Mental Health Services

a. Phone – 518-243-3300

b. Address – 216 Lafayette Street, Schenectady, NY 12305

c. Website – <http://www.ellismedicine.org/services/mental-health.aspx>

3. Campus Safety (after hours) – 518-388-6911

Thank You!

APPENDIX C

Vignettes

Wyatt/Jocelyn/Riley Vignette:

For the past two weeks Wyatt has been feeling really down. He wakes up in the morning with a flat heavy feeling that sticks with him all day long. He isn't enjoying things the way he normally would. In fact nothing gives him pleasure. Even when good things happen, they don't seem to make Wyatt happy. He pushes on through his days, but it is really hard. The smallest tasks are difficult to accomplish. He finds it hard to concentrate on anything. He feels out of energy and out of steam. And even though Wyatt feels tired, when night comes he can't go to sleep. Wyatt feels pretty worthless, and very discouraged. Wyatt's family has noticed that he hasn't been himself for about the last month and that he has pulled away from them. Wyatt just doesn't feel like talking.

Kyle/Kimberly/Jordan Vignette:

Up until a year ago, life was pretty okay for Kyle. But then, things started to change. He thought that people around him were making disapproving comments, and talking behind his back. Kyle was convinced that people were using digital devices to read his thoughts. Kyle lost his drive to participate in his usual work and family activities and retreated to his home, eventually spending most of his day in his room. Kyle was hearing voices even though no one else was around. These voices told him what to do and what to think. He has been living this way for six months.

George/Alicia/Peyton Vignette:

Before this year, life was pretty okay for George. While nothing much was going wrong in George's life he sometimes feels worried, a little sad, or has trouble sleeping at night. George feels that at times things bother him more than they bother other people and that when things go wrong, he sometimes gets nervous or annoyed. Otherwise George is getting along pretty well. He enjoys being with other people and although George sometimes argues with his family, George has been getting along pretty well with his family.

APPENDIX D

Demographic Survey

18. What is your age?

19. What is your biological sex?

- Male
- Female
- Intersex
- Prefer not to answer

20. What is your gender identity?

- Male
- Female
- Non-Binary
- Prefer not to answer

21. What ethnicity do you consider yourself to be?

- Hispanic or Latino
- Not Hispanic or Latino
- Prefer not to answer

22. In which racial or national-origin group do you consider yourself to be included? Select one or more of the following.

- American Indian or Alaskan Native
- Asian
- Black or African-American
- Native Hawaiian or other Pacific Islander
- White
- I prefer not to answer this question

- Other (Please specify)

23. Is English your native language?

- Yes
- No

24. How many neuroscience or psychology classes have you taken at Union?

25. How many Gender, Sexuality and/or Women's Studies classes have you taken at Union?

26. What do you think the purpose of this experiment/survey was?

27. Do you think any of the survey scale that you did were related in any way?

28. If yes, in what way were they related?

29. People take surveys for a lot of reasons. Were you completely honest and serious in responding to this survey? Or were you joking around or giving less-than-honest responses?

- I answered the survey seriously and honestly.
- I provided joking or less-than-honest responses to the survey.

30. Were you in a sober mindset while taking this survey? Is there any reason that we should exempt your responses?

- I was in the right mindset to take this survey; there is no reason to exempt my responses.
- I was not in a sober mindset, and my responses might reflect this.

