Discrimination, Death, and Disgust: Effects of Medical Technology on Disabilities

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Abstract:

This project was interested in investigating how medical technology devices may a) disclose disability to another person b) effect and alter human behavior and emotions after viewership c) if different types of medical technology devices elicit different amounts of behavior and emotional change and d) make a conclusion from previous literature to predict an indirect assumption of prejudice, stigma, and discrimination on a person with a disability. Previous literature concluded that people who are disabled are often ridiculed, stigmatized, and discriminated against, causing them to have health problems. Medical technology devices have helped people who are disabled, by supporting physiological health and assisting in mobility issues. Although they have many positives, medical devices can also disclose disabilities which could lead to more negative effects. There is also a lapse in research for different types of disabilities and how they may interact with participants' feelings and behavior. This study aims to address these gaps. This project had 60 participants, ages ranging from 18 to 24 years old, who are also primarily white individuals. This study found that disgust, perceived vulnerability to disease, infantilization, and shame/guilt increase with the viewership of people with disabilities, generally. I also measured mortality salience which was not statistically significant. The results also found no significance between the group types (mobility, physiology, and control) on any of the variables. This may be caused by study methodologies or confounding variables, but should require further research focus. I therefore suggest that because of the increased behaviors and feelings from our variables (disgust, perceived vulnerability to disease, mortality salience, infantilization, and shame/guilt), that as previous research has found, discrimination, prejudice, and stigma all increase towards those with disabilities. This study is an important advancement to the representation of and research on people with disabilities and what they may experience.

Introduction:

In 2023, the World Health Organization reported an estimated 1.3 billion people currently living with a disability (WHO, 2023). The organization stated that approximately 1 in every 6 people have some form of disability affecting their lives (WHO, 2023). In the United States, approximately 70 million people have reported themselves having a disabling condition (Center for Disease Control and Prevention, 2024). This would be 1 in every 4 citizens (Center for Disease Control and Prevention, 2024). Disabilities can be defined and perceived in a multitude of different ways. According to the Center for Disease Control and Prevention, "A disability is any condition of the body or mind (impairment) that makes it more difficult for the person with the condition to do certain activities (activity limitation) and interact with the world around them (participation restrictions)" (Center for Disease Control and Prevention, 2024, para 1).

In many communities of people with a disability, specific forms of technology or medical devices help aid the effects of their disorder, disease, or mobility. Again, from the World Health Organization, 2.5 billion people need one or more "assistive products" (WHO, 2024). This group may include other populations of individuals who may not consider themselves as disabled. For example, older individuals who need more support in their mobility and those who are injured periodically. Devices and technology in medicine come with many names. Some include assistive products, medical technology, medical aids, medical devices, technology devices, and more. Throughout this document terms like assistive products/devices/technology, medical aids, and technology aids are in reference to "any item, piece of equipment, software program, or product system that is used to increase, maintain, or improve the functional capabilities of persons with disabilities" (Assistive Technology Industry Association, para 2). Assistive products have increased in use in recent years, primarily due to the baby boomer generation

aging, a rise in noncommunicable diseases, and general technological advancements (WHO, 2024, Allen, 2024). In the medical field, assistive technologies have become a consistent and a growing field, proving useful in helping regulate effects of the disease or disability and supporting a person's work in the management of their disability (Eunice Kennedy Shriver National Institute of Child Health and Human Development, 2018). Since the 1950s, with the creation of the pacemaker, medical technology has integrated heavily in the management of chronic illnesses, diseases, and other disabilities (Yale Medicine Magazine, 2019). Current technologies like constant glucose monitors, cochlear implants, exoskeletons and prosthetics, have advanced significantly. In many cases where a person with a disability has used medical technology aids, they have had better quality of life (Awaji, et al. 2023 & Scherer, 1996), more independence (van Dam, et al., 2023), and better control over their health (Cutler, 2005).

While there are many positives to the new technological advancements and applications to personal health, medical technology poses as a form of disclosure for a disability when it is seen (Fennel, 2016). Disclosing something, whether it be a disability, identity, or information is a "strategic act in the pursuit of social approval, relationship and identity development" (Broderick, 2018, page 7). Disclosing a disability can be beneficial or harmful, and sometimes both. Many choose to disclose their disability to create closer bonds and intimacy (Afifi & Steuber 2009; Anagnostaki et al., 2013), support other people (Afifi & Steuber, 2009), seek resources and support in their environment (Smith et al., 2008), and more reasons that apply to specific situations. People may also choose to not disclose information, to maintain their secret, perceived negative outcomes, and future negative interactions (Vangelisti, et al., 2001). There may also be a lack of proper opportunity for someone to disclose information (Vangelisti, et al., 2001). Generally, there must be a significant reason to disclose information to another individual

(Vangelisti, et al., 2001). So when medical technology aids and devices nonverbally disclose a person's disability to the public, it could cause both positive and negative reactions from others.

After nonverbal disclosure of a disability, the potential for discrimination, prejudice, and stigma increases (Roberts, 2004). Discrimination is defined as "disadvantageous differential treatment of two groups that is in some respect caused by the properties that distinguish the groups" (Thomson, 2017, page 1). Some of the properties that often insight discrimination include race, gender, sexual orientation, age, and disability. While the number cannot be exactly quantified, about 40% of individuals with a disability were discriminated against in their workplace, 32% in health care facilities, and 18% at work because of their disability (Gonzalez, et al. 2023). Gonzalez et al. compared the rates of discrimination of people with and without a disability and reported that, no matter the location, people with a disability are more likely to be discriminated against (Gonzalez, et al. 2023). In another study, results found that those with a disability are more likely to be victims of violence and discrimination compared to those without a disability (Dammeyer & Chapman, 2018).

While discrimination is a behavior of disapproval, prejudice is seen as an attitude against a person. Defined by Gregory Allport in 1954, prejudice is defined as "an antipathy [intense dislike] based upon a faulty and inflexible generalization. It may be felt or expressed. It may be directed at a group as a whole, or toward an individual because he is a member of that group" (Allport, 1954, page 9). Many scholars have since described Allport's definition of prejudice as establishing scholarly analysis of the idea and that it helped forward the complexity of social issues. Other scholars have defined prejudice with more specific characteristics saying that prejudice occurs between groups, involves either a positive or negative evaluation of a group, is a biased perception of a group, and is based on either real or imagined characteristics of the

group (Devine, 1995, Jones, 1997)**.** In many cases, the characteristics of their disability may appear or present differently depending on the individual, even changing over time. The more revised and updated responses to Allport's definition, specifically about the characteristics and social issues of prejudice, illustrate the complexity that prejudice can have on groups.

Stigma is seen not as an act or an attitude, but instead a characteristic that designates a group or individual. More properly defined, stigma is seen "as a sign of disgrace or discredit that sets a person apart from others" (Ostman & Kjellin, 2018, page 494). Originally explained by Goffman in 1963, he mentioned that stigma are the attributes that keep someone from social acceptance, and encourage concealing their trait or identity from others (Goffman, 1963). Goffman cautioned that not all traits are stigmatized by every person, but it is a "question of perspective, not reality, and that stigma is in the eye of the beholder" (Ostman & Kjellin, 2018, page 494). This may be why certain groups of people are more comfortable or content with their identity or traits in specific social circumstances than others. As chronic illnesses and disabilities rise in susceptibility, other social interactions may change too. For example, disclosure of disability, stigmatization of disabled identities, and the perceivability and visibility of disabilities may all change. Stigma against those with disabilities can be caused by many different traits, markers, or identities since disabilities can impact, present, or harm a person in many different ways (Perez-Garin, et al. 2018).

As previously mentioned, disabilities can look and impact people differently. People with disabilities may have impairments with their mobility, physiological functioning in their body, or intellectual disabilities affecting their cognition. Research in the field of psychology and relating to disabilities, has a limited understanding of how different types of disabilities may affect prejudice, stigma, and discrimination (Barr & Bracchitta, 2015). This is because research has

tended to view people with a disability as one group, instead of investigating how each individual may have different effects and needs (Barr & Bracchitta, 2015).

As prevalence and susceptibility of disabilities in the world and especially in the United States has increased, so too has the ties with medical technology device aids (WHO, 2024, Allen, 2024). Medical technology has reported success in increasing independence (van Dam, et al., 2023), better controlling health needs (Cutler, 2005), and increasing the quality of life of users (Awaji,. et al. 2023, Scherer, 1996). While these technology aids have benefits, they also have been a form of nonverbal disclosure of disability creating a rise in the rates of discrimination, prejudice, and stigma to participants (Roberts, 2004). With this understanding, I investigated more specifically the feelings and behaviors participants may attribute to seeing someone with a disability as disclosed by their medical technology devices and aids.

Medical Technology:

The applications of medical technology devices has transcended leaps and bounds in its effectiveness in disabilities. Devices aiding in physiological effects like insulin pumps, cochlear implants, heart rate monitors, and more have proved crucial in the management of chronic conditions like Diabetes Mellitus, Stroke, and Cardiovascular Disease. Other aids in mobility disabilities may include walkers, prosthetics, canes, wheelchairs, and more. While medical technology is defined more broadly, stating “any item, piece of equipment, software program, or product system that is used to increase, maintain, or improve the functional capabilities of persons with disabilities” (Assistive Technology Industry Association, para 2), the applications of these devices can become quite individualistic.

Smartphone technologies, like automated delivery systems, mobile medical display systems, and data sharing apps have proven useful in chronic illness management (Dou, et al.,

2017). Automated drug delivery systems are apps like Omnipod 5, which were designed to assist and administer insulin to people with diabetes. Mobile medical display systems are apps that display medical information like heartbeat rate, blood pressure, blood sugar, and more. In a study conducted in 2017 and 2018, investigators were interested in the amount of people using apps to manage their diabetes, what apps were being used, and the difference in self care behavior from people who use and don't use the technology (Kebede & Pischke, 2019). Results concluded that a little over half (52.2%) of respondents with Type One Diabetes Mellitus used diabetes apps, and one third (33.3%) of respondents with Type Two Diabetes Mellitus used diabetes apps for the management of their disease (Kebede & Pischke, 2019). Researchers found that those using apps like Dexcom, mySugr, Freestyle Libre, and Xdrip had higher rates of self care behavior and better support for change in lifestyle and glucose monitoring (Kebede & Pischke, 2019). Acceptance of these apps in chronic health management, depended on perceived ease of use, perceived usefulness, relationship with the healthcare provider, perceived health threat, and the resistance to change from the individual user (Dou, et al., 2017). Apps and smartphone technologies have been increasing in prevalence in healthcare management, while also expanding into other disabilities (Wells & Spry, 2022). Diabetes had the most health care management apps, followed by migraine and asthma, then low vision, hearing loss, osteoarthritis, and then anemia (Martinez-Perez, et al., 2013). These apps are important to accept as they can help change and benefit individual users' health and health management.

Abandonment of medical devices is a large problem in disabled communities (Howard, et al., 2020). Approximately one third of medical device users and wearers will abandon their technology (Phillips & Zhao, 1993). The most frequently reported items, in this sample of participants to be abandoned, were wheelchairs, canes, bath chairs, walkers, and long-handled

reachers (Phillips & Zhao, 1993). As previously mentioned, technology integration in medicine has increased greatly in recent years, so the prevalence of specific device abandonment may have changed since 1993. Most abandonment of devices occurs after five years of use, or within the first year (Phillips & Zhao, 1993). When disabled people abandon their medical technology, they could experience a decrease in functional abilities, increase in costs or other expenses, and a higher risk of injury, illness, and disease (Scherer, 1996).

Predictors of abandonment of medical technology could be a plethora of things. A change in the wants and needs of the person with the disability, could require a different tool (Phillips & Zhao, 1993). The easier the technology is to acquire the more likely the product is to be abandoned, whether this is supplied directly from a producer or company, or a local drug store, and hospital (Phillips & Zhao, 1993). Many participants from Phillips and Zhao's (1993) study said that what may have worked in a hospital, would not apply in the home or work setting, unfortunately leading to abandonment of that aid and acquiring another device. On that similar pattern, if the device was not performing to the individual's needs it would be abandoned. More specifically, "if a device met the user's expectations of effectiveness, reliability, durability, comfort, safety, and ease of use the user was more likely to keep the device" (Phillips & Zhao, 1993, page 41). The strongest predictor of device abandonment, in this study, was if the individual's opinion was considered when acquiring the device. This connects strongly to the aesthetics and customization of tools, devices, and aids, that the individual wants and needs which will be discussed further in future directions.

A more recent literature review, from Croatia in 2024, found that people may discontinue use or abandon their assistive technology for three reasons: characteristics of the user, characteristics of the assistive device, and characteristics of the environment (Pinjatela, 2024).

The articles used by the author were selected from 2015 to 2023. In a similar vein to previous articles, characteristics of users that significantly predict abandonment are the physical condition, preference for another device or tool, difficulty in use, did not meet the needs or preferences of the user, lack of training, lack of motivation, fear of technology, and more. Predictors that facilitate abandonment, in characteristics of the device, include inadequacy or inappropriateness in the design, discomfort while using, having multiple assistive devices, unclear information or instructions. Finally, characteristics in a person's environment that can create abandonment are lack of training in the user, infrastructure is not suitable for use, challenges in the technological ecosystem and infrastructure, lack of access to assistive devices, limited funding opportunities, challenges of use in social interactions, and stigmatization of users while using assistive technology (Pinjatela, 2024). Stigmatization of assistive technology has been associated with abandonment of the devices, especially in older and aging populations (Parette & Scherer, 2004).

In many cases where abandonment is not possible, people will choose to conceal their medical devices to avoid nonverbal disclosure of disability. Concealment is the purposeful act of hiding or preventing something to be known to others, like information or an identity (Grigoryeva, 2024). Disclosure of a disability, through wearing medical technology devices, has been found to increase social isolation (Hocking, 1999), cause more violence towards the person (Dammeyer, & Chapman, 2018), and produce higher rates of discrimination and stigma (Roberts, 2004). People with Type One Diabetes and who use insulin pumps, which is a device that administers insulin, have been fearful of using or wearing their devices because of perceived emotional reactions to the device, body image, and social acceptance by peers (Ritholz, et al. 2007). Therefore, in order to avoid stigma, prejudice, and discrimination, many people with disabilities will conceal their technology if possible (Hocking, 1999). In the deaf and hard of

hearing community, members will often conceal their cochlear implants and hearing aids because of unwanted attention, increased social isolation, and social stigma (Profita, et al., 2018). While concealment of these devices may help to avoid stigma, concealment of medical technology can also have effects on health and well-being. Authors Le Forestier et al. (2024) concluded, "concealment is associated with worse health and wellbeing, with generally small effect sizes. Lower feelings of belonging, less social support, and lower self-esteem are the most plausible mechanisms for explaining why concealment is associated with worse health and wellbeing" (Le Forestier, et al., 2024, page 1). Le Forestier makes a connection between concealment of devices harming relationships, which therefore compromises the health and well-being of the person (Le Forestier, et al., 2024). This is especially interesting in the context of medical devices, as many of the technology's purposes are to benefit and support health in a person with a disability. Concealability may not always be purposeful. Many diseases do not appear outwards but harm bodily functioning to different organs, for example chronic pain, diabetes, and cancer are often not presented outwardly. These are often referred to as invisible illnesses. To help aid the effects of an invisible illness, it often requires a noticeable medical technology device. So whether it be purposefully or unpurposefully concealed, stigma, social interactions, and personal factors like body image and disease acceptance, can influence a person and disclosure of their disability.

Social interactions through medical technology can be both positive and negative experiences for the technology user. In many instances, wearing and displaying medical devices can facilitate community (Peterson, 2020), increase awareness of disabilities (O'Kane, et al., 2015), and improve the health and well being of the person with a disability (Wortley, et al., 2017). As previously mentioned, social interactions with medical tech can also be negative. Stigma (Roberts, 2004), social isolation (Hocking, 1999), and awkward feelings or too personal

questions being asked (Owen, et al., 2012), can be some results of displaying technology. These social interactions often lead to concealment of medical technology devices.

In an article by Shinohara and Wobbrock (2016), they investigated the self-confidence and self-consciousness of people with sensory disabilities, like blindness and hearing loss, who are using assistive technologies. The authors were also interested in the feelings of people without disabilities, when they saw someone using assistive technology in a public setting. After both sets of participants recorded their feelings, those with a disability said whether or not they felt self-conscious or self-confident in public, and those without a disability recorded how they felt after seeing or interacting with someone using medical technology. The assistive technologies form and functionality did impact social interactions, affecting the self-efficacy and self-confidence of the user. For the participants without a disability who were reporting on their perceptions and interactions with assistive technology, researchers found that when perceiving assistive technology they would apply judgement toward the situation or person. Most judgment was held on the capability and challenges of the person, creating sympathy and pity for the person with the disability. When directly interacting with a disabled person and their technology they felt self conscious or fearful of offending the ability of the technology user. Social interactions are affected by medical technology. When the assistive technology is perceived by another person, it can create feelings of pity and sympathy to the person with a disability. All of this information and data is supported in Shinohara & Wobbrock, (2016).

Saarinen et al. (2013) were interested in how people adjusted to wearing an insulin pump, which helps administer insulin. Insulin is a hormone that the body automatically produces in order to maintain blood glucose levels; for diabetics their body does not automatically produce insulin, requiring synthetic administration (Cleveland Clinic, 2024). Pumps are a technology that

attach to the body, and administer insulin through a tubing (Cleveland Clinic, 2024). These researchers wanted to find more information about how people transitioned from using insulin needle injections into insulin pump therapy. When discussing the involvement of others in the transition, participants said “Reactions from close relatives were mostly positive, although initially they could be frightened or disturbed. The interview also revealed examples of when the insulin pump made the person’s diabetes more visible. Participants felt compelled to tell others they had diabetes because the pump could be seen, or heard if its alarm went off” (Saarinen, et al., 2013, page 40). The article noted that participants received more questions about their technology and disease, family and friends were initially cautious of the device but eventually showed curiosity and interest, and finally the device became an extension of the user (Saarinen, et al., 2013). Social factors, like opinions from family and friends, perceived judgement by strangers, and experiences of prejudice, discrimination, and stigma can influence and change the usage of medical technology. What is unknown is if the same experiences affect all people with disabilities in the same way.

Disabilities:

Research often treats people with disabilities as a monolith, grouping them all together into one category, although people with disabilities may have different abilities too (Barr & Bracchitta, 2015). For example, a person who is mobility impaired and relies on a wheelchair to move, will have different abilities than someone with a chronic illness. Barr and Bracchitta (2014) conducted a study investigating how contact with different types of disabilities could affect the individual’s attitudes and future interactions with disabled people, no matter the type. They investigated three different groups of people with disabilities, those being physical, developmental, and behavioral. The authors separated disability distinctions because previous

empirical studies had only investigated people with disabilities as one group, with no distinctions. The study found that participants had more contact with people with physical disabilities than developmental, and behavior did not differ significantly from either physical or developmental disabilities. This may be associated with the concealability and invisibility of disabilities. Participants reported that those with developmental disabilities are more hopeless than those with physical disabilities. Those with a developmental disability are perceived as less optimistic than behavioral which is less optimistic than physical disabilities. The article found that having more contact with people with behavioral disabilities reduced the misconceptions on their abilities, also more contact with people with developmental disabilities reduced misconceptions and increased the optimism for their abilities. Overall, the research suggests that the type of disability, whether it be developmental, behavioral, or physical is a predictor for the amount of contact and attitudes created. The authors noted that contact alone isn't significant enough to change behaviors, but communication and conversation does.

The Stereotype Content Model, which measures dimensions of emotional warmth and mental competence, was used to measure how people feel towards those with physical disabilities using medical technology (Fiske, et al., 2002). An article investigated the perceptions of warmth and competence towards people who are physically disabled and use assistive technology, but was also interested in how being labeled as a "cyborg" could also change feelings (Meyer & Asbrock, 2018). The article found that people who are physically disabled and use bionic prosthetics, are deemed as more competent than those who do not use assistive technology, but people who are able-bodied are still considered more competent than the physically disabled (Meyer & Asbrock, 2018). Participants viewed people with disabilities using bionic prosthetics as emotionally warmer than both people with physical disabilities not using

assistive technology and those with no disabilities (Meyer & Asbrock, 2018). When referring to people with disabilities, who also use prosthesis as “cyborgs”, they are viewed as more competent but cold and threatening (Meyer & Asbrock, 2018). In another article, they reported that calling someone a cyborg, who has a disability, they are more likely to experience envy and harm (Cuddy et al., 2007).

The term cyborg is a type of mechanistic dehumanization. Cyborg is the nickname for a cybernetic organism, meaning an organism that has both biological and technical components (Warwick, 2012). Mechanistic dehumanization refers to “the contrast between humans and inanimate objects, occurring when people are likened to objects or denied human nature” (Haslam & Loughnan, 2014, page 405). There is another form of dehumanization, which is when there is a contrast between humans and animals and a person is directly associated with animals or they are denied uniquely human characteristics (Haslam & Loughnan, 2014). This is called animalistic dehumanization. Being dehumanized is a commonality in groups that are often discriminated against, whether it be race, gender, and disability status (Christoff, 2014). If you dehumanize another person, it can lead to that individual to experience social rejection (Martinez, et al., 2011), reduced moral worth (Haslam & Loughnan, 2014), less worthy of protection from harm (Gray, et al., 2007), increased aggressive behaviors (Obermann, 2011), and feelings of degradation, invalidation, and demoralization (Sue, et al., 2007). Mechanistic dehumanization often occurs in an organizational setting but is also frequently discussed in technology use settings (Christoff, 2014). While being compared to a nonhuman mechanical object is dehumanizing, some believe that cyborgs are instead superhuman. Superhumanization bias is “the representation of others as possessing mental and physical qualities that are supernatural (transcending the laws of nature), extrasensory (transcending the bounds of normal

human perception), and magical (influencing or manipulating the natural world through symbolic or ritualistic means) (Waytz, et al., 2015, page 352). Perceived superhumanization has often been associated based on race, with articles reporting that White people often associated Black people as having superhuman abilities, like a lack of pain (Waytz, et al., 2015). Human enhancement technologies or HET, have been used more frequently in healthcare and workplace settings increasing productivity and function (Hess, et al., 2024). While no current research has been conducted on perceived superhumanization in medical technology, a study found that employees using HET technologies, are firstly viewed as cyborgs, and then in a workplace settings this technology elicits superhumanization thoughts from customers (Hess, et al., 2024). As previously mentioned, customers then formed feelings of warmth and competence towards these "cyborgs", which changed interaction styles and consumer preferences (Hess, et al., 2024). In an article about the ethics behind neural implant acceptance, and being referred to as a cyborg, the study reported that disgust is often a factor in deniability of the technology (Reinares-Lara, et al., 2018).

According to the American Psychological Association (APA) disgust is "a strong aversion, for example, to the taste, smell, or touch of something deemed revolting, or toward a person or behavior deemed morally repugnant (American Psychological Association, 2018). Often disgust is seen to protect the physiological health of our body (Curtis, 2011), like avoiding rotten or unpleasant foods, but disgust can also be a form of prejudice towards groups of people (Taylor, 2010). For example, one research article found that when people interact or see someone with a physical abnormality or disability it creates more feelings of disgust (Park, et al., 2003). The authors focused on how previous historical diseases, like smallpox which would create lesions or rashes along the skin creating permanent scarring, would then make other people

associate the disease with the person (Park, et al., 2003). This association then created feelings of disgust and avoidant behaviors, to those with any physical anomalies like those without a limb, creating an implicit bias for generations to come (Park, et al., 2003). Disgust is a feeling that can implicitly appear, without cause, when viewing someone with a physical disability because of the historical association to diseases. To expand upon these previous findings, I wanted to know how this may appear in nonphysical disabilities that cannot visibly be seen, like heart disease, deafness, and diabetes.

Perceived vulnerability to disease (PVD) is a "is a trait-level indicator of behavioral immune activity that reflects both perceived infectability (PVD-Infection), a personal belief about susceptibility to infectious disease (e.g., if a disease is going around you will get it (Duncan, et al., 2009)) and germ aversion (PVD-Germ), the level of emotional discomfort experienced in situations where risk of disease transmission is high (e.g., someone sneezing without covering their mouth (Duncan, et al., 2009)) (Hoover, et al., 2022). As explained in the definition, perceived vulnerability often causes avoidance behavior due to transmission of a disease or germ. While you can avoid a physical space because of its germs, like a hospital, you also are avoiding interactions with people and specific groups. People with high rates of PVD have been shown to avoid individuals that are in their out-group, which is a group of people who are different from yourself, avoid individuals with physical abnormalities, and chose to interact with those who have features of facial attractiveness (Welling, et al., 2007). Choosing to interact with attractive people does not remove them from carrying a disease or germs that someone with PVD could be fearful of, as the diseases may be invisible in nature. As previously mentioned with mortality salience, avoidance of specific groups of people is a form of discrimination, stigma, and prejudice. With this information, I was interested in nonverbal disclosures of

disability through medical technology, which would cause individuals to feel more vulnerability to diseases, and therefore avoid people with disabilities.

Mortality salience is the awareness of one's inevitable death (American Psychological Association, 2018). This phenomenon is based on Terror Management Theory (TMT) created by Greenburg, J. Solomon, S. and Pyszczynski, T. in 1986. TMT states that death anxiety is the motivating factor in human behavior and the primary function for society. When you are more aware of your mortality you can have different effects in social interactions and human behavior. For example, heightened levels of mortality salience increases levels of fear and defensiveness when interacting with people who are terminally ill, to suppress thoughts of death and dying (Smith & Kasser, 2011). Mortality salience has also elicited avoidance from those who are older in age, because they elicit more thoughts of death and dying than younger aged individuals (Martens, et al., 2004). When people fear their own death and dying, they are more likely to avoid and be fearful of people, groups, and thoughts that create more death anxiety (Martens, et al., 2004). Avoidance and fear are some of the many reasons why people discriminate, stigmatize, and have prejudice toward others, examples of this are apparent towards those with mental illness (Richards, et al., 2024), healthcare workers while in a pandemic (Taylor, et al. 2020), and hiring disabled individuals (Dali, 2018). This connection between mortality salience and the prevalence of discrimination, prejudice, and stigmatization is important to investigate as those with a disability may elicit more thoughts of mortality. Previous research has also noted that those with a chronic illness or a disability think about and consider their death more often than those who don't (Stancliffe, et al. 2016). Ben-Naim, S et al. they found that when participants interacted with a confederate in a wheelchair, that contact created more thoughts about death as compared with people without a disability (Ben-Naim, et al., 2008).

Although they are often thought similarly, shame and guilt have quite different meanings and connotations in research. Shame is an "unpleasant self-conscious emotion arising from the sense of these being something dishonorable, immodest, or indecorous in one's own conduct or circumstances" (American Psychological Association, 2018). APA states that shame can create avoidant behavior and defensive anger, harming social interactions, interpersonal relationships, and psychological functioning (American Psychological Association, 2018). Guilt is defined as a judgement of wrongdoing, often creating motivation to fix or undo the action or situation that was wrong (American Psychological Association, 2018). This feeling is often accompanied with actions and fear that the mistake is exposed publicly. Generally, guilt focuses on an action or behavior that was wrong, whereas shame is a feeling associated with the self and person being wrong. While people with interpersonal relationships, like a parent or sibling, of those with an intellectual disability have been measured, no studies to my knowledge have displayed any interest in how a general population may feel shame and guilt towards someone with a disability (Findler, et al. 2016). This is especially interesting as disclosure of the disability may not be initially apparent.

Infantilization is when a competent adult person is treated like a child by another person regardless of their age. Being infantilized often leads to a sense of loss over their life (Robertson, et al., 2016), increased rates of depression and anxiety (Wang, et al., 2007), anger towards the person infantilizing or caring for them (Garber, et al., 2011), lower self-esteem (Robertson, et al., 2016), and damage to close relationships (Kakihara, et al., 2010) (Epstein, et al. 2023). Epstein, R. et al. stated "Infantilization generally occurs with populations that lack power: older adults, women, communities of color, LGBTQIA+ individuals, adolescents, individuals with disabilities, and so on" (Epstein, et al., 2023, page 137). Often the individuals with disabilities

who have received the most infantilization are those with developmental, intellectual, and sight disabilities (Epstein, et al., 2023). These individuals are often seen as needing more help to function in society, one study found that people perceive those with disabilities "as lacking interactive skills, as more dependent on others for help" (Weinberg, 1976, page 11). These groups of individuals with disabilities that have been associated the most with infantilization may have a key feature or tool that makes others recognize their disability. In a situation where people cannot automatically identify a person as disabled, I questioned whether they would be infantilized as much.

Research Study Overview:

This project was interested in investigating how medical technology devices may a) disclose disability to another person b) effect and alter human behavior and emotions after viewership c) if different types of medical technology devices elicit different amounts of behavior and emotional change and d) make a conclusion from previous literature to predict an indirect assumption of prejudice and stigma on the person with a disability. My driving research question was to see if there is a difference in the treatment and prejudice against disabled groups based on the technological devices that are used, and how does seeing these specific medical devices being used or worn by a person make them feel.

After reading many articles about my variables and outcomes relating to them, I began to theorize some of the outcomes of my study. I hypothesized that for disgust, levels will increase after interaction or contact with medical technology. I theorized that medical devices aiding in physiological disabilities will increase disgust more than mobility devices. I hypothesized that rates of vulnerability to disease will increase after interacting or viewing medical technology, this will especially occur with technology devices related to physiological outcomes rather than

mobility. I hypothesized for mortality salience that as you view medical technology, and therefore people with disabilities, you will have more thoughts about death. I also theorized that thoughts about mortality salience will increase after viewership of mobility devices. I hypothesized that shame and guilt would be felt more, especially when seeing someone with mobility or physiological medical devices. I hypothesized that mobility devices increase shame and guilt more than physiological devices do as they can be seen more explicitly than other technology. Finally, I hypothesized that rates of infantilization will occur more after interacting with people who are disabled than not and will happen more when the person uses a mobility device than a physiological device.

Methodology:

To investigate my research questions, I created an online survey using SurveyMonkey which was then shared through SONA systems to gather participants from Allegheny College psychology courses. When participants first came to the study survey, they would have to consent to participating, since this study was online, they consented by clicking a checkbox that was an alternative to their signature as approved by my IRB. In order to reduce response bias and social desirability bias, since I was predicting levels of prejudice indirectly, I decided to use deception. The story I initially disclosed to participants, is that the study was interested in examining the effects that different types of medical marketing photographs have on the individual perceiving them. This required me to use specific photographs, in which the person in the photo would be posed, looking at the camera, and using the device. To see the photos I used, please see Appendix A, with subcategories for mobility, physiology, and control. I also added specific questions to help keep the participant with the story, those questions are found in Appendix G. The study was formatted in 3 different sections. The first section asked participants

to respond to a series of questions regarding my six different variables, which will be discussed shortly. These responses served as a pretest and comparability score before they interacted with their independent variables. After the participants completed the questionnaire, they would be randomly assigned to one of three groups; mobility, physiology, or control. SurveyMonkey would do the random assignment. Depending on the group you were assigned to, you would view different images of people either wearing or using medical technology devices. For example, those in the mobility group would view technology devices that aided someone's mobility needs, like a standard or electric wheelchair, prosthetic, cane, or walker. The physiological participants would view medical technology devices that aid in the physiological functioning of the body. These devices included cochlear implants, insulin pumps, constant glucose monitors, colostomy bags, heart rate monitors. These devices were worn by the participant, whereas physiological group's were being used by the participant. The control group saw photographs of people smiling at the camera. Each participant saw 10 photographs in their group, for about 45 seconds. I chose 10 photographs, as I didn't want the participants to figure out the true purpose of the study and it was challenging to find photographs that met the criteria. The criteria included, the medical device had to be touching or being used by the person in the photo, the photo needed to be of higher quality like a marketing photo, all people in the photos needed to be of different ages, races, sexes, and general identities to reduce bias from other sources, besides the device. I also wanted to use deception and advertising photographs, as it gave a higher possibility of the models/actors compensation for their work. If I had consulted photos off the internet, at random, there is a likelihood that someone may have posted or sourced that photograph without permission, or not paid the model. With the advertising photos, I had a better likelihood for compensation for those in the image. After the participants viewed the

photos, they answered the same questions, as they had previously completed. This is like a post test, so I could compare results from before and after the independent variable interaction. I surveyed participants on six different variables, disgust, perceived vulnerability to disease, mortality salience, shame and guilt, and infantilization.

To measure disgust, I used The Disgust Scale, created by Olatunji, et al., which measures using a 5 point Likert scale. The Cronbach's alpha which shows the reliability of the measurement is .84, with good construct validity too (Olatunji, et al., 2007). For my specific interpretation of The Disgust Scale, my Cronbach's alpha was 0.44 for time one, and 0.43 for time two. While I do not fully know why the reliability is so low, I would assume it is because I did not ask participants every single question from the scale. The participant, to collect data, would have to respond with how disgusted they felt by specific statements. Some of the questions were "I never let any part of my body touch the toilet seat in public restrooms" and "I probably would not go to my favorite restaurant if I found out that the cook had a cold" (Olatunji, et al., 2007). All questions, used in this study, can be found in appendix B. When quantifying and coding my data, I used a five point scale. The number one was applied for strongly agree, two for agree, three coordinated with neither agree nor disagree, four was disagree, and finally five was strongly disagree. When evaluating the prompts to pose to participants, one of the statements said "It would not upset me at all to watch a person with a glass eye take the eye out of the socket" (Olatunji, et al., 2007). After discussing this more with my advisors, I decided to remove this question as it associates someone's disability, lack of sight, eye disease, or being born without an eye as examples, being a cause for someone's feeling of disgust. All other questions remained the same, without alterations.

I measured Perceived Vulnerability to Disease Scale created by Duncan, L., Schaller, M., and Park, J. in 2009 (Duncan, et al., 2009). This is a 15-item scale that has a consistent validity and reliability as reported by the authors. In my scale, for time one I had a reliability of 0.49 and for time two it was 0.54. In order to update and apply this scale better to my study, I exchanged certain words. For example, one of their questions was "I avoid using public telephones because of the risk that I may catch something from the previous user" (Duncan, et al., 2009) and I changed this to "I avoid touching door knobs because of the risk that I may catch something from the previous user" as I felt this applied more to a current day and age as most individuals have their own cell phone. I also changed another question which read "My hands do not feel dirty after touching money" in which I altered it to "My hands do not feel dirty after touching someone's used plate"(Duncan, et al., 2009). This question was changed for the same reason, as before, because people often have a personal credit or debit card that is used instead of money or cash. All questions, used in this study, can be found in appendix C. All of these statements were rated, on a 5 point Likert scale, in which the participant was asked to report their agreement or disagreement to the statement. If an answer was given the number one it was correlated with strongly agree, two for agree, three was for neither agree nor disagree, four was disagree, and five for strongly disagree.

I measured Mortality Salience with the Death and Dying Distress Scale (DADDS) (Lo, et al. 2011). This is a 10-item survey using a Likert scale from 0-6, asking The DADDS scale provided good internal reliability with a Cronbach's alpha value of 0.93. In my scale, I had a reliability of 0.91 for time one, and for time two it was 0.92. The questions asked participants to give their answers from the past two weeks, along a six point Likert scale. This scale ranged from extreme, great, moderate, mild, very little, to none. These questions asked patients how

they felt about their own death and dying, things like not having done all they wanted to, dying slowly or suddenly, and not knowing what happens after death. I exchanged the question language from the “past two weeks” to “recently”, as to focus on the present experience and not the past weeks. Besides that alteration, I did not change any questions. All questions that were asked to participants can be found in appendix D. As previously stated, this was numerically quantified on a six point scale, one was for extreme distress, two for great distress, three for moderate distress, four correlated with mild distress, five was very little distress, and finally six was for I was not distressed about this thought or concern.

To see how people may change their rates of infantilization towards different people with disabilities, I created and edited the Infantilization IAT by Epstein and Dumas, as it was created for people to see if they have been infantilized (Epstein & Dumas, 2010). To make this applicable for my study, as there were no currently available options for what I needed, I altered each question to ask what the participant was doing to others. For example, the original question asked participants “has someone… tried to make you speak” I altered this question to “have you… tried to make someone else speak”. I also added questions that seemed applicable to infantilization, as many of the questions in the form would have not complied with my IRB. Statements included “cut someone off who was speaking, use a "baby voice" when speaking to someone, told someone how to do a task a specific way, use a name like "baby" "girl" "boy" "sweetie" to an adult, limited someone's access to a building or chair purposefully, advocate or speak-up for someone without their permission, over explain a task to someone, tried to help someone who didn't verbally ask you to”. I felt that adding these questions were necessary as they aided more in how people with a disability may be infantilized outside of the general infantilization methods that apply to many other populations. I also understood, while collecting

and analyzing data, that some of these actions may be trends in language, like calling a friend or a romantic partner “baby” “sweetie” “girl” “boy” and to form results cautiously. All questions can be asked in appendix E. The reliability for this infantilization measure was 0.94 based off of Crohnbachs alpha. These questions were answered with yes or no, participants specifically selected the questions in which they had done what was stated. This meant, when quantifying the data, I gave each participant a one-point value for each question they had selected yes to participating or doing.

To measure shame and guilt levels in the participants, I used the shame and guilt proneness scale (GASP) created by Cohen, in 2011. The questionnaire gives the participant a situation and asks how they would feel based on their actions. GASP uses a 7 point Likert scale, which participants rated on the likelihood of what the question asked. When numerically defining these answers, one meant very likely, two was likely, three was somewhat likely, four correlated with neither likely nor unlikely, five was for somewhat unlikely, six for unlikely, and seven was for very unlikely. One of the sample questions that I used was “You strongly defend a point of view in a discussion, and though nobody was aware of it, you realize that you were wrong. What is the likelihood that this would make you think more carefully before you speak?” (Cohen, 2011). I did not alter or edit any questions for shame and guilt, as the situations were not regarding anything with disabilities or prejudice, so it met my needs. All questions that I posed to participants can be found in appendix F. This study met the authors benchmarks for validity and reliability, especially as scenario-based measures often have lower scores. In my study, I had a reliability of 0.57 for time one and 0.51 for time two.

In my study, I had a total of 60 participants. 54 people were White (90%), 2 were Hispanic or Latino (3.33%), 2 were Black or African American (3.33%), and 1 was Middle

Eastern or North African (1.66). In regards to gender identification, 43 were Female (71.66%), 11 were Male (18.33%), 3 were Nonbinary (5%), and 2 identified with another gender not listed (3.33%). To better understand if knowing or consistently interacting with disabled people could change the effects of my variables, I asked my participants to disclose if they or someone they know have a disability. Forty-seven (47) of my participants said yes (78.33%), 8 responded no (13.33%), and 4 reported maybe (6.66%). I gave the participants a maybe option, as many disabilities can be invisible, so some could not be certain without it being disclosed. All participants answered every question, so I didn't need to do any data deletion or data imputation. I had 21 participants in the mobility group, 18 in the physiology group, and 21 again in the control group. Participants were eligible for compensation in this study. According to my IRB rules, participants would be placed in a raffle, for a $5 gift card to a local business, near Allegheny College. 15 gift cards would be raffled off to participants that consented to disclosing their Allegheny mailbox number for drop off. This way I also ensure participant confidentiality.

Results:

Disgust:

I ran a repeated measures analysis of variance (ANOVA) to determine if there was a significant main effect of time on the amount of disgust someone would feel. The numerical value one was applied for strongly agree, two for agree, three coordinated with neither agree nor disagree, four was disagree, and five was strongly disagree. Please note this as you read the results, for disgust, as decreasing numerical values are correlated with increasing variable meaning. Results indicated that there is significance between the interaction of time, on feelings of disgust, $F\,(1, 57) = 5.12$, $p = 0.03$, $\eta^2_p = 0.193$. Our effect size indicates that 0.193 variance for disgust is explained by time. A Bonferroni's post-hoc test indicated that there was a main effect

between time one and time two, t(57) = 2.26, $p = 0.03$, Cohen's d = 0.12. Results indicate that disgust increased from time one (M = 2.9, SD = 0.52) to time two (M = 2.8, SD = 0.51).

I then looked at the main effect of group mobility, physiology, and control. Results indicated that there is no significance between the type of groups, F (2, 57) = 0.78, $p = 0.46$, $\eta^2_p = 0.03$.

I wanted to see if the interaction effect between the different groups and time on disgust. The results indicated that there is no significant interaction between the type of group and time on levels of disgust, F (2, 57) = 1.78, $p = 0.2$, $\eta^2_p = 0.06$.

While this information is important to the overall goals of the study, I wanted to look more in depth at the different groups, especially as the interaction effect between group type and disgust did not support my hypothesis. The table below displays these interactions. After investigating these results, we do see that there is a change in the mobility group and the physiology group from time one to time two. In the mobility group we do see an increase in feelings of disgust ($M_{\text{time one}} = 2.91$, $M_{\text{time two}} = 2.80$) over time. In the physiology group we also see a small change in disgust scores from time one to time two ($M_{\text{time one}} = 3.01$, $M_{\text{time two}} = 2.94$). Control had no such change in disgust scores.

Disgust:	**Group Type:**	**Mean:**	**Standard Deviation:**
Disgust Time One	Control	2.77	0.55
	Mobility	2.91	0.50
	Physiology	3.01	0.51
Disgust Time Two	Control	2.77	0.59
	Mobility	2.80	0.50
	Physiology	2.94	0.48

Perceived Vulnerability to Disease:

I ran a repeated measures ANOVA to determine if seeing someone with a disability, generally, may change the levels of perceived vulnerability to disease (PVD) the participant experiences. The numerical value one was applied for strongly agree, two for agree, three coordinated with neither agree nor disagree, four was disagree, and five was strongly disagree. Please note this as you read the results, for PVD, as decreasing numerical values are correlated with increasing variable meaning. The main effect results indicated there was a significant effect between time one and time two on perceived vulnerability to disease, F (1, 57) = 13.6, $p < .001$, $\eta^2_p = 0.193$. The effect size demonstrates that the relationship between time one and time two measurements of PVD may be small. Bonferroni's post-hoc test was conducted to determine if there is a significant difference between time one and time two. Results indicated that there is a main effect of time, t (57)= 3.69, $p < .001$, and Cohen's d = 0.27. The difference between the mean of time one (M = 2.67, SD = 0.43) and time two (M = 2.54, SD = 0.49) show that all groups showed an increased level of perceived vulnerability to disease over time.

I then looked at the main effect of the relationship between our group types on PVD. Results showed that there is no statistical significance between PVD across the groups, F (2, 57) = 1.5, $p = 0.23$, $\eta^2_p = 0.05$.

The interaction between our group types and time on perceived vulnerability was not statistically significant and therefore had no statistical relationship, F (2, 57) = 0.39, $p = 0.68$, $\eta^2_p = 0.01$.

Similarly to disgust, I wanted to look more closely at the different groups, time, and PVD. The table below displays means across these levels. After reviewing the results, I saw that there is some non-significant change in the mean value in all three groups. For the mobility

group we see that there is a non-significant increase in the amount of perceived vulnerability to disease experienced from time one to time two ($M_{time\ one} = 2.64$, $M_{time\ two} = 2.52$). In the physiology group we also see PVD increasing from time one to time two ($M_{time\ one} = 2.83$, $M_{time\ two} = 2.66$). What is confusing and something to investigate further is that the control group also had a change in PVD ($M_{time\ one} = 2.54$, $M_{time\ two} = 2.45$). This may have been from an error in control methodology or another variable that was not measured. This will be discussed further in the discussion section.

PVD:	**Group Type:**	**Mean:**	**Standard Deviation:**
PVD Time One	Control	2.54	0.54
	Mobility	2.64	0.35
	Physiology	2.83	0.40
PVD Time Two	Control	2.45	0.60
	Mobility	2.52	0.40
	Physiology	2.66	0.48

Mortality Salience:

To determine if seeing someone with a disability has an effect on mortality salience, I ran a repeated measures ANOVA. This was numerically quantified on a six point scale, one was for extreme distress, two for great distress, three for moderate distress, four correlated with mild distress, five was very little distress, and finally six was for I was not distressed about this thought or concern. Please note this as you read the results, for Mortality Salience, as decreasing numerical values are correlated with increasing variable meaning. Main effect results indicated that there was no relationship between time one and time two of mortality salience, $F\ (1, 57) = 0.07$, $p = 0.79$, $\eta^2_p = 0.001$.

When I reviewed the results from the main effect of group variables, I found that there was no statistically significant main effect of group on mortality salience, F (2, 57) = 0.40, p = 0.67, $\eta^2_p = 0.014$.

The interaction between the different types of groups and time on the thoughts and feelings of death was also not significant, F (2, 57) = 1.70, p = 0.2, $\eta^2_p = 0.06$. So overall, I saw that thoughts and feelings about death are not affected, by seeing someone with a disability, no matter the type of disability they may have when running my analyses.

Similarly to my other variables, because none of my hypotheses were supported by the data, therefore I wanted to look more closely at the mean values and see if there was any movement in the means. The table below shows these values more closely. For the mobility group, we see that there is a non-significant increase in the amount of mortality salience experienced, from time one to time two ($M_{\text{time one}} = 4.20$, $M_{\text{time two}} = 4.14$). In the physiology group we see PVD decreasing from time one to time two ($M_{\text{time one}} = 4.40$, $M_{\text{time two}} = 4.50$). This is extremely interesting as previous analysis has shown that there is an increase in the dependent variable over time, whereas this is being interpreted as when you see someone who is physically disabled you feel less mortality salience. Something to investigate further is that the control group also had a change in mortality salience ($M_{\text{time one}} = 4.15$, $M_{\text{time two}} = 4.05$).

Mortality:	**Group Type:**	**Mean:**	**Standard Deviation:**
Mortality Time One	Control	4.15	1.34
	Mobility	4.20	1.25
	Physiology	4.40	1.10
Mortality Time Two	Control	4.05	1.36
	Mobility	4.14	1.22

	Physiology	4.50	1.00

Infantilization:

I used a repeated measures ANOVA to determine if seeing someone with a disability may impact levels of infantilization displayed. Differently from the previous variables, for the infantilization variable, if the number is lower then the amount of infantilization is also low, similarly that higher numbers mean more infantilization. Please note this as you read the results for infantilization. Main effect results indicated that there is a significant effect of time one and time two of infantilization, F (1, 57) = 57.8, $p < .001$, $\eta^2_p = 0.50$. I ran a Bonferroni post hoc test, to measure a difference between time one and time two for infantilization. The interaction effect results from the post hoc test indicate that there is a main effect of time, t (57)= 7.6, $p < .001$, and Cohen's d = 0.5. The mean of time one (M = 7.43, SD = 3.32) and mean of time two (M = 5.75, SD = 3.4) indicate that there is a change of infantilization between time one and time two of measuring infantilization.

In my repeated measures ANOVA, I wanted to determine the relationships between each of our independent variables, specifically our groups, mobility, physiology, and control. Interaction effect results indicated there was no significant effect of the group type to one another, F (2, 57) = 2.13, $p = 0.13$, and $\eta^2_p = 0.07$.

Finally, I was interested in the interaction effect between group types and infantilization from time one and time two. This interaction was not statistically significant between the type of disability you see and the amount of infantilization elicited, F (2, 57) = 0.30, $p = 0.75$, and $\eta^2_p = 0.01$.

Since many of the interactions I ran did not support my hypothesis, I wanted to review the means of each group and the changes that may have occurred between time one and time

two. The table below shows these details more specifically. For the mobility group we see that there is a decrease in the amount of infantilization experienced, from time one to time two ($M_{time\ one} = 8.52$, $M_{time\ two} = 7.05$). In the physiology group we also see infantilization decreasing from time one to time two ($M_{time\ one} = 6.67$, $M_{time\ two} = 4.78$). Something to investigate further is that the control group also had a decrease in infantilization over time ($M_{time\ one} = 7.10$, $M_{time\ two} = 5.43$).

Infantilization:	**Group Type:**	**Mean:**	**Standard Deviation:**
Infantilization Time One	Control	7.10	0.75
	Mobility	8.52	0.79
	Physiology	6.67	0.69
Infantilization Time Two	Control	5.43	0.75
	Mobility	7.05	0.78
	Physiology	4.78	0.76

Shame and Guilt:

I used repeated measures ANOVA to determine if there is statistical significance between time one and time two and how that may alter levels of shame/guilt within a person. When numerically defining these answers, one meant very likely, two was likely, three was somewhat likely, four correlated with neither likely nor unlikely, five was for somewhat unlikely, six for unlikely, and seven was for very unlikely. Please note this as you read the results, for Shame and Guilt, as decreasing numerical values are correlated with increasing variable meaning. Main effect results indicated that there is a significant effect of time on feelings of shame/guilt, F (1, 57) = 5.6, $p = 0.02$, $\eta^2_p = 0.09$. Our effect size indicates that 0.09 variance of shame/guilt is explained by time. I also ran a Bonferroni's post hoc test, to see if there is a difference between

time one and time two for shame/guilt. The post hoc test found there is a main effect of time, t (57)= -2.37, p = 0.02, and Cohen's d = -0.11. The difference between the mean of time one (M = 2.48, SD = 0.74) and mean of time two (M = 2.56, SD = .75) show that there is a decrease in the overall level of shame and guilt over time.

I then reviewed my main effect between the groups on shame/guilt. Results indicated that there is no significance between our groups, F (2, 57) = 0.34, p = 0.72, and η^2_p = 0.01.

Finally, I went to look at the interaction effect between time (time one and time two) and group (mobility, physiology, and control) on shame/guilt. Results displays no statistical significance, F (2, 57) = 0.73, p = 0.49 and η^2_p = 0.03.

As with all previous variables, I wanted to look closer at the specific mean values and variance between these relationships, especially as my hypothesis is not being supported. The table below shows all of these means and standard deviations more clearly. For the mobility group, we do see a non-significant decrease in the amount of shame/guilt experienced over time ($M_{\text{time one}}$= 2.61, $M_{\text{time two}}$= 2.64). For the physiology group we also see shame and guilt decreasing over time ($M_{\text{time one}}$ = 2.36, $M_{\text{time two}}$= 2.50). Finally, we also see a change in the control group means, where shame and guilt levels also decreased over time ($M_{\text{time one}}$ = 2.47, $M_{\text{time two}}$= 2.55).

Shame/guilt:	**Group Type:**	**Mean:**	**Standard Deviation:**
Shame/guilt Time One	Control	2.47	0.86
	Mobility	2.61	0.67
	Physiology	2.36	0.71
Shame/guilt Time Two	Control	2.55	0.86
	Mobility	2.64	0.64
	Physiology	2.50	0.18

Discussion:

After completing my data analysis, I did find some interesting results that may play a role in why people hold prejudices, stigmatize, and discriminate against those with a disability, as disclosed by medical technology. Disgust plays part in discriminatory behavior (Taylor, 2010). My study found that disgust levels do increase over time with viewership of those who are disabled, generally. This does support my hypothesis that disgust would increase after viewing someone with a disability. I then found evidence that there is no significance between the types of groups you view. This meaningful information means there are no significant differences between our study groups, which may be important for future studies. From this information, I was interested to see how different types of disabilities may influence levels of disgust more than another. Specifically I was interested if people with mobility or physiological disability would elicit different results. My *p* value, concluded that the group type does not significantly affect levels of disgust in a participant. This did not corroborate my hypothesis, as I believed physiological groups would create more disgust in a participant. Finally, because I knew that many of the hypotheses were not supported, I looked closely at the mean and standard deviation changes over time. I hypothesize that the interaction between groups and time, on disgust, did

not appear to be significant because of the small changes in mean amount and how it may have been blunted by no changes in the control group.

Perceived vulnerability to disease (PVD) measures a participants general feelings of immune protection, infectability, susceptibility to infectious diseases, emotional discomfort of disease transmission, and germ aversion (Duncan, L. et al., 2009). In my study, I found that perceived vulnerability to disease does increase over time. This does support my hypothesis that viewing someone with a disability does create more PVD. Previous literature has demonstrated that when PVD is high, the amount of contact aversion they make against others increases (Welling, L. et al., 2007)**.** I then found evidence that there is no significance between the types of groups you view, through the main effect of group. I wanted to know how these different groups would then impact levels of PVD. My *p* value, concluded that group type does not significantly affect levels of perceived vulnerability to disease in a participant. This did not corroborate my hypothesis, as I believed physiological groups would create more PVD in a participant. Finally, because I knew that many of the hypotheses were not supported, I looked closely at the mean and standard deviation changes. Unlike other variables, perceived vulnerability to disease mean difference, from time one to time two, displayed an increase in PVD. Therefore, this variable and interaction are not significant, I hypothesized that this is because of the numerical values itself and no blunting from different direction means.

In regards to mortality salience, which is someone's awareness about their inevitable death, I found that the main effect of mortality salience does not have any significance over time. This does go against my hypothesis, as previous literature has supported that disabilities create more thoughts of death. I theorize that this may be a fault in the study design or within participant answers. Thoughts about your inevitable death do increase with age and as life events

come up, like a health diagnosis (Kalish & Reynolds, 1977). My study was offered almost exclusively to introductory psychology courses at Allegheny College, in which ages can range between 18 to 24 years old. Typically at this life moment, many emerging adults are not thinking, preparing, or considering their death (Kalish & Reynolds, 1977). The type of disability group, mobility and physiology, also was not statistically significantly affecting rates of mobility salience in this population. This again did corroborate my initial hypothesis, as I concluded that those with a mobility device would create more thoughts of death, as previous research has found mobility devices elicit more thoughts of dependence and support from participants. This is an interesting result that may require further investigation and research. This also may be because of the different directionality between the mean amounts. For the mobility group, the amount of mortality salience increased, for physiology it decreased, and for control it increased. This may have blunted the significance of the results, as the mean amounts were moving in different directions.

Infantilization, which is when you treat an adult person like a child, with language, behavior, and actions. This is often a type of discrimination that people with disabilities face, as others often view them incompetent or requiring help (Weinberg, 1976**).** My results concluded that infantilization does decrease, from time one to time two, with the viewership of disabled people. The main effect of the group was not significant, indicating that there was no relationship between the groups. In regards to the specific groups that were studied, none of the three groups were significantly associated with infantilization. This did not support my hypothesis, as I thought mobility groups would receive more infantilization because people often view them as needing more support and assistance than those with physiological disabilities. When I investigated more closely at the mean groups, the control group had an decrease in

infantilization, mobility had an decrease in infantilization, and physiology had a decrease in infantilization.

Finally, results showed that shame and guilt decreased from time one to time two. This does not support my hypothesis, and previous research as I thought that shame and guilt would increase after seeing someone with a disability. I based this hypothesis because people often experience shame and guilt for the person with the disability as they either cannot help them or they feel privileged with their personal abilities. The main effect of group interaction was not significant, so there is no significance between the groups. When analyzing the data on the two groups, I found that neither mobility or physiological groups are significantly affecting levels of shame and guilt in the participants. This does go against my initial hypothesis, as I hypothesized that mobility groups would create more shame and guilt. Similarly to previous variables, I investigated the mean difference between each group to see why the hypotheses were not supported. For mobility there was a decrease in shame/guilt, same with the physiology groups, and for control it also was a decrease in shame/guilt.

Overall, I found many significant results that related to increased levels of the variable, just from seeing people with a disability. This is a great advancement of knowledge on why those with a disability may experience more prejudice, stigma, and discrimination from others. From previous literature, I knew that higher rates of all of these variables contribute to why someone may have prejudice, discrimination, and stigma on another, especially to those who are creating these feelings. By acquiring and advancing this information, there is a better understanding and background to prevent harmful behaviors to people with disabilities. This will be discussed more in the Future Directions section.

In regards to the specific types of disabilities that could contribute, I found no significant results to any of our variables (disgust, perceived vulnerability to disease, mobility salience, infantilization, shame, and guilt). Through previous research studies, results showed that depending on the type of disability you either interact or see, there are different effects that may occur. This may also be an issue in study design. I had the disabilities be disclosed nonverbally, through images of medical technology. This was to ensure that invisible illnesses, like diabetes, heart disease, strokes, and more could be disclosed. A different study design, like disclosure verbally of their disability may be important, especially to understand how the types of disabilities may change rates of prejudice, discrimination, and stigmatization.

Limitations:

In this project, there are many things that could be altered for future studies, as well as limitations that were due to study design. Limitations for this project include: the concealment of medical technology devices, invisible illnesses not always being disclosed, indirect measures of prejudice, discrimination, and stigma, extremely small effect sizes between our independent variables and dependent variables, only college-aged students took this study, the number of participants, and the institution which participants took the study is a Predominantly White Institution (PWI), and concerns regarding control group methodology.

As previously discussed in this paper, concealment of medical technology is often a result of ridicule, stigma, and unwanted attention towards a person with a disability. Concealment of these devices helps prevent violence, discrimination, and social isolation/stigmatization because of their disability. In the deaf and hard of hearing community, members will often conceal their cochlear implants and hearing aids because of unwanted attention, increased social isolation, and social stigma (Profita, et al., 2018). This is a limitation in this study because I created disclosure

of disability, through images, where in a real-world setting medical technology and medical assistive aids are not always seen. This may mean that people who conceal their medical tech do not face as much discrimination, prejudice, and stigma, because they have concealed their disability. Sometimes medical devices are unintentionally hidden, for example the rotation of devices throughout sites on the body and clothing can hide their appearance. The photographs used are also not a significant representation of all people with a disability. For example, medical technology is constantly advancing so I could have missed a new technology device, people may not always use the devices that are pictured, and many disabilities are not visible through medical devices. These disabilities may be invisible illnesses that do not require aids, like Crohn's disease, Neuropathy, and mental illness. Therefore, invisible illnesses cannot always be disclosed. This is why I decided to withhold questions and images about people with mental health disabilities, because they cannot be disclosed without verbal disclosure or without an episode of behavior that may indicate their disability. The photographs were also taken from advertisements which typically display the model as happy, excited, and thrilled by their medical technology. This could have altered results because the participant may have inferred certain qualities or characteristics based off of the model's appearance.

I wanted to measure prejudice, discrimination, and stigma towards those with disabilities indirectly, because there are many factors that can influence those behaviors and actions that had not been investigated previously. In this study, I wanted to highlight those variables specifically. I wanted to measure indirectly, because if I asked participants directly they may have a response bias. Response bias is when participants alter or change their answers, to please the primary investigator and find 'good' results or because they fear how they may be perceived if they responded honestly, as well as the general social pressures that come with reporting negative

feelings. I wanted to measure disgust, PVD, mortality salience, infantilization, shame/guilt, as previous literature pointed out that they could have an explanation in prejudice and discrimination. By measuring these prejudice, discrimination, and stigma indirectly it does leave cause for more confounding variables that were not thought of initially. A direct approach should be investigated in further studies, as it may find more concrete evidence of these behaviors and actions towards people with disabilities.

From the results section, I learned that there were significant effects of seeing someone with a disability, generally, on rates of disgust, perceived vulnerability to disease, infantilization, and shame/guilt. While these results are fascinating and do show a relationship, I do want to note that our effect sizes, measured by partial eta squared (η^2_p) were extremely small. This indicates that, while the results are significant, the actual effect of someone with a disability on our dependent variables are extremely minimal. This is cause for concern, because there may be a confounding variable influencing the dependent variables rather than seeing someone with a disability. For example, the confounding variable may be the time break between the pretest (time one) and post test (time two), the medical technology being viewed and understanding the association of the device with a disability, the location where the participant is taking the study, previous interactions and experiences with someone who is disabled, or the questions being posed to the participant. All of these potential confounding variables should be investigated for their effects. A change in study design, like an in person interaction, could be beneficial for reducing the potential implications of confounding variables.

There are many issues with the participant pool and sample. Firstly, this study was conducted with only college-aged students. Participants' ages ranged from 18 years old to 24 years old. Having this information on any person is important, since this has not been

investigated previously, but with such a limited population range, generalization should and is limited. The institution in which participants were taking the study from, is a Primarily White Institution or PWI. This means that most students who attend Allegheny College are white or of caucasian descent. This significantly impacts my results, as 90% of my study population reported themselves as White. Therefore, this also cannot be a generalization for all population groups. I had a total sample size of 60 participants. This is a low amount of participants to acquire information from. While research does not want too high of participants, as it can alter and create data saturation, more than 60 participants in this study would have been better for data collection and generalizability. Therefore, this study is not representative of an entire human population and how they may treat someone with a disability. I would recommend that these factors be updated or change the study design.

Future Directions:

While many of my suggestions have already been mentioned in the discussion and limitations, I have many more recommendations that can improve this area of research. Firstly, as we have learned from our results section, there was no significant statistical relationship between our different groups (physiological, mobility, and control) with changes in our variables. While these results may have been blunted from different mean and standard deviation directions, a full comprehensive investigation should be completed to ensure that there are no differences between the types of disabilities. I would hypothesize that there is another variable that is harming or conflicting against the significance of these relationships. The causes may be the methodology of data collection, participant qualities, and the images used to represent those with disabilities.

Secondly, this area of research has a plethora of potential growth and development. As I am aware, this is the first project to place an implicit association between disabilities being disclosed through medical technology and how that may be a cause of prejudice, stigma, and discrimination towards those with a disability. While the establishment of this being a potential cause is still in development, I hope in future years, researchers may begin to focus on the health outcomes and problems that come from prejudice, stigma, and discrimination specifically towards those with a disability. Previous research has shown the tragic health effects, especially with people of color, the issues that emerge from longitudinal discrimination, stigma, and prejudice (Williams, et al. 2019). This work, in the future, could be important to expand into disability research, as negative health effects from discrimination, could especially harm someone with a chronic illness or disability.

Another potential effect of discrimination is the concealment of medical technology. As I have previously discussed, concealment has a lot of positives and negatives associated with it. While this has increased the production of smaller cochlear implants, or designing devices that blend into the person's skin color or hair color, other companies and users have taken this as an opportunity to show off their disability and personality (Profita, et al., 2018). Manufacturers and designers of accessible technology devices have historically, and purposefully, made their devices small, hidden, and inconspicuous for users (Pullin, 2009). Many of those who wear cochlear implants or hearing aids and have decided to customize their technology have decided to do so for many reasons. For kids with hearing loss or are deaf, it may help with acceptance and enjoyment of the device (Profita, et al., 2018). For many adults "motivations included personal motivations, such as supporting one's self-confidence and expressing one's personality; interpersonal motivations, such as supporting a family member and acting as a role model; and

outward facing motivations, such as supporting a broader community and projecting positive images of disability" (Profita, et al., 2018, page 27). Customization of cochlear implants, for high school aged women can help self-esteem, supports each individual's self expression, and less anxiety when facing criticisms (Ellington, & Lim, 2013). Making the medical device your own, through customization, increases the acceptance and usage of the devices (Profita, et al., 2018).

Acceptance of medical devices, depends greatly on the involvement of the individual, the customization of the product, the benefit the product provides to the individual's disability, and the perspective the person has on the device (Ritholz, et al., 2007). While customization can be beneficial in acceptance of medical devices, as previously stated, if the product is not applicable or useful in the management of a disability, illness, or disease then the technology will not be used (Parette & Scherer, 2004). In an article by Phillips and Zhao (1993), the authors discovered that the most common ways to increase acceptance of devices was for people's opinions to be included in the creation of the product, for the device to be easy to purchase and locate, for the performance of the device meets the needs of the user, and for it withstand changing times. Peterson (2020) found that people with Type One Diabetes, who also use an insulin pump, see the device as an extension of themselves, choosing to change their clothes and customize the pump's appearance.

Acceptance of technology aids depends upon many factors but the individual's customization (Ritholz, et al., 2007), applicability to the disability (Ritholz, et al., 2007), and perceived ease of use (Dou, et al., 2017) are extremely important. When people with disabilities accept the technology, they will use the tools (Parette & Scherer, 2004), the management of disease and disability better (Kebede & Pischke, 2019), and self care behaviors increase (Kebede & Pischke, 2019). For all of these reasons, researchers should start considering how acceptance

of medical technology could elicit better health outcomes and confidence in people with disabilities specifically. Along that, medical technology companies should obtain research on what devices are accepted and used by people with disabilities, to either make them better or make accessibility widen for their use.

Transitioning away from new ideas that could branch off from this current study, I also recommend that a replication study, with additional variables and different population samples, should be conducted. Firstly, this study had a very limited sample size, with a large portion of my participants being white college-aged students. To make better conclusions and generalizations from this work, having a more inclusive and representative study sample would be much better. I specifically would encourage a larger age range, race and ethnicity, as well as specifically separating individuals that have a disability from those who do not have a disability.

Secondly, I would add new variables that may also help indirectly predict prejudice, discrimination, and stigma towards those with a disability. Some of the variables I would recommend are, anger, fear, empathy, adaptability, and loyalty. I specifically suggest these variables as they are some of the more common reasons why people do or do not hold prejudice towards another. I also think that the specific methodology of this study could be adapted for in person interviews, observational interactions, and case studies that represent real-life experiences. Another interesting component would be to add physiological measurements, like heart rate monitors, cortisol levels, blood pressure, and eye tracking devices later down the line.

As I was contemplating what this study design would look like, I often ran into issues on how I would like to disclose invisible illnesses. Eventually, and through conversations with my advisor, I decided to disclose through the images. It is recommended, if future options or if another methodology is thought of, is to try another type of disclosure. This is especially

important, because photos do not convey the entire circumstance especially thoughts, and feelings.

Conclusion:

This project was interested in investigating how medical technology devices may a) disclose disability to another person b) effect and alter human behavior and emotions after viewership c) if different types of medical technology devices elicit different amounts of behavior and emotional change and d) make a conclusion from previous literature to predict an indirect assumption of prejudice and stigma on the person with a disability. I found in this study that there is a general change between time one and time two for all variables, besides mortality salience. This means that viewing someone with a disability, generally, does influence disgust, perceived vulnerability to disease, infantilization, and shame/guilt. I did not find that the type of disability, mobility or physiology, had statistical significance on any of our variables. This is important to note because it may mean that people treat all disabilities the same. While I don't believe that is true, it is something that could be concluded by this project. Future research should investigate this more. To focus on the overall purpose of this study, which is to indirectly predict the amount of prejudice, stigma, and discrimination towards those with a disability. This study predicts that those with a disability may experience a lot of prejudice, stigma, and discrimination because of the emotions that are elicited from viewership of medical technology, like disgust, perceived vulnerability to disease, and infantilization.

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I am eternally grateful for what I have learned in this time and the growth I have made both as a student and researcher. I cannot thank all of these people enough for the dedication they have made to my future research and to this project, specifically.

Appendix:

A - Study Images:

Mobility:

(Prostock-studio, 2021)

(Covvi - Sarah de Lagarde)

(Open Bionics, 2021)

(Fotografia Inc: Getty Images)


(ASphotowed: iStock, 2021)


(Invacare)

(IndiaMart, 2017)

(Fillauer, 2023)

(Freepik)

Physiology:


(Omnipod)


(ShutterStock)


(London Cardiology Clinic)


(Nutrisense)


(Medtronic)

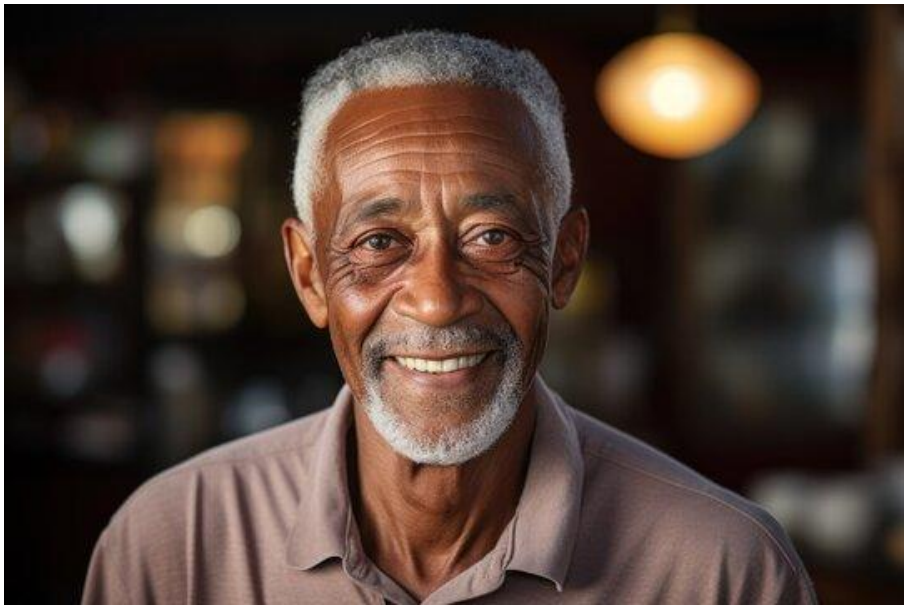

(BioTel, 2021)

(Capunata, L., 2021)

(Hearing Loss Association of America, Malik El-Amin, 2023)

(Elizabeth Hoffman, 2015)

Control:



(Adobe Stock)

(KreativKolors)

(RidoFranz, 2020)

(Donson, D., 2019)

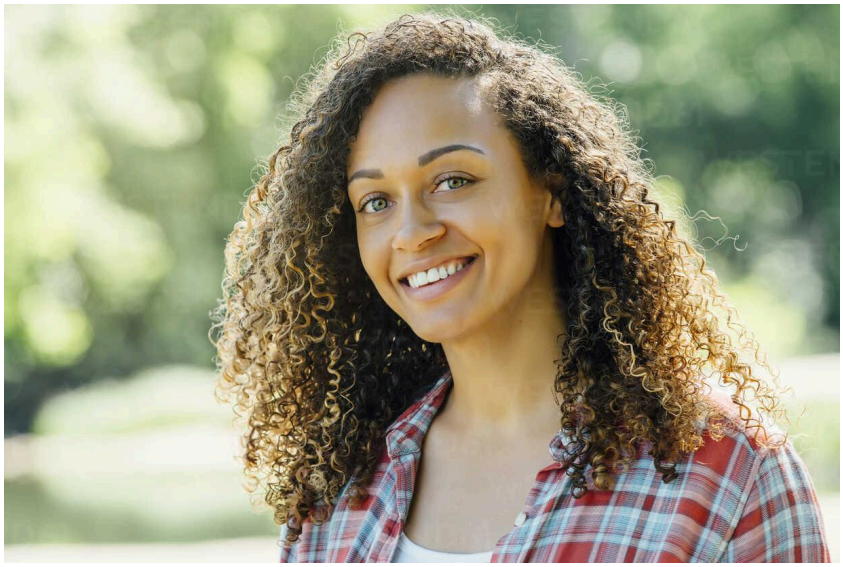

(ShutterStock)


(Global Standardization and Accreditation Agency - Kathy Jackson)

(Duarte, J., 2017)


(NorthStar Comfort Services - Philip Brower)


(MedStar, 2021)


(Stock Photo

B: The Disgust Scale (Olatunji, et al., 2007)
<u>The Disgust Scale: Measured using a 0-5 point Likert Scale.</u>

1. It would bother me to be in a science class, and to see a human hand preserved in a jar.
2. It bothers me to hear someone clear a throat full of mucous
3. I never let any part of my body touch the toilet seat in public restrooms.
4. Seeing a cockroach in someone else's house doesn't bother me. (Reversed Scored)
5. If I see someone vomit, it makes me sick to my stomach.

6. I would go out of my way to avoid walking through a graveyard.
7. I probably would not go to my favorite restaurant if I found out that the cook had a cold
8. I would eat a piece of chocolate shaped like dog poo that my friend gave me. (Reversed Scored)
9. I would brush my teeth if I realized that I drank from the same glass that an acquaintance had been drinking from. (Reversed Scored)

C: Perceived Vulnerability to Disease Scale (Duncan, et al., 2009)

Perceived Vulnerability to Disease Scale: Measured with a 0-5 point Likert Scale

1. I am unlikely to catch a cold, flu, or other illness, even if it is 'going around'. (Reversed Scored)
2. In general, I am very susceptible to colds, flu and other infectious diseases.
3. I am more likely than the people around me to catch an infectious disease.
4. I prefer to wash my hands pretty soon after touching someone.
5. I avoid touching door knobs because of the risk that I may catch something from the previous user.
6. I am comfortable sharing a water bottle with a friend (Reversed Scored)
7. It really bothers me when people sneeze without covering their mouths.
8. It does not make me anxious to be around sick people. (Reversed Scored)
9. My hands do not feel dirty after touching someone else's used plate.

D: The Mortality Salience Scale (Lo, et al., 2011)

Death and Dying Distress Scale: Measured using a 0-5 point Likert Scale

Over the Past 2 weeks how distressed did you feel about:

1. Not having done all the things I wanted to do

2. Not having said all the things I wanted to say to the people I care about
3. Not knowing what happens near the end of life
4. The missed opportunities in my life
5. The impact of my own death to my loved ones
6. My own death and dying

Over the past 2 weeks, how distressed were you that your own death and dying may happen:

1. Suddenly
2. Slowly
3. When I am alone
4. With a lot of pain and suffering

E: The Infantilization Test (Epstein & Dumas, 2023)

1. Tried to limit someone else's ability to drive
2. Tried to take away someone else's personal property
3. Tried to prevent someone else from leaving
4. Tried to make someone else wear their hair a certain way
5. Tried to prevent someone else from wearing certain clothing
6. Tried to stop someone else from contacting or associating with certain people
7. Tried to make someone else participate in certain social events
8. Tried to make someone else take a medication
9. Cut someone off who was speaking
10. Tried to make someone else speak
11. Tried to help someone who didn't verbally ask you to
12. Use a "baby voice" when speaking to someone

13. Over explain a task to someone
14. Told someone how to do a task a specific way
15. Judge someone who was struggling with a task
16. Use a name like "baby" "girl" "boy" "sweetie" to an adult
17. Limited someone's access to a building or chair purposefully
18. Question how someone was able to do that task without your help
19. Advocate or speak-up for someone without their permission

F: Shame and Guilt Scale (Cohen, et al., 2011)

Guilt and Shame Proneness Scale: Measured using a 0-7 Likert Scale

1. You are privately informed that you are the only one in your group that did not make the honor society because you skipped too many days of school. What is the likelihood that this would lead you to become more responsible about attending school?
2. You give a bad presentation at work. Afterwards your boss tells your coworkers it was your fault that your company lost the contract. What is the likelihood that you would feel incompetent?
3. You successfully exaggerate your damages in a lawsuit. Months later, your lies are discovered and you are charged with perjury. What is the likelihood that you would think you are a despicable human being?
4. You make a mistake at work and find out a coworker is blamed for the error. Later, your coworker confronts you about your mistake. What is the likelihood that you would feel like a coward?

5. While discussing a heated subject with friends, you suddenly realize you are shouting though nobody seems to notice. What is the likelihood that you would try to act more considerately toward your friends?
6. At a coworker's housewarming party, you spill red wine on their new cream colored carpet. You cover the stain with a chair so that nobody notices your mess. What is the likelihood that you would feel that the way you acted was pathetic?
7. After realizing you have received too much change at a store, you decide to keep it because the salesclerk doesn't notice. What is the likelihood that you would feel uncomfortable about keeping the money?

G: Supplemental Questions

1. Use your body language to avoid someone else
2. Thought about buying a product in a commercial
3. Followed an account on social media after a sponsored product placement in a video
4. Cried after watching a commercial/advertisement
5. Bought a product in a commercial
6. Unfollowed an account after they used a sponsored product
7. Skip or fast forward through an ad
8. Smiled after watching a commercial/advertisement

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