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Does what doesn't kill you make you stronger? Examining the effects of resilience and functional outcomes on post-traumatic growth in adults with acquired disability

by

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Abstract

TITLE: Does what doesn’t kill you make you stronger? Examining the effects of resilience and functional outcomes on post-traumatic growth in adults with acquired disability

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Disabilities acquired in adulthood are often unexpected and disruptive because a loss of functioning can affect one’s ability to maintain employment, pursue their interests, and participate in social activity without assistance or accommodation. This is especially true for those who experience a life-altering injury or develop a chronic health condition between the ages of 18 and 64, as they likely have not planned for the financial and social adjustments that life with a disability involves. However, factors such as post-traumatic growth can reveal the extent to which someone experiences personal growth and improvement in the wake of a traumatic and disruptive event, such as injury or illness. While much of the research examining post-traumatic growth has focused on cancer patients, this study examined post-traumatic growth in individuals with a disability acquired in adulthood and evaluated how factors such as resilience and functional outcomes affect levels of post-traumatic growth. Factors such as how the disability was acquired, how long the individual has been disabled, and quality of their interpersonal relationships and how they affect functional outcomes were also examined.

The study sample consisted of 86 individuals, 18-64 years of age, who acquired a disability in adulthood. Results from this study demonstrated that gender was a significant predictor of functional outcomes in that being female was associated with lower functional outcomes. The influence of resilience on post-traumatic growth was found to be dependent on the individual’s functional status. Participants with high resilience and high functional outcomes reported higher post-traumatic growth than those with high resilience and low functional outcomes. Participants with low resilience had similar post-traumatic growth regardless of functional outcomes. These findings suggest that greater resilience does not always contribute to higher post-traumatic growth. The proportion of participants with acquired disability in our sample who reported little to no growth was higher than the proportion of cancer survivors with similarly low growth, suggesting that there may be differences in adjustment to trauma between the two groups. Because this study addressed well-studied variables in a new population, this research provides a better understanding of the relationship between resilience and functional outcomes in post-traumatic growth for adults with acquired disability to inform treatment approaches in rehabilitative psychology. Allowing time and space for patients to process potentially traumatic aspects of illness, injury, and the experience of recovery may help improve engagement in rehabilitation and adjustment to the challenges that lie ahead.

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Dedication

For my husband,

my brother,

my mother, father, and stepmother,

and many of my friends

You have all gone through your own journeys of personal growth,

and shown resilience through tough times.

Thank you for sharing your stories with me so that I could share them with others.

This study is for you.

Chapter 1: Review of the Literature

Introduction

Experiencing illness or injury is often unexpected and disruptive. Even when the illness is transient or the injury is minor, it can be difficult to accommodate the onset of new symptoms and the pain that accompanies them in the context of existing obligations and expectations. This is especially true for younger adults who are often employed, building and maintaining social relationships, and attending to family duties such as spousal support or childcare. However, for those who experience a life-altering injury or are diagnosed with a chronic health condition that results in significant functional decline, adjustments become more than a temporary inconvenience. These situations refer to the concept of “acquired disability,” which represents a point after which the individual must learn to understand a new way of functioning.

Adjustment to disability is highly individualized, complex, and multi-faceted (Scura & Piazza, 2021). Within this experience are potential negative aspects, such as social (Coyle et al., 2017), occupational (Maas et al., 2021), and personal difficulties (Aitken et al., 2020). However, there are also positive aspects to these adjustments as well, such as the potential for growth through adversity (Middleton, 2016) and the building of resilience (Rohn et al., 2020), which have been studied in other health populations. The resulting research shows promise for a similar application to adults with acquired disability, who often face similar concerns of adjustment to a difficult diagnosis accompanied by adjustment to new limitations. But before individuals' experiences can be explored, it is important to define disability and discuss how disability is understood by patients, medical providers, and society.

Models of Disability

According to the World Health Organization (2023), an estimated 16% of the world's population, or 1 in 6 individuals, has a clinically significant disability. Within the United States, the Center for Disease Control and Prevention (2023) estimates that 26% of the population, or 1 in 4 adults, is disabled. Although accessibility measures for those with disabilities are required in public spaces and language of inclusion is common in academic, employment, and recreational settings, the common public perception may underestimate the number of people who have a disability. This may be partially due to the varying physical, emotional, and cognitive conditions encompassed by the label of "disability," as the requirements for accessibility vary widely between individuals depending on the nature of their disability. Disabilities can refer to difficulties with mobility, sensory deficits such as vision or hearing loss or absence, cognitive difficulties, difficulties caused by chronic illness, and difficulties related to mental health (Center for Disease Control and Prevention [CDC], 2023). Given the diversity of those who experience disabilities and the relationship this diversity has with society's consideration for accessibility, it is important to identify the unifying aspects of what defines a disability.

Disability is often defined in terms of an impairment or dysfunction of the body that impacts how one interacts with the home, social, or work environment (Scura & Piazza, 2021). This definition summarizes the key outcomes that result from a disability, but a more thorough exploration of the terminology reveals that there are several models through which disability can be viewed. Many professionals in the healthcare setting view disability through the Medical Model, which focuses on the pathology causing the functional difficulties and on the interventions that can address the source pathology or reduce symptoms (Olkin, 1999, 2002, 2011; Scura & PIazza, 2021). While this allows individuals to distance themselves from the pathology, it may cause some emotional adjustment concerns when they are faced with symptoms that cannot be alleviated or a condition that can never be "cured." This is not to undermine the value of the Medical Model for patients or practitioners in a medical setting. However, it does reveal a new dimension to long-term medical care that was previously less of a concern due to lower survival rates for certain health conditions and procedures. As medical treatment has advanced and medical procedures have improved, conditions that previously were more terminal are now more frequently survived. The end result is that individuals who would have previously been in the patient role in a more transient sense are now faced with the transition to a nonpatient role with lifelong changes in functioning capacity that cannot be improved (Middleton, 2016). Additional consideration is also warranted for the rising number of disabled veterans, which has been partially attributed to improved protective technologies utilized in combat zones. These measures allow soldiers to survive combat injuries that might have been fatal under previous protocols. Now, soldiers impacted by these injuries return home with diagnoses with long-term implications, such as traumatic brain injury, facial trauma, spinal cord injury, and vision and hearing loss (Hale-Gallardo et al., 2017). This dynamic suggests the need for additional paradigms through which disability can be defined.

Alternative models of disability may be helpful in allowing individuals to best understand how to overcome the challenges they face beyond their physical symptoms. The Biopsychosocial Model of disability seeks to build on the Medical Model while also acknowledging the role that the individual's personal assessment of their decline in functioning plays in their overall experience. The Biopsychosocial Model of disability considers both the physical and cognitive mechanisms of impairment while also encouraging emotional and spiritual appraisal of the situation by the affected individual (Scura & PIazza, 2021). By allowing consideration of emotions related to one's disability status, helping professionals can better understand what is important and use this to better guide care. While many with disabilities may struggle with negative emotions related to the challenges brought by their disability, there are also those for whom this is less salient and, therefore, should not be the focus of care. This is an important distinction for healthcare professionals who may be seeing someone with a disability for an issue unrelated to that disability. It is also important to note that the emotional appraisal of a disability could change over time in response to personal, occupational, and social developments. The recognition of spirituality's role in one's understanding of their disability is also important, as it adopts a more forgiving rephrasing of the Moral Model of disability, which contextualizes disability as related to one's past wrongdoings or as a mechanism used to test one's faith (Olkin, 1999, 2002, 2011). While this model may resonate as a sense of strength and purpose for some, the implication that the challenges that accompany a disability are somehow either deserved as punishment for previous transgressions or the means through which one may "learn a lesson," may lead to feelings of guilt and worthlessness for others as they work to make sense of their disability's place in their lives.

While the Biopsychosocial Model adds the helpful acknowledgement of two important aspects of the disabled experience, there is one more area that warrants recognition. The Medical Model acknowledges the relationship between the individual and their physical functioning and the Biopsychosocial Model acknowledges the relationship between the individual and how they contextualize their physical functioning, but what about the relationship between the individual and their environment? The Social Model seeks to address barriers to accessibility by assessing for social and functional barriers in personal, social, and occupational contexts to determine how best to accommodate and assist those with disabilities in overcoming them (Scura & Piazza, 2021). The Minority Model of disability takes this concept one step further by stating that society should be prepared to accommodate people with a variety of needs and, therefore, it is less so that the individual is “disabled” but rather that society is failing to meet their needs in addition to the needs of everyone else (Olkin, 1999, 2002, 2011). Through this lens, being disabled is a minority status, but there is an understanding that a fair and equitable society should not prevent access to achievement and fulfillment based on one’s membership to a minority group. While the amount of action necessary to accommodate all needs by a wide network of people in order to actualize this perspective may seem daunting and therefore discouraging for those with disabilities, the shift of the focus onto society and the environment and away from the individual removes the sense that they are defective simply because they require accommodations.

These models serve different purposes depending on the focus and the needs of the those being served by them. Different settings call for a different approach and an individual’s own beliefs may determine which model resonates best with them at that time. Because previous research focuses heavily on the Medical Model of disability (Olkin, 1999, 2002, 2011), aspects from this model are featured in the findings presented here. A smaller but notably increasing body of research has been conducted with the Biopsychosocial Model as the understanding of how emotional appraisal affects perception of pain, resilience, and functional outcomes has grown (Scura & Piazza, 2021). Although less research has been conducted with the Minority Model of disability, it is important to consider the needs, goals, and concerns of those with disabilities just as one would that of any other minority group, bearing in mind that each set of needs holds a different set of cultural expectations. These include practices such as not touching an assistive device without asking, maintaining eye contact with individuals instead of their interpreters or loved ones when speaking to them, or not assuming whether someone needs help without asking.

When discussing disability, the topic of language must also be addressed. While preferences such as whether to use person-first language, like “a person with a disability,” or adjectives, such as “a disabled person” are personal, the topic of whether to say the term “disabled” has also been discussed and debated. Some argue that using the term “disability” focuses on deficit or lack of ability rather than acknowledging the different sets of abilities that each person has, suggesting use of the term “differently abled” instead (Leshoda & Sefotho, 2020). While this is congruent with the Minority Model by focusing more on society’s role than individual deficits, the term “differently abled” can be considered invalidating to some because it removes acknowledgement of the challenges that many face in accessing and thriving in common spaces and experiences. For many, these challenges arise because there are actions associated with these challenges that they have difficulty completing and viewing those situations as a “different set of abilities” minimizes that difference from the non-disabled experience. Therefore, out of respect for those individuals, the term “disabled” will be used instead of “differently abled” in this review.

Now that the concept of disability has been explored through various lenses, a more explicit definition of disability for the purpose of this discussion is necessary, as the groups contained under that label are quite diverse. Here, and as the Americans with Disabilities Act (ADA) describes it, a disability is “a physical or mental impairment that substantially limits one or more of the major life activities, a person who has a history or record of such impairment, or a person who is perceived by others as having such an impairment” (Americans With Disabilities Act [ADA], 1990). To minimize the potential for confounding factors to affect results of the proposed study, focus will be directed primarily to physical disabilities in this review. While mental health and cognitive disabilities typically involve similar dynamics to those discussed here, the nature of these disabilities has a greater chance of directly impacting understanding and emotional appraisal of one’s condition due to involvement of the brain, which adds a dimension beyond the scope of this study. To better define the term “physical disability,” the focus will be on disabilities such as limitations in mobility, sensory input such as vision and hearing impairment, and the functioning of major bodily systems. This may include other chronic health conditions provided that cognitive and emotional difficulties are not a major component of the distress caused by these conditions.

Functional Outcomes in Adults with Disabilities

No matter the lens through which it is viewed, the experiences of individuals living with disability under this definition are inherently diverse. But another aspect of understanding the disabled experience is highlighted when the circumstances surrounding one’s disabled status are considered. The personal, social, and functional differences between having a congenital disability, or a disability resulting from a condition present at birth, and a disability acquired through illness or injury after birth, are significant. A large portion of this difference relates to the extent to which individuals in both groups view their disability as a permanent personal attribute as well as the extent to which they feel responsible for their disabled status. A series of three studies examining stigma placed on those with congenital versus acquired disabilities found that the congenital disability status was more stigmatized than the acquired disability status even for those with the same disability (Bogart et al., 2018). These effects were mediated by the degree of essentialism, or the extent to which one believes an attribute can be changed, and blame. These findings suggest that the disability status of those with a congenital disability was seen as a more permanent part of their identity, while an acquired disability was perceived as a more flexible and transient part of one's identity. With this in mind, those with congenital disabilities were viewed as less responsible for their difficulties while those with acquired disabilities were perceived as sharing some of the blame for the development of their difficulties (Bogart et al., 2018).

Blame and identity are not the only areas in which individuals with acquired disabilities differ from those with congenital disabilities. Because acquisition of a disability involves a loss of functioning, this process can often be sudden, unexpected, and disruptive depending on the nature of the disability. Acquired disabilities typically occur through life-altering injuries or the development of a chronic health condition. Life-altering injuries can occur through means of an automobile or workplace accident, exposure to combat conditions, complications of existing medical conditions, or as the result of assault or self-injury (Marsden & Tuma, 2020). Examples of life-altering injuries can include spinal cord injuries, head trauma, and amputation of a limb. Essentially, these are external injuries that have long standing consequences even after the initial wound has healed. Adjustment to these injuries often involves rehabilitation to new mobility and sensory conditions. By comparison, the development of chronic health conditions occurs through internal means and can include one or more organs resulting in clinically significant symptoms that cannot be completely alleviated by treatment. Examples of chronic health conditions include autoimmune disorders, internally developing neurological disorders, and disorders of specific organ systems, such as cardiac, pulmonary, or gastrointestinal disorders (Debnar et al., 2021). While many chronic health conditions have genetic components, whether they will occur and when they will occur is not always expected and the adjustment to treatment can often be as difficult as adjustment to the condition itself. Treating chronic health conditions often involves medication and lifestyle changes that may be difficult for some to tolerate due to side effects and increased physical demand for proper management.

It is important to note that the examples provided here are not an exhaustive list. For the purpose of this review, any non-terminal, long-term health condition which cannot be completely resolved without clinically significant residual symptoms and notable adaptation by the patient, is considered as a chronic health condition. It should also be noted that while chronic pain itself is not considered as a separate chronic health condition here, the source of the pain is often linked to either a life-altering injury or a chronic health condition and is therefore considered within the context of that condition. Many patients who experience a life-altering injury or develop a chronic health condition have a higher chance of polytrauma, or the development of multiple injuries or conditions as complications of events such as motor vehicle accidents, suicide, and homicide attempts, thus complicating their medical presentation and long-term recovery (Marsden & Tuma, 2020).

Because acquired disabilities require adjustment to a new “normal” rather than a return to baseline functioning after injury or illness, the trajectory of patients’ understanding of and adaptation to their disability is different from that of those with congenital disabilities (Middleton, 2016). While individuals with congenital disabilities also experience an ongoing adjustment process throughout the lifespan in response to new environments, roles, and factors which exacerbate existing challenges, the understanding of one’s disability status is acquired much earlier and is often factored into identity development (Bogart, 2014). In comparison, those who acquire a disability often have experienced functioning without a disability or, to tie in the Minority Model of disability, have not experienced the need for accommodations in order to participate fully in social or occupational settings. Therefore, an acquired disability signifies a greater change in functioning status and a greater adjustment to be made in order to acclimate to any changes in mobility, endurance, and social interaction. Additionally, for those who may have held the Moral Model of disability or for those who have not had experience interacting with disabled individuals, there can be a resistance to accept and adopt the understanding of oneself as being disabled. This reluctance may hinder emotional adjustment and access to much needed resources. A study examining adjustment factors in participants with congenital or acquired disability found evidence that those with acquired disabilities reported lower satisfaction with life and lower self-efficacy, but also lower identification of themselves as disabled (Bogart, 2014). Because of the differences involved in individual attitudes and adjustment processes between the congenital and acquired disability experiences, it should be noted that this study and the literature reviewed here aims to focus primarily on examining the experience of adjustment to disability acquisition.

When considering what successful adjustment looks like for those with acquired disabilities, it is necessary to examine functional outcomes. Functional outcomes refer to the extent to which the individual can comfortably function in society in terms of social, occupational, and financial participation (Frattali, 1998). This differs from quality of life in that the focus is as much on society’s ability to accommodate these individuals in allowing them to participate in a comparable capacity to those without disabilities as it is on the individual’s adjustment and comfort level with their disabled status. When those with acquired disabilities struggle to participate to the same degree as their non-disabled peers, it indicates areas where further assistance or consideration may be necessary. While quality of life is an important component of personal adjustment to the development of a disability, the focus tends to be more on personal comfort with less consideration for the difficulties individuals face, either financially or socially, due to barriers preventing them from participating to a level comparable to that prior to their injury or illness.

It is also important to note that this literature review focuses on adults who are under 65 years of age. The reason for this is that many adults do not expect to retire before age 65 and, therefore, would be more displaced by the development of a disability that requires accommodation for employment (Harel-Katz & Carmeli, 2019). Additionally, many important milestones such as the establishment of social relationships, romantic relationships, and family building also occur prior to age 65. Further, one’s identity as someone without a disability is typically developed by the age of 18 in individuals without congenital or early acquired disabilities (Bogart, 2014). Therefore, the acquisition of a disability during the ages 18 to 64 is one that can be uniquely disruptive because it requires an individual to redefine established aspects of their identity while also ensuring that their personal, social, financial, and professional needs are being met. Since becoming disabled is not as common during this period, support systems designed to alleviate the stresses caused by the development of a disability are often not yet in place. Therefore, this review seeks to understand the unique challenges faced by adults with acquired disabilities between the ages of 18 and 64. While some studies featured may include participants who are slightly younger or older than this range, care has been taken to remove any studies that do not include at least some participants within this age range. The studies selected for this review explore specific factors of the adjustment experience for participants with various specific types of disabilities. The findings from these studies can generally be divided into the categories of social participation, activities of daily living, occupational engagement, pain and physical health considerations, and mental health considerations.

Social Participation

For those who develop a disability, it is important to have a strong social network on which one can rely for support and assistance. Social support is especially important for those who are newly disabled because they may require more assistance to complete tasks previously done independently (Yoon et al., 2020). However, the realization of this need during a time of new personal adaptation can be difficult to balance. The physical limitations of a new disability and the difficulties associated with emotional adaptation to that disability may pose challenges to maintaining existing relationships and forming new ones (Kingsnorth et al., 2019). This can be especially salient for those who experience noticeable changes to their physical appearance as a result of a life-altering injury or chronic health condition, as this may lead to an increase in self-consciousness. A recent qualitative study examined how 30 male participants with spinal cord injuries perceived an increase in staring behavior from strangers. Thematic analysis revealed that this experience was related to feelings of embarrassment, but also consideration for the context in which staring occurred and recognition of the opportunity to interact with the public positively to promote understanding of their disability (Renwick et al., 2018). From these results, increased awareness of staring appears to have led to opportunities for personal growth and the acceptance of their new situation, since the visible aspects of spinal cord injury led to increased visibility within the public eye.

Exploration of previously unreceived public attention can apply to chronic health conditions as well. A qualitative, longitudinal study of 10 women who were over 50 years old living with Human Immunodeficiency Virus (HIV) also explored the social stigma associated with disclosure of their HIV status. The results suggested that there were concerns about possibly losing their housing, employment, and the opportunity to fulfill family roles, but participants found that focusing on engagement in meaningful activities and avoiding stressful interactions was helpful in managing the stress related to these concerns (Soloman et al., 2018). This highlights how public knowledge about a chronic condition such as HIV and the assumptions associated with it can be difficult to navigate for patients of all ages. This can be particularly difficult for health conditions typically associated with certain demographic features. Another qualitative study of 19 adults under 55 years of age who had experienced stroke found that participants felt invalidated by the misconception that stroke is something only experienced by older adults (Shipley et al., 2018). In both of these cases, the assumptions made about these individuals not only had the potential to be harmful in immediate social interactions, but also appeared to contribute to a reluctance in disclosing one's disabled status and a decrease in overall social participation. This could be seen as a barrier to receiving adequate social support caused by a lack of public understanding.

Because life with a disability can be filled with unpredictable symptoms and difficulties related to accessing social events, social isolation and loneliness are unfortunately common concerns. A study of 500 participants who regularly experienced migraines found that 46% of participants endorsed at least one measure of loneliness while also indicating a lack of satisfaction with their ability to self-manage their migraine symptoms (Lui et al., 2020). This was more common in those with chronic migraine patterns when compared with participants with episodic migraines, suggesting that the longevity of symptoms may be contributing to participants' difficulty meeting their social needs. Social isolation was also found to be more severe in a sample of 8,806 adults aged over 60 years with vision loss and blindness, with some participants reporting having fewer than one close friend (Coyle et al., 2017). Visually impaired older adults were also noted as less likely to be married, which the authors stated may put them at greater risk for developing additional health concerns because their visual impairment and solitary status may make it difficult to notice subtle changes in their cognition and physical health.

There are also circumstances where loneliness may be common regardless of disability status. Given the relatively recent rise in concern for loneliness in the general population in the wake of the quarantine period at the height of the COVID-19 pandemic, a study of adults with various physical disabilities found that participants reported a comparable experience of living in lockdown to their non-disabled peers (Dalise et al., 2021). Still, participants with higher levels of disability also reported lower social well-being and an increased risk in engagement in risky behaviors. The authors suggested that this may be related to the stress experienced by participants who require additional assistance unavailable to them during the quarantine period due to restrictions in place on in-person contact. Even for those with a relatively new and possibly temporary status of disability, changes in social behavior have been noted. An existing literature review of the experiences of patients who were discharged from the Intensive Care Unit (ICU) revealed that some participants reported enjoying social interactions less, feeling as though they were “not needed” by their families, and feeling concerned that their friends and family were imposing restrictions on their activities due to concerns about their physical health (Hashem et al., 2016). Yet the author also adds that this was not the case for all, as some participants felt that their social involvement improved after discharge because the experience allowed them to recognize the importance of family in a crisis situation, and some reported experiencing healing qualities in time spent with friends. The positive aspects of this experience are important considerations which will be explored in greater detail later in this review.

Engaging in social activities can be difficult for individuals with newly acquired disabilities, especially those who need additional support from peers for adjustment. To address this in a community setting, Centers for Independent Living have been established to offer services such as peer support, advocacy, independent living skills, and transitional support for those adjusting to situations where their physical care needs have increased. There is research to suggest that engagement with a community center can help to prevent the development of secondary health conditions typically stemming from complications associated with chronic health conditions or life-altering injuries (Hale-Gallardo et al., 2017). There is also research showing the benefits of social participation for individuals with disabilities, such as volunteer work or participating in club activities. A study of 1,681 participants found that those who were active in club activities and volunteer work were more likely to report feeling as though they had more control over their health conditions. Those who did not participate in such activities reported feeling less in control, perceived their health condition as more chronic, had a lower understanding of their health condition, and felt as though their health condition more greatly impacted their emotional state (Meulenkamp et al., 2019). In this study, participants with more chronic conditions were also shown to participate more in volunteer activities and those with a higher reported understanding of their health conditions were more likely to meet new friends. The importance of active social participation was also shown in another study of adults over 50 years of age with spinal cord injuries, wherein participants reported that participation in family roles and interaction with others was an important component of their sense of autonomy and wellbeing even though housing adaptations and environmental barriers were challenging in terms of mobility (Norin et al., 2017).

One of the unique challenges many individuals with acquired disability face relates to an increase in the need for additional physical assistance. This can be a challenge on many levels, especially in situations where the individual is younger and may have variable levels of financial and available social support. This creates a unique dynamic for younger adults because they have often led independent lives without the expectation of needing physical assistance prior to becoming disabled. Because financial resources also tend to be limited during this stage of life, there are limitations with respect to hiring professionals to assist them, leading to adoption of a dual role for family members to provide that assistance and possibly undesirable changes in living arrangements to accommodate these needs (Kingsnorth et al., 2019). This can also significantly affect social engagement, as mobility limitations and increased physical care needs are not conducive for easy travel to meet friends and spend time in environments where accessibility levels are unknown. A study of 511 participants ages 16 and older with spinal cord injuries revealed that lower household income and financial strain were related to poor social relationships and increased mental health difficulties (Zücher et al., 2019). This may be related to the unexpected strain placed on existing social relationships related to physical needs, as well as limitations in external social engagement due to lack of access.

Qualitative research has examined aspects of the transition from previously balanced relationships to relationships wherein one participant relies on another for physical needs in order to understand the dynamics of these relationships. These dynamics are especially important to examine between younger adults and those providing assistance, as one’s concept of identity is largely formed in young adulthood, when the expected path involves transition from receiving care from one’s parents to independence (Haywood et al., 2019). This can be a delicate subject for those who acquired disabilities during this period and must adopt a new understanding of what independent life means for them.

In a qualitative study of 18 young adults with spinal cord injuries, the complex connotations of the word “caregiver” were featured in participants’ responses (Haywood et al., 2019). According to the authors, the word “caregiver” is frequently assigned to patients’ parents and significant others following acquisition of a disability to recognize their increase in duties providing assistance for the patient. However, participants stated that this word is typically associated with babies and the elderly, and fails to capture the intimate, practical, and emotional support provided by those assisting them in this role, as these duties typically go beyond those of caregivers in other circumstances. Another qualitative study of adults ages 22 to 65 with spinal cord injuries expanded on similar themes relating to the strain caused by the change in relationship dynamics between participants and those providing care. The authors reported themes of participants experiencing protective behaviors, imbalance of responsibilities, a loss of sex and intimacy, and difficulty maintaining or redefining the relationship after the injury occurred (Jeyathevan et al., 2019). From the perspective of these experiences, participants recommended that healthcare providers take time to educate and train family members as well as patients during the rehabilitation process to allow them to better adapt to the new relationship dynamics ahead. A review of recent rehabilitative protocol literature also examined the role of family-centered care models, which are primarily utilized in pediatric settings, in treatment of adults (Kokorelias et al., 2019). The goal was to determine how best to implement a smoother transition from the hospital to the home for patients with life-altering injuries or chronic health conditions. Results suggested that development of a stronger adult-focused family-centered approach would be most beneficial, as adult patients in these situations often require additional support from family members and an adjustment from their previous level of independent functioning.

Activities of Daily Living

One of the most drastic changes from life without a disability to life as someone with an acquired disability is the adjustment made to how one defines their independence and approaches activities of daily living (Koch Fager et al., 2019). Depending on the nature of the disability acquired, this may range from more minor accommodations, such as adjusting one's approach to daily tasks with consideration for new needs or the use of assistive devices, to more involved accommodations, such as requiring assistance to complete activities such as bathing, dressing, and using the bathroom. While the relationship dynamics of greater physical needs was discussed in the previous section, measures aimed to ease transition from a hospital environment, where all care needs are met, to a home environment, should be explored. The research available on this topic is primarily focused on the difficulties faced by those with spinal cord injuries. This is likely because injury to the spinal cord affects not only mobility, but also digestive regulation and cognition in some cases, and therefore may pose some of the greatest challenges to adjusting from a previously independent lifestyle to one with greater physical care needs (Pili et al., 2018). While this is not to say that this is the trajectory that all individuals with an acquired disability face, the concerns raised through this research can be applied to other life-altering injuries or chronic health conditions in terms of understanding the physical and mental resources required to complete necessary tasks for successful functional outcomes.

One of the first aspects of adjusting to new physical needs is understanding how the rehabilitation environment facilitates patients' needs in teaching them how to navigate activities they could previously do without assistance. Because patients often go through rehabilitation programs as part of their transition away from the acute care portion of their hospital experience, this is often their last opportunity to receive more comprehensive training before they return home (Jeyathevan et al., 2019). Even in outpatient rehabilitation programs, the expectation is that the patient and their family will learn to use these new skills independently after they return home. A study was conducted using in-depth analysis of patient and provider interactions during occupational therapy in a rehabilitation setting to determine what factors affect successful acquisition of these new skills for patients with acquired brain injury. The findings from this study revealed that factors such as patients' memories of past interactions with therapists, poor sleep quality, frustration, and emotional processing may negatively impact meaningful participation in functional training activities (Raudaskoski & Bisgaard

Klemmensen, 2019). While many rehabilitation programs are scheduled to mimic the faster pace of regular life, fatigue is a real concern when it comes to patients being adequately present to retain the skills covered during occupational therapy. Additionally, the hospital environment of inpatient rehabilitation settings may pose some challenges for sleep due to noises from monitoring equipment and personnel moving in and near one's room, midnight awakenings from scheduled medication administration, and adjustment to sleeping in a new environment. While these conditions cannot always be controlled, considering their effect on a patient's fatigue level, and adjusting the pacing where possible to allow for more rest may allow for more optimal attainment of functional training activities.

This is especially important during the beginning of rehabilitation, as patients' tolerance for frustration may be lower than usual as they adjust to a new environment, a new sense of their physical condition, and the processing of past hospital experiences leading up to admission into rehabilitation (Morris et al., 2019). Another consideration for providing adequate rehabilitation services is the rehabilitation environment itself and the facilities it contains. Because rehabilitation involves practicing new approaches to functional skills in different settings, it can be difficult to provide a realistic experience in settings where there are limitations in space and equipment. A study comparing the experience of nine participants recovering from stroke using virtual reality to practice simulated activities of daily living with nine patients receiving conventional rehabilitation revealed important differences; use of virtual reality showed significant improvements in global cognitive functioning, attention, memory, visuospatial abilities, executive functioning, emotion, and overall recovery compared with the conventional group, who only improved in memory and social participation (Faria et al., 2016). Although this was a small study, the results suggest a potentially effective alternative for facilities with limited space and equipment. Even though recovery from stroke involves cognitive components that differ from many acquired disabilities previously mentioned, these findings are still relevant for patients who spend extended periods in hospital settings, as they may have cognitive effects due to the differences in social and occupational demand compared with that of non-hospital settings.

The logistics of the transition from the hospital to the home environment should also be considered. Because of the sudden and unexpected nature of many acquired disabilities, the home environment is often not suitable and available support from others is typically not in place when patients enter the hospital. This is especially true for younger adults who do not have congenital or existing acquired disabilities prior to injury or development of a chronic health condition. A case study of a 55-year-old U.S. veteran with a spinal cord injury from an automotive collision illustrates some of these transitional needs that can be overlooked (Siddiqui et al., 2021). In this study, the authors describe the patient’s re-admission to the hospital several times after discharge due to complications from hypertension resulting from food insecurity and from impacted bowels. They argue that this situation arose because the patient was unable to renew his Social Security

Disability benefits. He also did not have access to the physical support necessary for food preparation and bowel relief due to COVID-19 restrictions for caregiving allowance at the time. Attention was also given to his lack of access to transportation, despite owning a vehicle, due to the modifications necessary for him to operate that vehicle with his newly acquired disability. Because of these collective circumstances, he was not able to return to an environment conducive to successful independent functioning when he was discharged from the hospital. While this is only one case, it represents many of the real-life problems that individuals who suddenly experience a life-altering injury or a severe chronic health condition can face. A study examining functional outcomes across different levels of acquired weakness during intensive care for 115 previously independent, ventilated adults discharged from an ICU revealed that immobilization was the most significant factor associated with weakness at discharge. Functional outcomes significantly differed across patients with severe, moderate, and a lack of weakness at the time of discharge (Eggmann et al., 2020). While this suggests additional difficulty during the transition from the ICU to the home environment, patients reported similar levels of quality of life six months after discharge, suggesting that these differential factors even out with time provided that adequate support is received after discharge.

One limitation to the rehabilitation setting is that time spent there can often be limited due to factors outside the patient’s control, such as financial, insurance, or institutional restrictions. The result of this is that many patients may be discharged to the home setting when they require additional training for better functioning and maintenance of learned skills. Different approaches have been explored to address how to provide former patients continuity of care in a meaningful, cost-effective way. Technology has been helpful in this arena, with the emergence of mobile-based health and rehabilitation applications to allow patients to continue practicing skills learned in rehabilitation while staying connected and guided by their providers after discharge. However, a study of 500 clinicians revealed that only 23% of respondents reported being aware that such tools exist and only 51% of the overall sample reported feeling comfortable using these tools in continued care (Morries et al., 2019). This is an example where increased awareness may improve patient access, but additional research may be necessary to explore how to address providers' discomfort with utilizing correspondence through mobile care.

Another concern about patients' health following discharge is continued decreased physical activity due to patient concerns for additional injury or exacerbation of symptoms. Because inactivity can affect treatment outcomes and increase the risk of developing additional complicating chronic conditions, Rimmer and Lai (2017) developed a tentative patient-to-patient rehabilitation to wellness-model of continued treatment called the Transformative Exercise Framework. Using this approach, patients are connected to physical and occupational therapists and exercise trainers within the community who can help patients engage in exercise activities that are safe, effective, and adapted to their specific needs. This is accomplished by establishing a connection while patients are still in a rehabilitative setting that focuses on rebuilding strength, endurance, and coordination. The goal is to transition the patient to qualified exercise trainers in the community to continue to engage in exercise activities that maintain the momentum started in the rehabilitation setting while also combating obesity as well as loneliness and depression through continued community connection (Rimmer & Lai, 2017). While this approach offers hope for improved continuity of care for many patients, measures such as this have yet to be adopted on a wider scale.

Beyond the scope of learning additional skills and rebuilding strength and endurance, continued success in functional outcomes is also impacted by adaptation to new physical needs in the existing environment. When asked to provide their own definitions of successful functioning post-injury, nine U.S. veterans ages 36 to 86 with spinal cord injuries identified the importance of being able to complete normal activities in a timely and efficient manner and the ability to function independently. Difficulties with accessibility and barriers such as wheelchair-related issues were their biggest challenges in achieving and maintaining these goals (Hill et al., 2017). This is important because the criteria for success are best identified and understood by the individuals who are directly affected. Similar accessibility concerns were noted in a study of 183 participants with severe spinal cord injuries who noted their greatest difficulty was mobility regardless of current age or age of injury (Yoon et al., 2020). While this is significant in understanding what the primary challenges to successful functioning might be, it should be noted that participants who were younger than age 65 reported more difficulties with mobility than those age 65 or older, suggesting a significant difference in environmental adaptations or expectation for accommodation between these two age groups.

In addition to anticipation of needs, perception of one's illness or health condition can also affect functional outcomes. Results from a sample of participants with chronic lower back pain found that those who held negative perceptions of their illness were more likely to report a greater level of dysfunction, poor treatment adherence, maladaptive behavior in response to their illness, and poorer treatment outcomes (Ünal et al., 2019). These findings indicate how negative adjustment can affect physical outcomes when it is paired with a lack of engagement in treatment as part of a maladaptive response to the difficulties associated with a chronic health condition or life-altering injury.

One final consideration in adapting one's approach to activities of daily living after acquiring a disability is that the chronic component of this process requires the need to adjust to different demands as individuals transition to new stages of life. While this has been explored more in-depth as individuals transition into older adulthood, the demographic of late adolescence and early adulthood has not been as well researched. As was previously discussed, this period is important because individuals transition into new, more independent roles and begin to better understand their identities as they enter and progress through early adulthood (Bogart, 2014; Haywood et al., 2019). While this is already a period of identity confusion and transition to new family roles and dynamics, for those who have experienced the development of a chronic health condition or experienced a life-altering injury, there is an added dimension of adjustment to new expectations in the wake of the loss of previous functioning. In a qualitative study of four participants ages 17 to 21 with either congenital or an acquired physical disability, this dynamic was explored through participation in an intensive summer program living in a college residence setting called the Independence Program, which allowed participants to build life skills necessary for successful functional outcomes (Kingsnorth et al., 2019). Results indicated that participants experienced positive growth in life skills and adopted new adaptive behaviors that continued months after the program's completion. While the sample size was small, these findings indicate that additional family training may be beneficial to better prepare families for the transition from providing parental caregiving assistance to the monitoring role of providing physical assistance where appropriate.

Occupational Engagement

Participation in employment is an area of rehabilitation that is of unique concern for individuals who have acquired a disability and are under the average retirement age. While social participation and activities of daily living are areas of adjustment that contribute to functional outcomes, determining when and whether to return to work following the development of a disruptive chronic health condition or life-altering injury is not always addressed during the rehabilitation process (Harel-Katz & Carmeli, 2019). Employment is a complex area to explore because different disabilities involve different needs for accommodation, some of which may no longer fit previous areas of employment. For those who experience a life-altering injury, the changes that occur in terms of personal needs and areas of functioning can be drastic and unexpected. The experience of the development of a chronic health condition may be similarly jarring due to complications caused by the specific condition, but in some cases the development can be slow and progressive. In these cases, diagnosis may be initially unclear and therefore delayed, leading to greater healthcare utilization, greater disruption to attendance as individuals adjust to symptoms, and possibly changes to a specific position or occupation. In any case, these factors complicate the process of understanding where one stands in terms of need for accommodation in the workplace, job security, and determining when and whether one is able to work. For adults further from retirement, the lack of available financial resources and preparation add to the stress associated with this situation (Aitken et al., 2020).

As employment with an acquired disability is explored, it is important to recognize where technological advancements have been helpful in allowing individuals more control over their accommodations while also recognizing where limitations exist. Through the use of assistive technology, areas previously unavailable to those with disabilities limiting mobility or the senses become more accessible. Those who utilize these devices can control their own experience rather than relying on the location to be accessible, as not all locations are accessible. For those with mobility limitations, especially those so severe that they impact hand function, this has historically been a difficult barrier to cross. In a comprehensive review of the current state of assistive technology for these needs, Koch Fager and colleagues (2019) discussed how Augmented and Alternative Communication has improved technology access through the development of methods such as eye gaze tracking, head tracking, and delayed touch activation. This is especially helpful for those with severe neurological difficulties that prevent sensation and control in the extremities by allowing for input through eye and head movement and adjusted touch screen capability. Technology such as this has also helped those who have difficulty speaking to express themselves through other means, without the need for use of their fingers to type on a keyboard.

While these developments are incredibly helpful for expression and inclusion for these individuals, there are some downsides related to dependence on proper positioning of devices and a lack of portability for larger devices. These difficulties restrict users to properly calibrated devices within limited spaces, preventing the ability to use technology or, in some cases, communicate across settings. Another group greatly benefited by technological advancement is those with hearing loss. However, while hearing loss itself is relatively common, awareness of how assistive technology works for these individuals to more effectively communicate with hearing individuals is less common. This can result in difficulties in communication in situations where the use of assistive technology is not possible due to inappropriate acoustics of the space or a lack of connection to other communication enhancing systems in environments that are not designed for these tools (Blazer et al., 2016). This dynamic, combined with the social stigma attached to hearing loss because of its association with advanced age, can lead to difficulties in communicating and connecting across circles and can also affect one's chances of finding and maintaining employment, career advancement, and participation in greater society (Blazer et al., 2016).

The discussion of assistive technology is closely related to employers providing accommodations within the workplace. According to the ADA, employers are required to provide accommodations in the workplace that are reasonable insofar as they "do not create an undue hardship or direct threat" (ADA, 2023). While this states the minimum requirements, it is not prescriptive in terms of defining the best balance of accommodation with company needs. While individual needs and company environments vary widely, research has identified some patterns related to more successful accommodation of employees with disabilities. One study identified six areas of focus for American employers to better accommodate employees with acquired disabilities as a further clarification of workplace factors that may mitigate impairments in functioning. These include identification of more diverse and manageable ways to allow for workplace interventions to help those with disabilities, measurement of specific workplace-relevant functional outcomes, identification of a stronger theoretical framework behind the factors related to employer implementation of accommodations, focusing on specific clinical populations in which disability risk is most troubling, and providing better representation of employees and employers that reflects the diverse and changing nature of work in light of development of a disability (Shaw et al., 2016).

These areas highlight the ways in which the process of identification and implementation of accommodations is still largely a developing concept for American employers even thirty years after the ADA was released. Additionally, the need to explore factors related to the need for accommodations by industry is also important, as different disabilities affect different industries to different degrees. An Australian study examining 17 years of data related to occupation and disability status revealed that the level of physical decline was related to occupational level, with the largest effects seen in those with jobs requiring less formal training (Aitken et al., 2020). These findings may be related to the higher physical demand associated with jobs requiring less academic and formal training. This is notable because greater physical involvement in a position indicates where there may be greater risk for injury related to that line of work. However, finding appropriate workplace accommodations for those in more physical positions may be difficult in situations where the nature of the disability acquired does not allow one to participate in core aspects of the job as previously performed.

While it also falls under the topic of workplace accommodations, return to work is a specific aspect of employment to be considered because it involves a careful examination of whether one can continue working in the same career following the changes associated with development of a chronic health condition or life-altering injury. One complicating factor is that the experience of disability acquisition is itself stressful, which might affect individuals’ attitudes towards employment regardless of their specific needs. An existing review of literature revealed that acquiring a disability often negatively impacts motivation for participating in occupational activities (Harel-Katz & Carmeli, 2019). This finding is notable, as activities aimed towards improving motivation to work are not often employed during rehabilitation and may be helpful to prepare patients to transition back to the workplace.

Several studies have examined which factors predict individuals’ success in returning to work after developing a disability. One study of male Israeli veterans identified that the presence of mental health-related disabilities, or the mixture of mental and physical health disabilities, reduced the likelihood that individuals would successfully return to the workforce (Segev & Shiff, 2019). By comparison, the authors noted that those with only physical disabilities, those with higher educational levels at the time of injury, and those who participated in rehabilitation programs showed greater chances of reintegration into the workforce successfully. The manner in which employees are permitted to return to work is also important for a more successful long-term re-entry process. A longitudinal study of 12,494 employees ages 16 to 64 found that employees who were permitted a gradual return to work through adjustment of work duties, work hours, or days of work to accommodate a loss in functional ability, without change in compensation following a disability-related leave of absence greater than six months, were more successful in reintegration into their workplaces (Maas et al., 2021).

Pain and Overall Health Considerations

A complex relationship exists between pain, health, and chronic health conditions and life-altering injuries. The onset, persistence, and severity of pain can vary widely between individuals depending on the nature of their disability and other related factors. Given the volume of pain research, the studies examined in this review focus on factors related to how pain is experienced among those with acquired disability, independent of compounding factors, such as mental health difficulties. According to a study conducted by Miró and colleagues (2017), there are indications that pain intensity and interference with daily activities may be experienced differently among adolescents and young adults than is typically the case for older adults with chronic pain. An examination of pain ratings for 113 participants ages eight through 20 with physical disabilities such as spinal cord injury, cerebral palsy, spina bifida, neuromuscular disease, and limb deficiency, showed that the ratings for pain interference changed when considering average, daily pain versus severe, disruptive pain among the younger patients; these rating differed from the standard ratings for pain generally used for all patients, and developed using data from older patients that does not differentiate between average and disruptive pain. This difference in the experience of pain should therefore be considered by clinicians when examining pain in younger patients by asking them to differentiate and rate their pain for their typical experience and also for spikes in experienced pain.

How pain is interpreted also has an effect on behaviors associated with pain management and functional outcome. Results from a study of 732 patients who had experienced notable injuries revealed that factors such as attributing fault to another and receiving compensation for the injury were often related to poor functional outcomes and continuation of disabling chronic pain a year later (Giummarra et al., 2017). The level of reported catastrophizing of pain, or higher perception of threat from the pain experienced, was also observed to affect the extent to which pain was reported as interfering with daily activities. These results suggest a potential relationship between participants' perception of experienced injustice and a lower sense of self-efficacy with greater disruption to overall functioning related to the experience of chronic pain. Psychological distress and chronic pain are also closely related, as indicated in a sample of participants both with and without regular joint pain and rheumatoid arthritis; results showed that psychopathology was related to pain catastrophizing and psychological inflexibility and was more frequently found in participants who reported chronic pain (Trompetter et al., 2019). A relationship between Adverse Childhood Experiences (ACEs) and greater pain intensity in orthopedic patients who had higher health anxiety or less effective coping strategies has also been demonstrated (Ottenhoff et al., 2019). This may indicate a bidirectional relationship between the severity of pain experienced and the stress experienced from the disruption caused by this pain.

With regard to pain management and overcoming overall health challenges, there has been evidence suggesting that pain severity can be reduced, and physical functioning improved in chronic pain patients through regular exercise. However, an existing review of the literature has revealed that the sample sizes for the studies available are small, indicating insufficient supporting evidence for this claim currently (Green et al., 2020). It is worth noting that kinesiophobia, or the fear of movement, has been found to be associated with worse post-injury functional outcomes (Giummarra et al., 2017). While further research is necessary to determine the extent to which regular exercise is helpful in alleviating chronic pain symptoms, avoiding a sedentary lifestyle may prevent development of additional health concerns associated with inactivity, such as muscle atrophy, obesity, and depression.

There is also evidence that complicating factors from acquiring a disability may be related to differential health outcomes between individuals with different levels of disability. A large longitudinal study of 4,010,720 U.S. veterans examined rates of mortality among participants reporting low, medium, and high disability ratings, which corresponded to low, medium, and high impact to daily functioning. Results showed that veterans with high disability ratings were more than twice as likely to pass away after one year of claiming high disability status when compared with those who claimed a low disability status (Maynard et al., 2018). A more specific study examining aging among individuals with spinal cord injuries found that individuals with spinal cord injuries demonstrated an earlier age of mortality and an acceleration of aging of their organ systems when compared to their non-disabled peers (Pili et al., 2018). The authors stated that they were also more likely to develop secondary conditions such as pneumonia, gastrointestinal hemorrhage, pulmonary emboli, or renal disorders at the time of injury, which may contribute somewhat to the accelerated aging to their respective organ systems related to each concern.

Mental Health Considerations

One final factor to consider when examining functional outcomes for adults with acquired disability is the impact of the disability on one’s overall mental health. There have been many studies examining both positive and negative aspects of emotional adjustment within the context of experiencing and surviving a life-altering injury or acute medical event related to development of a chronic health condition (Aitken et al., 2020). Here, the focus is more on the development of psychopathology and factors affecting life satisfaction over time. The potential for positive psychological experiences associated with survival of such events will be explored in a later section in greater detail. Potential predictors of negative emotional health have been studied in detail as the development of a mental health diagnosis adds another dimension to an individual's acquired disability status. This is especially relevant in situations where emotional distress interferes with treatment adherence or impacts daily functioning. For example, a study of 511 participants ages 16 and older with spinal cord injuries found that a smaller and less reliable social network was related to greater reported depressive symptoms and other mental health difficulties, even when controlling for socioeconomic conditions (Zücher et al., 2019). This speaks to the importance of social support in adjusting to life with a life-altering injury.

Several studies also found other psychosocial factors, such as previous adverse experiences and a complex course of disease, contribute to higher reported levels of emotional distress and the development of psychopathology. In a study of 608 participants with multiple sclerosis, a disease course involving remitting symptoms with later relapse and the presence of depressive symptoms, clinically significant anxiety, and fatigue symptoms at the time of diagnosis were significant predictors of clinically significant anxiety one year later (Podda et al., 2020). Similarly, a study of 100 patients with chronic illness revealed that 50% of the sample reported symptoms consistent with moderate to severe depression, which were positively correlated with participant age and a past history of mental health difficulties other than depression (Rana & Babar, 2020). This is not uncommon, as revealed by an existing review of the literature regarding patient status at the time of discharge from the ICU. Findings from this review showed that patients often experience increased symptoms of anxiety and depression associated with their experience in the hospital, which may include post-traumatic stress symptoms for many patients (Hashem et al., 2016).

Post-traumatic stress symptoms were also found to be a notable factor in a longitudinal study of 476 adult injury hospital patients; higher numbers of possible traumatic events witnessed by participants prior to their hospitalization were associated with elevations on post-traumatic symptom measures even when controlling for in-hospital depressive symptoms (Hung et al., 2019). Additional factors that were shown to be associated with elevated post-traumatic symptoms included having witnessed homicide or serious injury to another, being female, the presence of elevated depressive symptoms during hospitalization, and reporting no household savings or assets. A qualitative study of 31 farmers who had experienced a serious injury also reported high levels of stress and depression related to experiences of traumatic thoughts following injury as well as a sense of lost independence (Murray et al., 2019). In this study, the importance of social support networks and a sense of community were noted as important in an individual's adaptation to the reality of new physical limitations following potentially traumatic experiences.

When assessing for symptoms of emotional distress, it is always important to consider the presence of suicidal ideation. This is no less true when working with patients with acquired disabilities, even after the initial period following injury or diagnosis. In a clinical review, Budd and colleagues (2020) identified three types of biases clinicians display when assessing for suicidal ideation in patients with disabilities. These included the underestimation of the patient's abilities, the assumption that patients are fragile and "saintly" in nature, and the expectation that patients are suffering without adequate assessment based on the clinician's projection of their own assumptions about life with that disability (Budd et al., 2020). In underestimating patients' abilities, clinicians risk not only failing to recognize when patients may intend and be able to act on suicidal thoughts, but they may also discount patients' strengths by applying more gentle clinical recommendations unnecessarily. This denies the patient the opportunity to push themselves harder to possibly improve their outcome. By assuming the patient is fragile and "saintly," clinicians risk missing signs of depressive symptomology and possible suicidal ideation. This is based on the belief that it would not be in the patient's character to follow through with such thoughts because of the clinician's expectation for how disabled individuals "should" act. When this occurs, patients with suicidal ideation may go unnoticed. On the contrary is the assumption that the patient is in greater distress than they actually are, which may result in a false positive when screening for suicidal ideation when none exists. This may be an indication of countertransference and the clinician's own fears about experiencing disability, which poses a risk to building rapport and objective evaluation.

While accurate assessment of suicidal intent is always important in a clinical setting, it is especially important for those with acquired disability because the sudden and permanent nature of their injuries are often accompanied by feelings of hopelessness and suicidality. A study of 100,806 workers ages 15 to 80 revealed that serious workplace injuries may impair workers' long-term well-being, with a substantial increase in drug overdose and completed suicide reported among those injured compared to their uninjured peers (Applebaum et al., 2019). Similarly, a study of 349 patients diagnosed with multiple sclerosis found that men experienced more suicidal intention while women experienced more suicidal thoughts following their diagnosis, both of which were related to greater reported depressive symptoms, higher disability status, greater total number of symptom relapses, longer disease duration, and lower level of education (Romaniuc et al., 2020). In a sample of 200 patients with clinically significant headaches, headache disability and pain catastrophizing were associated with suicidal ideation, with four participants attempting suicide during the course of that study (Rathod et al., 2016). Among these studies, common themes appear to be recency of diagnosis, experience of serious injury, the presence of depressive symptoms, and in some cases, the presence of recurring distressing and painful symptoms. With this in mind, monitoring for suicidal ideation in patients with acquired disability is critical.

One final consideration in terms of functional outcomes for those with acquired disability is the sense of life satisfaction or general well-being. This is somewhat similar to quality of life in that it involves the individual's appraisal of their current circumstance. It is separate from emotional distress because it examines vital components for successful adaptation to life with a disability such as coping skills, protective factors, and general psychological resources. Several studies have examined factors that may contribute to and predict differences in life satisfaction and sense of well-being in participants with acquired disabilities. Based on a sample of 1,001 participants representative of the national population of Lithuania, it was observed that a higher number of reported diagnoses of illness predicted weaker psychological resources and lower overall psychological well-being (Diržytė & Perminaas, 2021). Similarly, another study of a mixed sample of

120 participants, including adults with an acquired mobility impairment and their non-disabled peers, found that life satisfaction reports were lower in those with a mobility impairment (Rogowska et al., 2019). The authors noted that levels of life satisfaction and health locus of control, or the belief that health is under one's ability to control, were mediated by self-efficacy.

However, not all studies demonstrated that disability status was consistent with lower perceived quality of life. A study of veterans found that health-related quality of life after lower limb amputation was found to be higher in participants who reported higher rates of physical activity and sport participation as well as a higher level of education (Christensen et al., 2016). In this same study, lower ratings of quality of life were found for participants with a greater degree of limb amputation and higher reported levels of back pain and phantom limb pain. Similarly, a study of 1,498 participants, including those with and without regular joint pain and rheumatoid arthritis, found that flourishing was equally likely in both groups and typically related to a higher reported degree of engagement in living (Trompetter et al., 2019).

Post-Traumatic Growth

One key theme that emerges throughout the existing research on the experience of individuals with acquired disability is the need for adjustment to life with a disability following an event wherein one's previous level of functioning has been permanently altered. For some, this may be receiving a diagnosis indicating greater restrictions and requirements for health habits to avoid additional consequences. For others, this may require a trip to the emergency department due to either acute illness or sustained injury. A major experiential aspect to acquisition of a disability in comparison to being born with one is the potential for permanent changes to one's way of functioning. To better understand how such an experience is processed and reconciled, it is necessary to explore the experience of trauma and the ways in which people respond to it.

According to the American Psychological Association (APA; 2023), trauma refers to the emotional response experienced in reaction to an intensely frightening, threatening, and unexpected event such as an automobile accident, natural disaster, or physical assault. For those who experience an extended clinically significant response to trauma with symptoms such as unwanted thoughts pertaining to the experience, avoidance of reminders of the experience, and persistent negative emotions associated with the experience, a diagnosis of post-traumatic stress disorder (PTSD) may be warranted. But for those who experience a positive reaction to trauma through increased appreciation for life, a greater connection to others, and a change in perspective, post-traumatic growth is indicated. According to Tedeschi and Calhoun (1996), post-traumatic growth is said to occur when someone perceives benefits after experiencing an adverse event.

Tedeschi and Calhoun explain these positive changes as divided into three categories: changes in self-perception, changes in interpersonal relationships, and changes in one's philosophy of life. These categories relate to changes in perspective in reaction to experiencing an adverse event. A change in self-perception may come from a sense of increased competence stemming from an elevated sense of personal strength from having survived such a stressful event. This perception of oneself as stronger for having experienced adversity can help an individual feel more prepared for future difficult events. A change in interpersonal relationships may come from the actual or near loss of someone in the individual's life. This may remind them of the importance of dedicating time and effort towards the important relationships in their life and allow them to appreciate the time they have with those close to them. In situations where the adverse event involves another person's action, the change to interpersonal relationships may be shifted towards preparation against future events, such as being cautious of others who may pose a future threat. A change in one's philosophy of life may relate to an increased sense of appreciation for one's own life in the wake of events that threaten a previously established sense of safety. One's perspective may change to adapt what they have learned from experiencing a traumatic event by exploring their values and prioritizing those that are most significant to them. This may be expressed through small, mindful decisions, or larger steps towards a sense of self-actualization, such as a change in the way one acts. Some become more or less spiritual or religious in response to the event, depending on whether the event itself corresponds to or challenges previously held beliefs (Tedeschi & Calhoun, 1996).

Middleton (2016) explores post-traumatic growth through a less individualized lens by recognizing where existing practices and theories already support the prevalence of this experience in different settings. The concept of growth through adversity is noted as a common theme in many major religions, such as Buddhism, Christianity, Hinduism, Islam, and Judaism. It is also important to recognize the functional role that post-traumatic growth plays in allowing those with either physical or psychological distress to move past the dependent "sick role" into an understanding of their pain that allows them to own and grow from their difficult experiences. From a psychological perspective, post-traumatic growth can be seen in several existing theories. In Abraham Maslow's hierarchy of human needs, the sense of self-actualization as a means of morality, experiential purpose, and acceptance when conditions are appropriate allows for the concept of growth once the struggle for more basic needs is met (Maslow, 1943). This is also true for Carl Rogers' concept of self-actualization, the absence of which is said to lead to psychological distress (Rogers, 1961). Through these systems, the need to acknowledge one's own experience is clearly understood, which plays into the idea of growth after an adverse experience. Marie Jahoda's mental health hygiene model views mental health not only as the absence of psychopathology, but also the presence of positive self-perception, personal growth, development, self-actualization, autonomy, a realistic relationship with external reality, and environmental mastery (Jahoda, 1958). Under this model, the concept of acknowledging and growing in perspective in response to an adverse experience is in line with a positive sense of mental health. To summarize, while research about post-traumatic growth has emerged in recent years, the concept itself was already present in existing psychological frameworks and has been an important part of the human experience through religion for centuries.

When discussing post-traumatic growth, the topic of resilience is often raised as well. While resilience itself will be discussed in greater detail later, it is important to distinguish post-traumatic growth from resilience. Resilience, which affects one’s ability to better respond to current and future adverse experiences, is primarily a protective measure guarding against future potential trauma. Post-traumatic growth, on the other hand, is primarily a reaction to a specific trauma but extends beyond the scope of resilience, suggesting that the individual can not only move past the experience but has improved as a person in response to it (Dell’Osso et al., 2022). Resilience refers to a reduction in vulnerability and can often be compared to ego strength or considered as an aspect of self-efficacy. Post-traumatic growth results from the experience of vulnerability, such that the individual is sufficiently disrupted by the experience to grow, promoting a renovation of the self (Dell’Osso et al., 2022).

Post-traumatic growth can be measured in several ways, but the most common method is the Post-Traumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996). In the development of this instrument, individuals were asked to rate their experience in relation to a past adverse event. Their responses were mapped on to five domains of Personal Strength, New Possibilities, Improved Relationships, Spiritual Growth, and Appreciation for Life. These five domains were most consistently correlated with personality traits of extraversion, openness to experience, and optimism. Although this measure was developed through studies using college students as participants, this was based on the premise that college students are comparable to the general population in terms of their experience with trauma. One of the studies involved in the measure's development involved 117 students, 54 of whom were identified as having experienced at least one severe self-reported traumatic event within the previous year, which included instances of robbery, criminal assault, and natural disaster (Tedeschi & Calhoun, 1996). Results indicated that those who had reported experiencing a traumatic event scored higher on the PTGI than those who did not, suggesting sensitivity and specificity of the measure to the presence of past trauma in post-traumatic growth. Women tend to score higher on the PTGI than men, specifically in the domains of Improved Relationships and Spiritual Growth, which may be indicative of differences between genders in response to trauma (Tedeschi & Calhoun, 1996). The PTGI has been utilized in more research studies examining post-traumatic growth than any other measure.

Jayawickreme and colleagues (2021) challenged the use of the PTGI and argued that the PTGI primarily measures an individual's perceived personal change, which does not necessarily correspond to actual change. This critique is aimed less at the PTGI itself and more at the cross-sectional design that many studies use to examine post-traumatic growth. By asking participants to compare their current strengths with their performance before the trauma, the results may not paint an accurate portrait of change. The alternative approach suggested by

Jayawickreme, and colleagues is to contextualize post-traumatic growth within personality change in response to trauma. This may allow for a more authentic understanding of whether change has occurred by measuring the associated personality traits over time in a longitudinal study. This can be accomplished through the use of semi-structured interviews or other personality measures.

However, there are some limitations to employing this approach. The first is that the use of semi-structured interviews is time consuming, which may reduce the amount of data collected based on researcher availability and lead to lengthy review processes. Additionally, longitudinal studies carry a risk of losing participants with time, which may also impact sample sizes. However, the most significant critique of this approach is that adverse events are usually unpredictable in nature, making it difficult or even impossible to capture a clear picture of the personality traits that might be changed prior to the event. In acknowledging these difficulties, Jayawickreme and colleagues suggest consideration of several points when measuring post-traumatic growth through any means. The first is to recognize that many studies examining post-traumatic growth do so within the context of trauma narratives from Western, Educated, Industrialized, Rich, and Democratic (WEIRD) societies which may not translate to the experiences of those who do not meet these descriptors. The second consideration is that not all adverse experiences are equivalent and, therefore, should be compared with caution. To avoid this, cultural contexts are an important adaptation to existing measures. Interpretations may be appropriate when more culturally salient explanations for post-traumatic growth exist, but that cannot be assumed in all cultural contexts. When possible, qualitative, descriptive research should be conducted to capture all aspects of post-traumatic growth including details not captured through the PTGI alone (Jayawickreme et al., 2021).

A review of the literature on post-traumatic growth revealed several studies that employed alternative approaches to the PTGI. Using the personality evaluation approach suggested by Jayawickreme and colleagues showed that post-traumatic growth in cancer patients was related to the personality traits of resilience, hardiness, dispositional positive affectivity, and dispositional gratitude and coping strategies of using social support, religious engagement, positive reframing, and reflection (Knauer et al., 2022). Another literature review of qualitative research on post-traumatic growth in cancer patients identified themes such as the desire to improve existing relationships, express new feelings, or explore alternative careers that mapped onto the five existing PTGI dimensions. Results from this review revealed that post-traumatic growth may be influenced by socioeconomic factors and the individual’s role in their family and community prior to their cancer diagnosis (Menger et al., 2021). Using a longitudinal approach, 1,030 participants from New Zealand who experienced traumatic interpersonal events (such as assault, sexual harassment, domestic violence, bullying, stalking, or threatening) and 1,225 participants who experienced the birth of their own child or that of a close friend were evaluated to compare changes in life satisfaction, sense of belonging, self-esteem, meaning in life, and gratitude. Survey responses revealed that participants' ratings were consistent over time and did not differ between groups, suggesting a lack of evidence in this case for post-traumatic growth resulting from adversity and evidence for general resilience within the local population (Howard, 2022).

A more general review of the existing literature including studies using the PTGI reveals that post-traumatic growth has been observed in a variety of individuals across numerous settings. In order to expand the scope of research for this narrative, care has been taken to include studies that do not feature WEIRD samples when available. Initially, much of the research sought to examine post-traumatic growth in reaction to cancer diagnosis and treatment. In a study examining post-traumatic growth in 583 Irish participants diagnosed with head and neck cancer, results indicated that 60% of participants reported moderate-high post-traumatic growth overall as assessed by the PTGI (Sharp et al., 2018). Appreciation of Life was identified as the highest rated domain on the PTGI on average for participants. Higher overall post-traumatic growth ratings were associated with a younger age, being female, and having greater social support. Surprisingly, a higher level of reported financial stress was also reported for participants with higher post-traumatic growth ratings. This may suggest the increased capability for growth in response to an added stressor or it may indicate an external factor that did not negatively affect post-traumatic growth.

In a study comparing adolescent and young adult pediatric cancer survivors with healthy controls who had experienced traumatic events, findings revealed that event centrality scores were higher for the experience of cancer when compared with non-cancer events, even for those who did not report cancer as their most stressful adverse event experienced (Cook et al., 2021). Event centrality refers to the extent to which the individual views the traumatic event as central to their identity and personal experience. The authors noted that event centrality was positively related to both post-traumatic growth and post-traumatic stress symptoms. This finding differentiates the personal nature of receipt of a threatening medical diagnosis in terms of event centrality when compared with other, possibly more external, traumatic events. Another study comparing pediatric cancer survivors to healthy controls showed that cancer survivors reported significantly more post-traumatic growth than their healthy siblings. The authors noted that post-traumatic growth was also shown to decrease over time, suggesting that these changes may not be permanent (Zebrack et al., 2012).

Additional factors may also be present among patients who experience post-traumatic growth. In fact, a qualitative study of 18 Iranian breast cancer patients identified four factors suggestive of post-traumatic growth: appreciation of life, stability, spiritual prosperity, and effective interaction with others (Mehrabi et al., 2015). Another qualitative study of 13 Turkish breast cancer patients found similar factors of spiritual and philosophical exploration of the meaning behind experiencing cancer and changes in values and coping skills suggestive of post-traumatic growth (İnan & Üstün, 2019). These findings suggest that the life-threatening experience of a cancer diagnosis may have prompted participants to explore their satisfaction with their life choices and promote a shift towards living a life more congruent with their values.

Post-traumatic growth has also been examined on a biological level. A study of 71 breast cancer patients revealed that higher levels of High Sensitivity C-Reactive Protein, an indicator of inflammation, were positively correlated with higher depression scores but negatively correlated with higher scores of resilience and Self-Perception domain scores of the PTGI (Gundogmus et al., 2022). A relationship was also identified between higher post-traumatic growth ratings and reduced risk of organ rejection, improved kidney function, and improved quality of life among patients who received kidney transplantation (Nash et al., 2022). These findings were unique in that they suggest a relationship between post-traumatic growth and a positive biological response.

To examine how post-traumatic growth changes over time, a longitudinal study of Polish participants with HIV reported that post-traumatic growth was observed when social, financial, or spiritual support resources were gained while post-traumatic stress was related to loss of resources one year after the diagnosis (Pięta & Rzeszutek, 2022) A relationship between higher resilience and fewer post-traumatic stress symptoms over time was also observed, indicating the importance of resilience for avoidance of significant post-traumatic stress, but not necessarily better post-traumatic growth. Another longitudinal study of 1,966 Australian colorectal cancer patients found increasingly higher scores in benefit finding during the months following their diagnosis when compared with their baseline scores. Of note, higher benefit finding earlier in the study predicted significantly higher psychological distress. This may be linked to an increased negative psychological response to the threat of possibly progressing cancer after having identified a greater appreciation for life through increased benefit finding (Occhipinti et al., 2015). Relatedly, positive predictors of post-traumatic growth among 260 Spanish participants with multiple sclerosis included higher disability ratings, severity of pain, anxiety, and female gender; negative predictors included greater interference of pain, higher education, and greater social dysfunction (Gil-González et al., 2022). These findings suggest where greater anxiety and associated physical distress may contribute to eventual post-traumatic growth under the right circumstances.

The COVID-19 pandemic allowed researchers the unique opportunity to capture a global condition likely to cause adverse events in many individuals' lives. This produced several unique studies examining post-traumatic growth in participants all over the world. One study of 422 Chinese participants who reported losing someone to COVID-19 revealed four profiles of the relationship between grief, post-traumatic stress, and post-traumatic growth. These profiles included individuals who were resilient, those who experienced growth, those who experienced moderate levels of growth and grief, and those who experienced high levels of both growth and grief (Chen & Tang, 2021). Participants who identified the person they lost as someone close to them were more likely to demonstrate higher levels of both growth and grief. These profiles demonstrate how higher rates of negative experiences, such as grief and post-traumatic stress, do not necessarily prevent post-traumatic growth.

In an effort to examine how different aspects of the same adverse situation would affect post-traumatic growth outcomes, a study of 3,078 U.S. veterans found that post-traumatic growth in reaction to the pandemic was most strongly correlated with anxiety about the pandemic's effect on personal, physical, or mental health, previous post-traumatic growth in response to other adverse events, and pandemic-related avoidance symptoms (Na et al., 2021). The authors stated that a moderate severity of post-traumatic stress symptoms was also found to predict endorsement of post-traumatic growth. These factors combined suggest that the experience of some distress is likely necessary in order to experience post-traumatic growth.

Because post-traumatic growth has been observed to occur alongside post-traumatic stress, their relationship warrants further exploration. To examine factors that differentiate post-traumatic stress and post-traumatic growth, a study of 145 Chinese breast cancer patients compared patterns between the two outcomes along with startle response, physiological arousal, anger, numbness, depression, anxiety, alexithymia, family support, and chemotherapy experience. Results showed the common correlation between individuals reporting post-traumatic growth and those reporting post-traumatic stress was anxiety (Chen et al., 2019). This finding suggests that rumination after an adverse event has the potential to cause post-traumatic stress but may also result in post-traumatic growth through the process of deeper consideration about one's circumstances. This was contextualized within the

Taiwanese cultural trend towards stoicism, which relates to lower self-disclosure. While this lack of disclosure may lead to emotional distress, the culturally congruent nature of this way of addressing the event may have allowed participants to better own their experiences. Similarly, a study of 199 Chinese participants discharged from the hospital after COVID-19 showed a trend of adversity relating with personal growth. Results showed that social self-stigma, but also social support and receipt of mental health care services during hospitalization, were positively associated with post-traumatic growth (Xiao et al., 2022). This illustrates that while one's own negative self-perception following a traumatic event may lead to stress, the ability to contextualize and process these feelings in the context of connection with loved ones or therapeutic support also allows for personal growth.

While some research measuring post-traumatic growth has been conducted with participants with acquired disabilities, it is somewhat scarce and specific to certain health conditions. For example, a study of 19 Australian adults ages 18 to 55 who experienced stroke during young adulthood gave qualitative responses consistent with post-traumatic growth alongside resilience, optimism, hope, benefit finding, and meaning making as indicative of successful adaptation to the acquired disability component of acute recovery (Shipley et al., 2018). In another area, a study of 119 post lingually deaf cochlear implant users noted higher levels of post-traumatic growth in female participants and those with lower levels of education (Kobosko et al., 2021). The authors noted that men demonstrated lower levels of post-traumatic growth possibly due to a difference in coping strategies, as more women reported active coping, which was associated with higher post-traumatic growth ratings.

Resilience and Functional Outcomes

In examining post-traumatic growth, the concept of resilience has been referenced several times. Resilience refers to adaptive cognitive, behavioral, and even neurobiological responses to adversity that is notably not pathological in nature (Rakesh et al., 2019). One key difference between resilience and post-traumatic growth is that resilience is reflected through a reduction in negative response to traumatic stimuli while post-traumatic growth reflects growth during the period following a traumatic stimulus irrespective of the initial response to that stimulus. This does not necessarily indicate the absence of a negative response and may even be somewhat fueled through the experience of psychological or physiological distress provided that adequate support and atmosphere for processing of the individual’s response to the adverse event is present. In this way, post-traumatic growth is considered to indicate only positive changes after experiencing a stressful event while resilience encompasses both positive and negative effects of exposure to stressful events. With this in mind, resilience is considered to be a trait associated with the reduction of post-traumatic stress and has been referenced as such in various theoretical frameworks such as stress inoculation, stress epigenetics, allostatic load, early life adversity, and transgenerational inheritance (Rakesh et al., 2019).

In terms of the effects of resilience on improved outcomes in participants with conditions causing chronic pain and functional difficulties, a relationship was observed between greater trait resilience, higher positive affect, and better pain outcomes in patients with multiple sclerosis (Arewasikporn et al., 2018). The relationship between resilience and symptoms was also explored in participants with hidradenitis suppurativa, a chronic condition causing abscess of the skin; higher reported rates of resilience were related to a reduction in depressive symptoms and better quality of life (Kirby et al., 2017).

Another aspect of resilience that differs from post-traumatic growth is that resilience can be built through therapeutic intervention and has been shown in some studies to relate to functional outcomes in patients who receive this training. Notable changes in resilience and associated factors were also observed in individuals receiving resilience training. A longitudinal study of 136 participants with migraine and depression showed that a greater number of participants completing a one-day Acceptance and Commitment Therapy (ACT) workshop no longer met criteria for a major depressive episode when compared with controls receiving migraine education and support as usual (Dindo et al, 2020). Results can also be seen from remote instruction. Firefighters also reported greater levels of resilience and lower levels of psychological inflexibility and experiential avoidance after participating in a six-session internet-based resilience training course (Joyce et al., 2018).

Resilience training has also been shown to be successful as a component of cancer treatment as well. A study of 167 breast cancer patients were shown to report higher resilience and emotional regulation when compared with peers without a cancer diagnosis, suggesting the added emotional management benefit of resilience development through a stressful experience such as cancer (Guil et al., 2020). In terms of resilience training, a study of 92 adolescents and young adult cancer patients who received resilience training through the Promoting Resilience in Stress Management (PRISM) program also showed improved benefit finding and reported levels of hope when compared with controls receiving usual care (Rosenberg et al., 2019). Even family members of patients with cancer benefitted from resilience training. A study of 94 parents of children diagnosed with cancer revealed that one-on-one delivery of resilience training improved resilience levels and benefit finding in parents (Rosenberg et al., 2019). Beneficial effects of both resilience and post-traumatic growth were reported in parents of pediatric cancer patients attending more than 12 sessions of a resilience building intervention evaluated in over 22 clinical trials (Ludolph et al., 2019).

Post-Traumatic Growth and Resilience

The process through which resilience develops suggests a relationship with post-traumatic growth. A longitudinal case study of two women with spinal cord injury demonstrated how higher resilience can evolve over the course of 10 years in response to situational, environmental, and personal challenges. According to the participants, this allowed them to better anticipate and manage additional complications that arise with age in addition to the difficulties associated with disability (Rohn et al., 2020). In another study of 17 Japanese adults with type 1 diabetes, the evolution of resilience throughout adjustment was examined in greater detail. Results indicated that resilience developed in stages, starting with preparatory resilience in response to diagnosis, resilience built in response to adjustment to the realities of treatment, reconstruction of negative feelings in response to treatment adjustment, and finding a new strategy to live better with diabetes (Nishio & Chujo, 2017). One unique aspect of this study is that it followed participants' retrospective experiences of initially bracing themselves for life with diabetes based on previous expectations, coming to experience the stress involved with the logistics of treatment and associated stigma, then reexamining their initial reactions to better facilitate a more adaptive lifestyle in synchronicity with their diabetes as a new, permanent feature in their lives. While referred to as resilience, under closer examination, the dynamic aspect of these processes appears to also feature personal growth, incorporating aspects of post-traumatic growth such as changes in self-perception. If viewing resilience through the framework of stress inoculation, one may argue that personal growth is a necessary part of that process, even in situations wherein the initial event calling for resilience is not traumatic. From examination of participants' personal experiences, the preparatory resilience noted related more to their initial reactions to receiving a diabetes diagnosis, such as feeling guilty for their past lifestyle or fearing the anticipated accompanying bodily changes. This notably differed from the most recent stage of resilience noted, which focused more on identifying how to balance the needs imposed by diabetes with participants' personal values (Nishio & Chujo, 2017). The importance of personal growth in the development of resilience in response to adverse events indicates the importance of the relationship between both concepts.

This connection has been explored in several studies examining the relationship between resilience and post-traumatic growth. In a study of 951 Dutch participants following the COVID-19 pandemic, two groups of participants were identified as experiencing post-traumatic growth. The resilient response group demonstrated low levels of primary stress but high levels of secondary positive appraisal of events, while the stressed response group was characterized by high levels of initial stress and rumination (Blom et al., 2022). This study indicated two very different types of response profiles of post-traumatic growth resulting from differing levels of experienced stress during the event itself. A study of 420 college students examining the relationship between post-traumatic growth, resilience, and empathy revealed that self-perceived post-traumatic growth was associated with cognitive ability and social interaction strength while resiliency was negatively correlated with empathy (Elam & Taku, 2022). This suggests that the ability to connect with others may be associated with post-traumatic growth outcomes. An existing review of the literature related to resilience and post-traumatic growth for colorectal cancer patients indicated that resilience was often shown to be a mediator for both positive (e.g., hope, social support) and negative (e.g., mental and physical burden) aspects of illness (Sihvola et al., 2022). Resilience was also positively associated with post-traumatic growth.

As the research previously explored has indicated, resilience can also affect the timing and extent to which post-traumatic growth is experienced. In a study of 2,060 Chinese breast cancer patients, those with higher resilience showed greater reported post-traumatic growth than those with moderate or low resilience (Li et al., 2019). However, results indicated that patients with high resilience also had a more rapid rate of decline in post-traumatic growth. Another study of 230 Albanian participants found that resilience appeared to be a buffer against post-traumatic stress but did not negatively affect development of post-traumatic growth (Fino et al., 2022). In fact, higher resilience was shown to be related to higher scores on the Appreciation for Life domain of the PTGI. A study of 91 Polish kidney transplant patients also showed that resilience accurately predicted post-traumatic growth in patients receiving kidneys from live donors and from cadavers (Tomaszek et al., 2021). Similarly, a study of 493 Italian participants conducted shortly after quarantine during COVID-19 also found that indirect effects of anxiety, depression, and stress on post-traumatic growth were mediated by resilience, in addition to hope and self-efficacy (Di Corrado et al., 2022).

Exploration of the relationship between post-traumatic growth and resilience is important in that they both offer potentially protective factors against development of post-traumatic stress into more long-standing psychopathology. A study of 100 Polish breast cancer patients revealed that resilience was shown to occur alongside post-traumatic growth and social competence (Michalczyk et al., 2022). A study of 154 Italian cancer patients found also significant relationships between resilience, post-traumatic growth, post-traumatic stress, and coping strategies (Gori et al., 2020).

These associations were further explored in a study of 421 Lithuanian participants who had experienced intimate partner violence and reported distinct profiles of the relationship between post-traumatic growth, post-traumatic stress, resilience, and centrality of events. Results indicated that post-traumatic growth occurred in the positive growth profile, featuring above average resilience and low stress, and the distressed growth profile, featuring medium levels of resilience, high post-traumatic growth, and high post-traumatic stress. However post-traumatic growth was not observed for profiles with high levels of post-traumatic stress and low resilience or profiles with low levels of resilience or post-traumatic stress (Bakaitytė et al., 2022). These findings suggest that the presence of post-traumatic stress does not prevent post-traumatic growth, but the presence of adequate resilience is a key factor for growth. It was also noted by the authors that those who reported receiving psychological help were more likely to be in the distressed growth profile than in the negative impact or low impact profiles. This provides support for the presence of a supportive environment in the development of post-traumatic growth.

Differential profiles were also examined in a study of 381 former COVID-19 patients. The results from this study suggested that the presence of high resilience and support may have impacted post-traumatic growth in profiles where participants reported low levels of post-traumatic growth along with low levels of post-traumatic stress as well as high resilience and social support (Adjorlolo et al., 2022). The results of this study suggested that higher resilience may affect the stimulus value of future adverse events and their ability to cause post-traumatic stress. This supports the idea that building resilience inoculates one against negative effects of future trauma; it also suggests a limit for future growth for those who have possibly experienced greater levels of previous adversity. This was also shown in a longitudinal study of 492 Spanish participants who had fewer post-traumatic symptoms when resilience was higher, but also did not experience post-traumatic growth (Collazo-Castiñeira et al., 2022).

Conclusion

Nearly one quarter of the global population has a disability (World Health Organization [WHO], 2023). Personal experience of acquiring a disability through a life-altering injury or the diagnosis of a chronic health condition can be considered as an adverse event to some, especially those who experience greater disruption of social engagement, occupational status, and physiological and psychological distress. This experience can be further complicated by the circumstances under which the disability was acquired, which can include accidents, combat conditions, and medical emergencies involving a sudden, painful, and endangering experience (Scura & Piazza, 2021). The source of the injury or chronic condition may be external and anonymous but can also be perceived as inflicted by others in cases of violence or oneself in cases of development of a chronic condition. With this in mind, adjustment to one's new baseline after a disrupting event with lasting consequences can be difficult (Jeyathevan et al., 2019). By examining post-traumatic growth, which has been shown to be connected with personal growth across individual, interpersonal, philosophical, and spiritual domains in response to adverse events, and resilience, which has been identified as a strengthening effect to better weather future adversity, a better understanding of how differing experiences affects functional outcomes among individuals with acquired disabilities can be attained. The research reviewed here shows that the factors contributing to functional outcomes for a variety of disabilities have been examined. However, examination of post-traumatic growth and resilience levels across different types of acquired disabilities has been limited so far. Because resilience is a protective factor that has been developed in others, it may also play a significant role in better functional outcomes and recovery among individuals with acquired disabilities and inform clinical interventions in the rehabilitation setting (Arewasikporn et al., 2018).

Chapter 2: Study Rationale and Justification

Previous research has shown that higher levels of post-traumatic growth (Nouzari et al., 2019) and resilience (Macía et al., 2020) are associated with higher perceived quality of life and reduced symptoms of psychopathology (McGinnis, 2018) for individuals who have experienced adverse events, such as the diagnosis of a terminal illness. Post-traumatic growth has been specifically shown to be connected with better overall adjustment and lower ratings of distress in cancer patients who used coping strategies involving benefit finding, (noting how their diagnosis has contributed to their personal growth), and meaning making, (identifying the personal significance of their diagnosis to their lives; Occhipinti et al., 2015). Patients who report higher levels of resilience have been observed to cope with cancer in more adaptive ways than those with lower levels of resilience (Gori et al., 2021; Macía et al., 2020). Research suggests that resilience may also moderate depressive symptoms and patients' ability to cope with their experience of having cancer (Macía et al., 2020; Zebrack et al., 2012). Resilience has been shown to have a direct positive effect on post-traumatic growth, with cancer patients reporting higher levels of resilience, demonstrating higher overall levels of post-traumatic growth and better functional outcomes (Li et al., 2020).

Although numerous studies have examined the relationship between post-traumatic growth, resilience, and functional outcomes in patients diagnosed with cancer, this relationship has not been studied in individuals with acquired disability. Kobosko and colleagues (2021) examined the effects of post-traumatic growth levels in post-lingually deaf cochlear implant users and found associations between higher reported levels of post-traumatic growth and higher levels of overall health and adaptation for individuals adjusting to changes in their hearing. This suggests that a similar relationship between post-traumatic growth and adaptation may exist for individuals with acquired physical disabilities, such as hearing loss. In many ways, the overall personal effects of developing a disability in adulthood show similarities to receiving a cancer diagnosis in that both processes are unexpected, disruptive, and potentially painful. However, because the sometimes-terminal aspect of a cancer diagnosis differs from the prognosis of many acquired disabilities, there are likely some differences in the relationship between these factors for individuals with acquired disabilities. It is also important to consider the potentially negative emotional effects of the need for long-term adaptation for individuals with an acquired disability, as survival rates are likely to be higher than those of some cancer patients, while expectation for functional outcomes may be lower.

Given that injury is often involved with the development of an acquired disability, post-traumatic symptoms are frequently reported in acutely injured individuals and emotional distress is common in those who have been suddenly injured (Hung et al., 2019). Chronic pain, a prominent feature in many conditions associated with acquired disability, has also been associated with the development of post-traumatic symptoms (Chen et al., 2019). While the relationship between post-traumatic symptoms and post-traumatic growth is inconsistent, understanding post-traumatic growth in individuals with acquired disabilities is important because of its adaptive role in the recovery process (Chen et al., 2019). Higher levels of post-traumatic growth have also been associated with lower experiences of pain, better overall ratings of health, and lower levels of disruption in activities of daily living (Parkih et al., 2015). There is also evidence to suggest that higher positive life changes, resulting from higher levels of post-traumatic growth, are related to better functional outcomes for those who have experienced physical trauma (Walsh et al., 2018). Long-term positive life changes may even allow individuals to surpass their previous levels of psychological functioning prior to experiencing an adverse event (Ludolph et al., 2019). Higher resilience has also been associated with fewer emotional distress symptoms in patients experiencing physical illness (Ludolph et al., 2019). Research has shown that resilience training may be able to assist individuals with expanding their capacities for goal-directed behavior during periods of heightened emotional distress (Kent et al., 2015; Shipley et al., 2018).

This study is the first to examine the relationship between post-traumatic growth, resilience, and functional outcomes among adults with acquired disabilities. Our approach is unique in terms of the population studied and that, to date, post-traumatic growth has largely not yet been examined in participants with disability, acquired or otherwise. Additionally, while resilience in individuals with disability has been examined in previous studies, the relationship between resilience levels and post-traumatic growth was not considered in the context of functional outcomes. Examining the relationship between post-traumatic growth, resilience, and functional outcomes in those with acquired disabilities may inform treatment for these individuals. Exercises in building resilience through exploring patients' post-traumatic growth levels could guide patients' ability to understand and reframe their adverse experiences, allowing them greater control in an otherwise unexpected and disruptive circumstance.

Chapter 3: Aims and Hypotheses

1. To examine predictors of functional outcomes, including but not limited to demographic factors, physical disability-related factors (type and duration), and quality of interpersonal relationships in individuals with a disability acquired in adulthood.
    1.1. Individuals who are younger will demonstrate better functional outcomes than older individuals.
    1.2. Individuals who acquired their disability through illness will demonstrate better functional outcomes than those who acquired their disability through other means, such as accidents, violence, or neglect of others.
    1.3. Individuals who have their acquired disability for a longer duration will demonstrate better functional outcomes than individuals who have had their disability for a shorter duration.
    1.4. Individuals with higher levels of reported interpersonal relationship quality will demonstrate better functional outcomes than those with lower levels of interpersonal relationship quality.
2. To examine the impact of resilience and functional outcomes on post-traumatic growth among individuals with a disability acquired in adulthood.
    2.1. Individuals with higher levels of resilience will have greater post-traumatic growth scores than those with lower levels of resilience.
    2.2. Individuals with lower functional outcome scores will have lower post-traumatic growth scores than those with higher functional outcome scores.

    2.3. There will be differences in the effect of resilience on post-traumatic growth outcomes for individuals with low and high functional outcome scores.

3. To compare post-traumatic growth outcomes in individuals with a disability acquired in adulthood to individuals with cancer.
    3.1. Individuals with a disability acquired in adulthood will have comparable post-traumatic growth to individuals with cancer.

Chapter 4: Methods

Participants and Recruitment

Eligible participants were required to: 1) have an acquired disability in adulthood; 2) be 18-64 years of age and 3) be able to read and write English fluently. An acquired disability is described as the loss of function in areas previously unaffected by a lack of function due to the development of a disability from an event, or diagnosed chronic condition that is perceived as life-altering. Individuals diagnosed with a congenital disability were still able to participate provided that they had acquired a disability during adulthood. Because the risk for onset of many common chronic conditions increases with age, this study excluded individuals aged 65 and older in order to avoid the confounding effects related to the normal aging process. Other exclusion criteria included congenital disability with no acquired disability, acquisition of a disability prior to age 18 with no disability acquired in adulthood, presence of an intellectual or cognitive disability which prevented the participant from completing the survey, and the presence of mental health diagnoses without indication of a physical disability. Individuals with neurological conditions such as stroke, brain tumor, or traumatic brain injury as part of their presentation were excluded.

Participants were recruited through online platforms (e.g., Facebook, Instagram, and Discord) requesting their voluntary participation in the survey for this study. Organizations and social media groups specific to common disabilities acquired in adulthood were contacted for permission to distribute the survey to its members in order to ensure participant representation across the United States. Approval from the Florida Institute of Technology Institutional Review Board was obtained prior to the initiation of recruitment. All participants were asked to provide informed consent prior to their participation in this study.

Data Collection Procedures

Participants were provided with a link to the survey and the informed consent form. Participants were able to complete the survey on their personal electronic device (e.g., computer, phone, or tablet) individually. The online survey was estimated to take approximately 15-20 minutes to complete. To start the survey, participants were first required to complete an informed consent and review the attached information describing the study. Participants then verified their eligibility by completing an initial set of questions. If participants were eligible to participate, they were directed to complete the rest of the survey. While taking the survey, participants were permitted to withdraw at any time. If a participant wanted to return to a previous question, they were able to return by using the “back” button embedded in the survey. Participants were permitted to decline a response to any of the survey questions. All data collected from the survey was de-identified and entered into a HIPAA-compliant database.

Measures

Participants were directed to access the survey through the Qualtrics website. All data collected was stored in a secure server in the Department of Psychology at Florida Institute of Technology. The full survey is available for review in Appendix B. Participants were permitted to access the survey repeatedly if desired, but duplicate responses were identified and removed through identification measures implemented through Qualtrics.

The survey was comprised of components from the following:

Demographics

Participants were asked to include demographic data, including age, gender, race, ethnicity, nature of disability, how the disability was acquired, time since acquisition of disability/onset of illness, employment status, level of education, socioeconomic status (household income), and status of government assistance.

Post-Traumatic Growth

Post-traumatic growth was measured through the Post-Traumatic Growth Inventory. The Post-Traumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996) is a 21-item instrument which measures post-traumatic growth and perceived self-improvement through self-report by asking the participant to rate their experiences in relation to a crisis from zero to five points, with ‘0’ indicating that the participant did not experience the change indicated in that item at all and ‘5’ indicating that the participant experienced the change indicated in that item to a very great degree in relation to a crisis. Possible scores range from 0 to 105. Specific items on the PTGI load onto five factors of Personal Strength, New Possibilities, Improved Relationships, Spiritual Growth, and Appreciation for life (Tedeschi & Calhoun, 1996). The variable of interpersonal relationship quality was derived from participants’ scores on the Improved Relationships subscale, which examines perceived quality of social relationships after an identified event; this was described as the participant’s illness or injury on the survey for this study. Higher scores on the PTGI indicate that the participant perceives a great amount of change and personal growth; closer examination of which of the five factors is scored the highest suggests those areas in which the participant has experienced the greatest development. Generally, scores ranging from 0 to 45 are indicative of low levels of post-traumatic growth and scores ranging from 46 to 105 are reflective of medium to high levels of post-traumatic growth (Mazor et al., 2016).

The internal consistency for the 21 items of the PTGI is strong ($\alpha = .90$) (Tedeschi & Calhoun, 1996). Construct validity for the PTGI has been supported by thematic analysis congruent with the five factors for trauma survivors who completed semi-structured interviews and endorsed associated statements on the PTGI (Shakespeare-Finch et al., 2012). Additionally, confirmatory factor analysis studies examining the factor structure and latent mean invariance of the PTGI revealed satisfactory goodness of fit for all five factors for breast cancer patients (Brunet et al., 2010), as well as arthritis patients and those with inflammatory bowel disease (Purch Stephenson, 2014). This suggests adequate validity of the five-factor structure and the PTGI’s use of comparably measuring post-traumatic growth across these five categories in individuals with a variety of conditions who have experienced adverse life events. The PTGI also shows strong discriminant validity in terms of social desirability, with a negative correlation between the two constructs as indicated in results from a sample of undergraduate students at a university in the southeastern United States ($r = -.15$, $p < .01$) (Tedeschi & Calhoun, 1996). In terms of the relationship between post-traumatic growth and resilience, post-traumatic growth in the parents of children receiving surgery to correct congenital disease was found to be positively associated with CD RISC scores ($r = .43$, $p < .01$) (Li et al., 2012, as cited in Davidson, 2018).

Resilience

Resilience was measured through the Brief Resilience Scale (BRS; Smith et al., 2008). This instrument was developed to measure resilience as defined as one’s ability to recover quickly from stressful events and adapt to future stressors. The BRS is a six-item instrument which measures resilience through self-report by asking the participant to rate the extent to which they agree with each statement. There are three positively worded items and three negatively worded items to control for response bias related to social desirability. Each item is scored a total of one to five points, with possible raw total scores ranging from six to 30, with higher scores indicating higher resilience. Scores for each question are totaled then divided by six to calculate the final score. Smith and colleagues define final scores between 1.00 and 2.99 as low resilience, 3.00 and 4.30 as normal resilience, and 4.31 and 5.00 as high resilience (Smith et al., 2008).

Consideration was taken during the development of the BRS to measure how participants with chronic health conditions might differ in response to healthy controls, with a goal for the BRS to identify resilience to stress from physical sources as well as resilience to stress from psychological ones (Smith et al., 2008).

In a comprehensive study comparing BRS responses from two groups of healthy undergraduate students, one group of cardiac patients, and one group of middle-aged women with and without fibromyalgia, internal consistency, test-retest reliability, convergent and discriminant validity, and group differences were examined. Internal consistency was observed to be strong, with Cronbach's alpha ranging from 0.80 in university students to 0.91 in middle-aged women (Smith et al., 2008). Internal reliability was also found to be acceptable, with a Cronbach's alpha of 0.87, in an outside study of adults with serious mental health difficulties living in the community (Sánchez et al., 2021). Test-retest reliability was somewhat questionable in the original study (0.69 for 1 month and 0.62 for 3 months; Smith et al., 2008).

In terms of construct validity, BRS scores have been observed to be positively correlated with other measures of resilience, such as the Connor-Davidson Resilience Scale-25 and the Ego Resiliency scale (Smith, 2008; Windle et al., 2011). An outside factor analysis conducted by Sánchez and colleagues (2021) indicated that the BRS is unidimensional and explained 61.20% of the variance indicated. Convergent validity was supported through positive correlations between higher BRS scores and higher ratings of optimism, purpose in life, social support, active coping, and negative correlations in relation to pessimism, alexithymia, behavioral disengagement, and self-blame (Smith, 2008). The BRS was also shown to have discriminant predictive validity through negative correlations with perceived stress, anxiety, depression, and physical symptoms

(Smith, 2008). Additional support was observed in a study of adults with disabilities receiving vocational services, wherein higher BRS scores were positively associated with psychological well-being and negatively associated with endorsement of depressive symptoms (Tansey et al., 2016). Among university students, no gender differences were observed in scoring, but men were found to score higher than women in the cardiac patient group (*M* = 4.07, *SD* = 0.6; *M* = 3.67, *SD* = 0.70). In terms of chronic pain, middle-aged women with fibromyalgia scored lower than those without fibromyalgia (*M* = 3.09, *SD* = 0.93; M = 3.96, *SD* = 0.58).

Functional Outcomes

Functional outcomes were measured through the Short Form Survey-36. The Short Form Survey-36 (SF-36; Ware & Sherbourne, 1992) is a 36-item instrument which measures general health and physical functioning across eight domains of Physical Functioning, Bodily Pain, Role Limitations due to Physical Health Problems, Role Limitations due to Personal or Emotional Problems, Emotional Well-Being, Social Functioning, Energy/Fatigue, and General Health Perception through a series of self-report items. The structure of the measure consists of one item of a general appraisal of the participant's personal health, one item comparing the participant's health with others of the same age, ten items asking about the participant's physical limitations on a typical day, 20 items about participants' experiences over the past four weeks in physical, emotional, and social settings based on their physical condition, and four true or false statements about general health and vulnerability. Of the 20 items inquiring about participants' experiences over the past four weeks, nine items measure physical experiences on a six-point Likert scale ranging from one to six, with '1' indicating "all of the time" and '6' indicating "none of the time." Responses are assigned numeric raw scores, then recoded as standardized values according to a scoring key, with each standardized score ranging from 0 to 100. Scores are then averaged for each of the eight domains. Higher scores indicate a better health state. Although the SF-36 does not provide a total score calculating overall functional outcomes (Ware and Sherbourne, 1992), the most common accepted method of calculating an SF-36 total score is to average the scores of all eight domains. This produces an SF-36 overall average score with a range of 0 to 100, with higher scores indicating better overall functional outcomes (Lins & Carvalho, 2016). This method was used to calculate total SF-36 scores in this study.

Mean scores for each domain range from 52.15 for Energy/Fatigue (*SD* = 22.39) to 78.77 for Social Functioning (*SD* = 25.43), based on a baseline medical outcome study conducted in the United States (RAND Corporation, n.d.). The SF-36 has acceptable internal consistency and a strong convergent validity ranging from $r = .74$ for Social Functioning and $r = 0.93$ for Physical Functioning when compared with the Nottingham Health Profile (Brazier et al., 1992). Patients of more intensive tertiary rehabilitation programs scored ≥ 1 SD lower in both physical and mental health subscales when compared with population norms, which suggests adequate construct validity (de Vries et al., 2015). A factor analysis supported the measure’s physical and mental health summary scales, as well as their ability to discriminate between physical and mental health contributing factors to overall health in participants with chronic pain (LoMartire et al., 2020) and who were over 65 years of age and disabled (Gandek et al., 2004).

Research Design and Data Analysis

This study utilized a cross-sectional design. Descriptive statistics, such as means, standard deviations, and frequencies, were calculated for the participant demographics and the primary outcomes (post-traumatic growth, resilience, functional outcomes). A two-way ANOVA was used to assess for differences between groups on continuous variables. The effects of demographic factors, such as age, gender, level of reported interpersonal relationship quality, chronicity of disability, and nature of disability acquisition, on functional outcomes were examined through a predictive linear regression model. A 2x2 ANOVA was used to assess the interaction effect between resilience and functional outcomes on post-traumatic growth. An independent samples *t*-test was used to examine differences in post-traumatic growth scores based on gender. Finally, a chi square goodness of fit test was used to compare the proportion of individuals with little to no post-traumatic growth ratings and moderate to high post-traumatic growth ratings in our study sample of participants with acquired disability to a sample of head and neck cancer patients enrolled in a published study similarly examining post-traumatic growth (Sharp et al., 2018). Data was analyzed using the Statistical Package for the

Social Sciences (SPSS) - version 29. All analyses were considered significant at the $p < .05$ level.

Chapter 6: Results

Participants

Demographic variables

A total of 260 participants started the online survey for this study. Of these, 28 were excluded because they were located outside the United States, three were excluded because they were completing the survey for someone else, and two were excluded because they were 65 years of age or older. Forty-eight participants were excluded because they did not meet the inclusion criteria of having a life-altering injury or chronic health condition with onset in adulthood. Thirty-four participants were excluded because they reported a neurodegenerative disorder, head injury, or neurological event, such as a stroke, among their diagnosed chronic health conditions. One participant reported an injury involving their head, but specified the effects were neuropathy, so they remained in the study. Neurological conditions that do not significantly affect cognition (e.g., numbness, neuropathy) were included in these analyses. From the 145 participants that remained, 59 were excluded because they did not complete all three measures of the Post-Traumatic Growth Inventory (PTGI), the Brief Resilience Scale (BRS), and the Short-Form Survey (SF)-36. The final sample consisted of 86 participants (36.0% ages 25 to 34, total sample age range: 18-64 years), including 23 men (43.5% ages 25 to 34, age range: 25-64 years), 50 women (32.0% ages 25 to 34, age range: 18-64 years), 12 nonbinary or gender non-conforming individuals (41.7% ages 18 to 24, 41.7% ages 25 to 34, age range: 18-54 years), and one participant who defined their gender through other means, who was in the 18-24 year age group. The majority of individuals identified as White or Caucasian (*n* = 76; 88.4%) and Not Hispanic or Latino (*n* = 79; 91.9%). Most participants were employed full-time (*n* = 43; 50.0%), had a bachelor's degree (*n* = 24; 27.9%) or a master's degree (*n* = 19; 22.1%), and reported a household income of over $100,000 (*n* = 26; 30.2%). Most participants denied receiving financial relief from government assistance programs (*n* = 68; 79.1%). See Table 1 for complete demographic data.

General health variables

Results indicated that 17 participants (19.8%) reported a life-altering injury without a chronic health condition, with 5 of these participants (5.8%) reporting more than one life-altering injury. Forty-one participants (47.7%) reported a chronic health condition without a life-altering injury, and 29 participants (33.7%) reported multiple chronic health conditions. Twenty-eight participants (32.6%) reported both a life-altering injury and a chronic health condition occurring after age 18, and of those, 8 participants (9.3%) reported multiple injury sites and 21 participants (24.4%) reported multiple chronic health conditions. See Tables 2 and 3 for descriptive information regarding injuries and health conditions reported. Seventeen participants (19.8%) reported congenital disabilities as well as acquired disabilities. All participants who reported a chronic health condition agreed that it had disrupted or altered their life at some time. Most participants (*n* = 24; 27.9%) reported that their injury or health condition was diagnosed 4-10 years ago. The most common cause of injury or health condition reported was illness (*n* = 47;

54.7%), followed by accidents (*n* = 27; 31.4%). Sixty-four participants (74.4%) reported feeling responsible for their injury or health condition. Although many participants (*n* = 17; 19.8%) declined the question altogether, most participants (*n* = 61; 70.9%) reported that COVID-19 did not have a role in the development of their injury or chronic health condition. Ten participants (11.6%) reported a cancer diagnosis. This excluded them from the chi-square goodness-of-fit analysis comparing the average PTGI scores of participants with acquired disabilities to head and neck cancer survivors from a study from Sharp and colleagues (2018). Detailed data on general health variables can be found in Table 4. Detailed data on composite and subscale scores can be found in Table 5 for the PTGI, Table 6 for the SF-36, and Table 7 for the BRS.

Objective 1. To examine predictions of functional outcomes, including demographic factors, physical disability-related factors (type and duration), and quality of interpersonal relationships in individuals with a disability acquired in adulthood.

Hypothesis 1.1 **Individuals who are younger will demonstrate better functional outcomes than older individuals.**

Hypothesis 1.2 **Individuals who acquired their disability through illness will demonstrate better functional outcomes than those who acquired their disability through other means, such as accidents, violence, or neglect of others.**

Hypothesis 1.3 **Individuals who have their acquired disability for a longer duration will demonstrate better functional outcomes than individuals who have had their disability for a shorter duration.**

Hypothesis 1.4 **Individuals with higher levels of interpersonal relationship quality will demonstrate better functional outcomes than those with lower levels of interpersonal relationship quality.**

To investigate the hypotheses that factors such as younger age, acquisition of disability through illness, longer duration of disability, and higher reported interpersonal relationship quality would predict better functional outcomes, a standard multiple regression was conducted. The independent variables examined were age, gender, type of acquired disability, method of disability acquisition, duration of disability, and interpersonal relationship quality. Gender and type of acquired disability were not associated with specific hypotheses but were included as a *post hoc* analysis as demographic factors. The dependent variable was functional outcomes, as measured by the overall averaged score of the SF-36 across domains with possible scores ranging from 0 to 100 (M = 38.75, SD = 16.42). According to a *post hoc* power analysis, the sample size of 86 participants provided 94% power of detecting a moderate size effect across outcomes (0.15) for the linear regression (Erdfelder et al., 2007). Assumption testing suggested that there were no outliers in the dependent variable of functional outcomes, as measured by the average of domain scores of the SF-36 and there were no violations of normality or multicollinearity.

Because age was collected as a categorical variable, eligible age groups were coded into two groups, comparing participants 18-44 years of age in the younger group to participants 45-64 years of age in the older group. Gender was dummy coded into three groups of male, female, and either nonbinary/non-gender conforming or other. Nonbinary/non-gender conforming and other were combined due to a smaller number of participants but separated from male and female participants due to potential differences in overall experience. Type of disability was coded into two groups, comparing those with both a life-altering injury and a chronic health condition in one group to those with either an injury or health condition in the other group.

Cause of disability was coded into two groups, comparing those having acquired their disability through illness in one group to those who acquired their disability through either violence, accidents, neglect of others, personal neglect, or an unspecified cause in the second group. Duration of disability was coded into two groups of shorter duration (0-10 years) and longer duration (11-30+ years) based on sample distribution. Reported interpersonal relationship quality was measured through scores on the Improved Relationships subscale of the PTGI and examined as a continuous variable.

Being female was found to significantly predict overall functional outcome scores (M = 38.75, SD = 16.42) when compared to the reference group of male participants, b = -11.73, p = .010. Based on examination of the standardized beta coefficient, female gender was negatively associated with functional outcome scores, suggesting that being female was associated with lower functional outcome scores. Meanwhile, gender identification as either nonbinary/non-gender conforming or other was not a significant predictor of functional outcomes when compared with male participants, b = -8.95, p = .137. Age (b = -5.94, p = .137), being both injured and having a chronic health condition (b = -1.38, p = .711), and the cause (b = -3.36, p = .39) and duration (b = 2.74, p = .49) of disability did not significantly predict functional outcomes. Quality of interpersonal relationships also did not significantly predict functional outcomes (b = 0.22, p = .249). Together, gender, age, type of disability, cause of disability, duration of disability, and reported interpersonal relationship quality significantly explained 13% of the variance in overall functional outcomes, $R^2 = .13$, $F(7, 78) = 2.81$, $p = .012$. However, the specific results did not support individual hypotheses 1.1, 1.2, 1.3, or 1.4. Refer to Table 8 for complete results.

Objective 2. To examine the impact of resilience and functional outcomes on post-traumatic growth among individuals with a disability acquired in adulthood.

Hypothesis 2.1 **Individuals with higher levels of resilience will have greater post-traumatic growth scores than those with lower levels of resilience.**

Hypothesis 2.2 **Individuals with lower functional outcome scores will have lower post-traumatic growth scores than those with higher functional outcome scores.**

Hypothesis 2.3 **There will be differences in the effect of resilience on post-traumatic growth outcomes for individuals with low and high functional outcome scores.**

To investigate the hypothesis regarding the relationship between levels of resilience and functional outcomes and post-traumatic growth, a two-way 2x2 between-groups ANOVA was conducted. The independent variables were resilience as measured by the BRS (low, high) and averaged overall functional outcome as measured by scores on the SF-36 (low, high). The dependent variable was post-traumatic growth, as measured by the PTGI. Assumption testing suggested that there were no outliers and no violations of normality across variables. According to a *post hoc* power analysis, the sample size of 86 participants provided 45% power of detecting a moderate size effect across outcomes (0.25) for the two-way 2x2 ANOVA (Erdfelder et al., 2007). Therefore, the results of these analyses should be interpreted with caution and should be considered exploratory to guide future research.

Average resilience scores were coded as low or high for the analyses by dividing the sample into groups as designated by Smith and colleagues (2008) of BRS low (1.00 – 2.99) and high scores (4.31 – 5.00), then dividing the moderate range of resilience (3.00 – 4.30) at the median of equal to or less than 3.65 or 3.66 and higher. Participants with resilience scores ≤3.65 were categorized in the Low group and those with scores ≥3.66 were categorized in the High group, resulting in the final BRS Low group (*n*=67) and the BRS High group (*n*=19). These groups were coded so that high scores indicated greater resilience and low scores indicated lower resilience. Average functional outcome scores were coded as Low (*n* = 43) or High (*n* = 43) for the analyses by using the median of the sample based on average overall SF-36 scores (*Mdn* = 37, which were coded so high scores indicated better functional outcomes and low scores indicated lower functional outcomes. Use of the median is an appropriate method of differentiating between low and high scores on continuous variables that are relatively normally distributed (DeCoster et al., 2011). Participants with a functional outcome score (<37) were identified as the

Low functional outcome group and those with functional outcome scores (≥37) were identified as the High functional outcome group.

Levene's test for equality of variances of the groups was conducted, *F*(3, 82) = 2.45, *p* = .070, and results suggest that the homogeneity of variance assumption was fulfilled. The main effect for resilience scores on post-traumatic growth scores was not significant, *F*(1, 85) = 0.00, *p* = .970, partial η^2 = .00. Post-traumatic growth was not significantly higher for those with high resilience (*M* = 47.42, *SD* = 32.72) than it was for those with low resilience (*M* = 39.82, *SD* = 24.01). This does not support hypothesis 2.1 that participants with higher resilience scores will have higher post-traumatic growth ratings than those with lower resilience scores. The main effect for functional outcome scores on post-traumatic growth scores was also not significant, *F*(1, 85) = 2.23, *p* = .139, partial η^2 = .03. Post-traumatic growth was not significantly different between those with higher functional outcomes (*M* = 42.65, *SD* = 29.66) and those with lower functional outcomes (*M* = 40.35, *SD* = 22.42). This does not support hypothesis 2.2 that participants with lower functional outcome scores would have significantly lower post-traumatic growth scores compared to those with higher functional outcome scores. The interaction between resilience ratings and overall average functional outcome scores on post-traumatic growth was significant, *F*(1, 85) = 4.57, *p* = .036, partial η^2 = .05. Participants with high resilience and high functional outcomes reported higher post-traumatic growth than those with high resilience and low functional outcomes. This supports hypothesis 2.3 that there is a significant difference on the effect of resilience for those with low and high overall functional outcome ratings on post-traumatic growth. Upon visual inspection, those with low resilience ratings had similar post-traumatic growth regardless of level of functional outcomes. See Figure 1 and Table 9 for further details.

As an exploratory analysis, an independent samples *t*-test was conducted to examine the effect of gender on post-traumatic growth scores to address potential effects identified in previous studies of female gender on higher PTGI scores (Gil-González et al., 2022; Hung et al., 2019; Kobosko et al., 2021; Sharp et al., 2018). For the purpose of this analysis, gender was grouped into one female group (*n* = 50) and one group for male, nonbinary/non-gender conforming, and other identified participants (*n* = 36). This was done to equalize the distribution between groups to identify whether identifying as female significantly affected PTGI scores for participants in this study. According to a *post hoc* power analysis, the sample size of 86 participants divided into these groups provided 57% power of detecting a moderate size effect across outcomes (0.50) for an independent samples *t*-test (Erdfelder et al., 2007). Levene’s test suggested that PTGI scores for female participants and non-female participants were statistically equivalent, *F*(84) = 1.1, *p* = .304. Results showed no significant difference in PTGI scores between female and male, nonbinary/non-gender conforming, or other identified participants, *t*(84) = 0.63, *p* = .529.

Objective 3. To compare post-traumatic growth outcomes in individuals with a disability acquired in adulthood to individuals with cancer.

Hypothesis 3.1 Individuals with a disability acquired in adulthood will have comparable post-traumatic growth to individuals with cancer.

To investigate the hypothesis that individuals with acquired disabilities would show comparable post-traumatic growth ratings to individuals with cancer, a chi-square goodness-of-fit test was conducted. A study from Sharp and colleagues (2018) that examined post-traumatic growth scores using the PTGI in head and neck cancer survivors (n = 539) was used as a comparison sample representing individuals with cancer. Participants in the Sharp study were divided into two groups based on average PTGI item scores (M = 55.74 total, M = 2.70 per question) consisting of little or no post-traumatic growth (n = 218, 40.40%) and moderate or high post-traumatic growth (n = 321, 59.60%; Sharp et al., 2018). The average total score for each of the five domains of Relating to Others, New Possibilities, Personal Strength, Spiritual Change, and Appreciation for Life were noted, as well as the mean item score for all 21 items in the measure.

Ten participants (11.60%) of the 86 participants included in previous analyses of the current study were removed from this analysis due to report of a cancer diagnosis. Because the literature on post-traumatic growth already indicates a relationship between cancer and higher post-traumatic growth, this analysis was conducted with the 76 remaining participants who did not report cancer in order to control for this potential confound. According to a *post hoc* power analysis, the sample size of 76 participants provided 74% power of detecting a moderate size effect across outcomes (0.30) for the chi-square goodness-of-fit test (Erdfelder et al., 2007). Given the large size of the comparison study sample in relation to the sample size of the current study, this analysis is exploratory and intended primarily to guide future research and should be interpreted with consideration of this discrepancy between groups.

The average score for all PTGI items for each participant in the current study was calculated, as it was in Sharp and colleagues' (2018) study. Each item of the PTGI is rated from 0 ('I did not experience this as a result of this event') to 5 ('I experienced this change to a very great degree as a result of this event'), with lower numbers representing lower post-traumatic growth and higher numbers representing higher post-traumatic growth across items. Participants' average PTGI item scores were then categorized into a no-or-little-growth group (range of scores = 0.00-2.49) and moderate-to-high-growth group (range of scores = 2.50-5.00), as done in the Sharp et al (2018) study. The resulting variables were then used to compare the average PTGI item score ratings for participants with acquired disabilities to those of cancer survivors. Among those with acquired disabilities, fifty-five participants (72.4%) were identified as having no-or-little-growth and 21 participants (27.6%) were identified as having moderate-to-high-growth. A chi-square goodness-of-fit test indicated that there was a significant difference in the proportion of participants in the post -traumatic growth groups among those with acquired disabilities in comparison to cancer survivors (low to little growth group, 40.4% and moderate to high growth, 59.6%), $\chi^2(1) = 32.26$, $p < .001$. This does not support the hypothesis that individuals with disabilities acquired in adulthood would have comparable reported post-traumatic growth to cancer survivors.

Chapter 7: Discussion

It is estimated that one in four adults in the United States has a disability (CDC, 2023), and that number increases to two in five by age 65 (Scura & Piazza, 2021). This study sought to examine the extent to which adults who become disabled through life-altering injuries or development of chronic health conditions experienced post-traumatic growth. It was the first study to look at post-traumatic growth in acquired disability as a single, combined group rather than examining specific diagnoses. Although this group is comprised of a variety of conditions, post-traumatic growth warranted exploration because of the potentially traumatic nature of injury or illness and the potential for polytrauma during serious injuries (Marsden & Tuma, 2020). Previous research has demonstrated that prior intensive care unit patients admitted for injuries and illness experienced mental, physical, social, and functional disruption following discharge, even if the cause of admission did not lead to long-term disability (Hashem et al., 2016). This illustrates the likelihood for acute disruption in functional outcomes as a result of life-altering injuries or chronic health conditions that could eventually contribute to a change in perspective related to post-traumatic growth such as improved relationships, increased openness to experience, and heightened appreciation of life (Tedeschi & Calhoun, 1996).

This study involved a sample of relatively young adults who had reportedly lived with their respective injuries or health conditions for multiple years, with 55.9% of the sample falling between the ages of 25 and 44, and duration of disability ranging between 4 to 20 years for 54.6% of participants. Most participants reported that they continued to work full-time and held a college degree. Household income varied widely, but the largest single grouping reported a household income of over $100,000. Most participants denied receiving government assistance. These numbers indicate a sample of participants that was primarily in early to middle adulthood, experienced with their disability, well-educated, high functioning, and possibly adequately financially supported without government assistance. This is notable in comparison with existing disability research, as the exclusion criteria contributed to a younger sample overall.

Participants' average overall functional outcome scores were somewhat low for the sample as a whole but slightly higher for those who only reported a life-altering injury. Across the eight domains of functional outcomes measured by the SF-36, average domain scores were relatively higher for the domains of Emotional Well-Being, Role Limitations Due to Emotional Health, Pain, and Social Functioning when compared to the group's lower average domain scores of General Health, Energy/Fatigue, and Role Limitations Due to Physical Health. This distribution of domain scores suggests that participants reported better management of mental health, fewer setbacks related to difficulties with mental health, less pain, and adequate social engagement despite experiencing more setbacks due to physical health limitations, greater fatigue, and lower overall reported general physical health. Adequate management of emotional symptoms alongside appropriate levels of social support is consistent with previous research (Hale-Gallardo et al., 2017; Meulenkamp et al., 2019).

However, the report of better management of mental health and lower limitations due to emotional difficulties is notable, as 39.5% of participants reported experiencing chronic mental health conditions in addition to physical disability. This suggests that this sample may be well adapted to the emotional aspects of acquired disability and its challenges, despite lower physical health. Lower average ratings for general health, fatigue, and role limitations related to physical health suggests that the resulting sample perceived themselves to be physically hindered by their acquired disability. This is notable given the high level of educational attainment and physical demand of full-time employment, as education and employment can be difficult when new accommodations are necessary, or stamina is decreased by changes in physical functioning, pain, and fatigue (Harel-Katz & Carmeli, 2019). Overall, participants reported lower levels of resilience according to the Smith et al. (2008) groupings of BRS scores. When divided into groups, those who reported both an injury and a chronic health condition and those who reported only a health condition demonstrated similarly low resilience. Those who reported only a life-altering injury demonstrated resilience in the moderate range (Smith et al., 2008).

Overall, the results of this study revealed that the influence of resilience on post-traumatic growth depended on the individuals’ functional outcomes. Post-traumatic growth was higher for participants who reported higher levels of resilience and higher levels of overall functional outcomes. However, participants who reported higher levels of resilience and lower overall functional outcomes demonstrated lower post-traumatic growth. Meanwhile, those who reported lower levels of resilience demonstrated lower levels of post-traumatic growth regardless of the reported level of functional outcomes. This highlights the complex relationship between resilience and post-traumatic growth, adding to the literature that showed that higher resilience does not always contribute to higher post-traumatic growth (Adjurlolo et al., 2022; Collazo-Castiñeira et al., 2022; Di Corrado et al., 2022). It is important to recall that resilience and post-traumatic growth are dynamic concepts. Previous research has shown that post-traumatic growth ratings can change with time and perception of one's own diagnosis, treatment, and prognosis can lead to changes in post-traumatic growth ratings (Occipinti et al., 2015). Because aspects of emotional and social adjustment are part of the functional outcomes measured, higher functional outcomes alongside higher resilience may indicate where the necessary growth and adaptation to new physical demands may have occurred, resulting in higher reported post-traumatic growth. Since this sample has largely reported disability durations for multiple years, worse functional outcomes despite higher resilience suggests a possible demoralization effect for participants who might feel more physically limited, fatigued, and pained for longer durations.

Additionally, because functional outcomes were measured across the domains of social functioning and role limitations related to physical health and emotional health, there is the possibility that participants reporting lower functional outcomes felt unfulfilled in terms of their role in their personal and professional lives, as well as their interpersonal relationships. This may have negatively affected how they perceived their personal growth in the context of their injury or health condition, as improved relationships may be considered less salient to those who report high resilience and lower functional outcomes, specifically characterized by lower social support and greater role limitations. This is consistent with previous research on individuals with disabilities that shows that increased participation in activities involving others, such as volunteering or clubs, was associated with greater sense of control over health conditions; those who were more isolated reported lower understanding of their condition, greater role limitation due to difficulties with physical functioning, and lower mood (Meulenkamp et al., 2019). It is important to note that resilience or functional outcomes alone did not have a significant effect on post-traumatic growth. While the small sample size suggests that the examination of this relationship is primarily exploratory, the similarity of this study's findings to previous research examining post-traumatic growth and resilience suggests that further research with larger sample sizes may continue to inform our understanding of the relationship between these two variables.

Previous research comparing post-traumatic growth in individuals with shared life experiences (siblings) with and without a history of cancer suggests that there is a relationship between experiencing cancer and higher post-traumatic growth (Zebrack et al., 2012). In an effort to build on existing post-traumatic growth research, which has been largely based in cancer patients, this study compared average post-traumatic growth ratings between participants who did not report a history of cancer and head and neck cancer survivors in a study by Sharp and colleagues (2018). It was hypothesized that post-traumatic growth in adults with acquired disabilities would be comparable to that in cancer survivors, given the potential for traumatic experience and lifestyle adjustments related to a life-altering injury or chronic health condition diagnosis. However, the proportion of participants with acquired disability in our study reporting little-to-no post-traumatic growth was much higher than was the case for cancer survivors. This suggests that these two groups may not share as much in common as previously anticipated.

There are similarities between the experience of a cancer diagnosis and a life-altering injury or diagnosis of a chronic condition in that they both involve elements of initial disruption of daily functioning and adaptation to new expectations. However, one key difference between a cancer diagnosis and diagnosis of a chronic condition or life-altering injury is that of expected duration and distress. Although there have been many developments in cancer treatments increasing chances of remission in for some forms of cancer, cancer is still considered a terminal illness and as such, diagnosis comes with a grieving process specific to terminal illness. While some may grieve in response to a loss of physical functioning that comes with acquired disability, the reality is that those who are diagnosed with the conditions encompassed within this study may expect to live much longer than those who receive a cancer diagnosis. With the sense of urgency associated with the risk of death may come an elevated sense of post-traumatic stress (Zebrack et al., 2012), which has been shown to relate to higher levels of post-traumatic growth (Chen & Tang, 2021). Therefore, those with cancer may be more likely to experience post-traumatic stress at higher levels and show development in the domains that make up post-traumatic growth such as greater appreciation for life, increased spirituality, openness to new experiences, and improved interpersonal relationships as they seek to make the most of their limited time. Meanwhile, someone who has lost physical functioning, and facing long-term changes and adaptations as a result, may similarly adjust to the trauma but may do so at a slower pace or at a lower intensity.

Functional outcomes are an important aspect to examine for adults with acquired disability below retirement age, as aspects such as role limitations affected by physical and mental health concerns were included in this variable. This differs from quality of life, which has been examined in other studies related to disability (Diržytė & Perminaas, 2021; Eggmann et al., 2020; Rogowska et al., 2019), but which focuses on personal appraisal of enjoyment without measuring potential practical life stressors, such as ability to work or participate socially. In this study, the effects of age, gender, type and duration of disability, method of disability acquisition, and interpersonal relationship quality on functional outcomes were examined and only female gender was a significant predictor. The study results suggested that women with disabilities acquired in adulthood are more likely to face limitations in overall functional outcomes. This is consistent with existing research stating that women with chronic health conditions (Dodd et al., 2022; Naess et al., 2019; Raggi et al., 2011) experience lower functional outcomes than men. This may be due to greater emotional and physical role expectations placed on women culturally in terms of caretaking and household management responsibilities. As role restriction was measured in the functional outcome measure, these increased expectations of physical and mental workload for women may result in lower functional outcome scores due to stress and perception of inability to meet these standards. Quality of interpersonal relationships was not found to significantly predict functional outcomes, despite previous research outlining the relationship between social support (Murray et al., 2019; Zücher et al., 2019) or lack thereof (Coyle et al., 2017; Lui et al., 2020) in outcomes for adults with disabilities.

Because research has suggested a relationship between female gender and higher Post-Traumatic Growth Inventory scores in previous studies, the effects of female gender were examined on post-traumatic growth ratings in this study. Previous research showed higher post-traumatic growth ratings among women in samples of post-lingually deaf cochlear implant users (Kobosko et al., 2021), head and neck cancer survivors (Sharp et al., 2018), and college students reporting past trauma (Tedeschi & Calhoun, 1996). This was thought to reflect potential differences in how women responded to trauma in comparison to men (Tedeschi & Calhoune, 1996) or the tendency for women to use more active coping skills while men preferred avoidant coping strategies (Kobosko et al., 2021). However, female participants in this study did not demonstrate significantly higher Post-Traumatic Growth Inventory scores when compared with their male and nonbinary counterparts. When comparing this sample to those of previous studies and given the different age ranges of the samples across studies, it is likely that were generational differences between gendered coping skills that complicate the direct comparison of post-traumatic growth outcomes between participants in our study and those in previous research. It is worth noting that while the subsample of nonbinary and other-gendered participants was relatively small, this study was the first to differentiate these individuals from the male and female groups with acquired disabilities. Therefore, by not limiting analysis to groups within the gender binary, there may be additional aspects of coping and trauma reaction and gender that can be explored in future research.

Clinical Implications

Previous research shows that post-traumatic growth was experienced by COVID-19 patients following a hospital stay (Adjorlolo et al., 2022; Xiao et al., 2022). Post-traumatic growth and resilience have also been shown to help patients in other health-related contexts like recovery from stroke (Shipley et al., 2018) and hidradenitis suppurativa (Kirby et al., 2017). While rehabilitation programs provide patients and their families with much of the structural assistance they need to adjust to new life circumstances, previous studies suggest that there can sometimes be a gap between rehabilitation curricula and the psychological considerations of patients who may be struggling to adjust (Raudaskowski & Bisgaard Klemmensen, 2019). Additionally, logistical difficulties (Siddiqui et al., 2021) and transition of care (Morris et al., 2019; Rimmer & Lai, 2017) are unexpected struggles faced by adults who were likely completely independent prior to their injury or chronic health condition diagnosis.

This study revealed that there is a relationship between resilience and post-traumatic growth in adults with acquired disabilities, but the difference between growth and the alternative is functional outcomes. By allowing time and space to process the potentially traumatic aspects of injury, illness, loss, and hospital stays, patients may find themselves better positioned to explore their own personal growth in the context of overcoming adversity. This is a highly personal process that is integral to building resilience for future challenges (Rakesh et al., 2019). Therefore, it is important that this process be encouraged in the same way the other skills are addressed in rehabilitation. Clinicians working in a rehabilitation setting can foster personal exploration of growth by listening for language associated with benefit finding and even assessing for post-traumatic growth over time. This is something that can be integrated into an existing therapeutic context with the idea that such a process may help ease individuals into adjusting to their new baseline as someone who can find strength in that experience to help them navigate the challenging dynamics ahead.

Chapter 8: Limitations and Directions for Future Research

There were several methodological limitations of the proposed study that affected the extent to which conclusions could be drawn. This study was conducted through an online survey that included lengthy questionnaires. Although care was taken to reduce the burden on the participant by electing shorter questionnaires where possible, the length of the surveys likely impacted the percentage of surveys completed. Additionally, the lack of an incentive may have also negatively affected participation rates. In designing a survey intended to be taken by participants with disabilities, free-response fields were limited, and no scrolling menus were included due to the impact they might have on screen readers. For this reason, categories were created for most variables, thereby restricting some of the response options.

A similar design difficulty can be seen in the selection of chronic health conditions, which requires the participant to know under what category their disability might fall and correctly indicate it. Because neurological conditions were an automatic exclusionary criterion, additional participants with neurological conditions that do not affect cognition may have been excluded due to participant confusion. Notably, because the term “Mild Cognitive Impairment” as it pertains to the neurodegenerative diagnosis is not widely known to a younger population, and additional misunderstanding of the difference between cognitive difficulties caused by a condition such as Attention-Deficit/Hyperactivity Disorder or the experience of concentration difficulties or “brain fog” may have also contributed to self-exclusion from the study by participants who might otherwise have qualified. All of these factors may have detrimentally affected our participation rate.

This study utilized a cross-sectional design, which limited report of the outcomes examined here to a single point in time for each participant. As previously noted, post-traumatic growth, resilience, and functional outcomes are all dynamic variables that can change over time. The course of development for these variables is lost without a longitudinal design, limiting our understanding of true post-traumatic growth (Jayawickreme et al., 2021). It should also be noted that this study is based entirely on self-report with no external validation of diagnoses through medical records or ancillary data. The manner of categorizing disability by injury or chronic health condition, and through which system of the body affected, was also left to the participant who may have misunderstood the nature of their disability from a medical perspective. While efforts were made to make the language more accessible by avoiding jargon, clarity may have been lost for some participants in the process. Finally, although efforts were made to distribute the survey across a variety of platforms both online and within the community, the resulting sample was overwhelmingly white, non-Hispanic/Latino, wealthy, and well-educated. This limited the extent to which results could be examined within the context of other factors contributing to resilience and functional outcomes, such as socioeconomic status and experienced discrimination.

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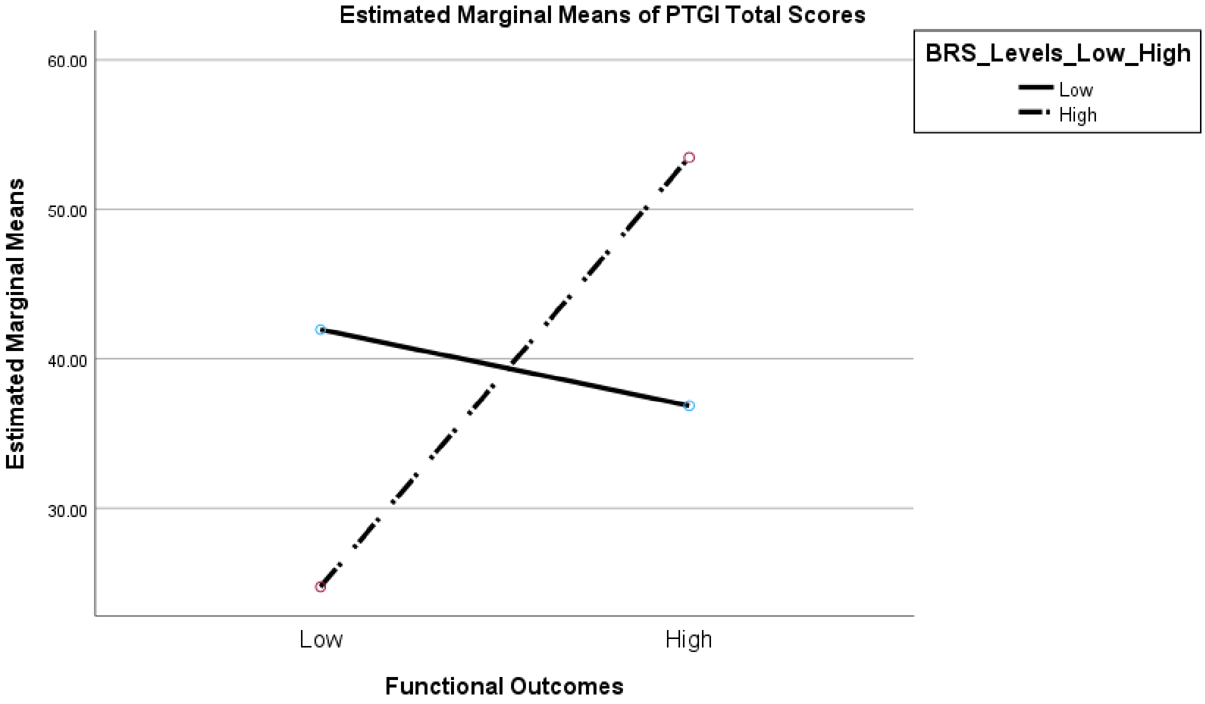
Figures

Figure 1

Analysis of variance (ANOVA) between resilience and functional outcomes on post-traumatic growth



Tables

Table 1

Demographic Variables by Type of Acquired Disability

Variable	Injury Only (n = 17)	Health Condition Only (n = 41)	Injury and Health Condition (n = 28)	Full Sample (N = 86)
	n (%)	*n (%)*	*n (%)*	*n (%)*
Age				
18-24	2 (11.8%)	5 (12.2%)	2 (7.1%)	9 (10.5%)
25-34	5 (29.4%)	16 (39.0%)	10 (35.7%)	31 (36.1%)
35-44	3 (17.6%)	9 (22.0%)	5 (17.9%)	17 (19.8%)
45-54	2 (11.8%)	4 (9.8%)	9 (32.1%)	15 (17.4%)
55-64	5 (29.4%)	7 (17.1%)	2 (7.1%)	14 (16.3%)
Gender				
Male	8 (47.1%)	5 (12.2%)	10 (35.7%)	23 (26.7%)
Female	6 (35.3%)	27 (65.9%)	17 (60.7%)	50 (58.1%)
Nonbinary	2 (11.8%)	9 (22.0%)	1 (3.6%)	12 (14.0%)
Other	1 (5.9%)	0 (0.0%)	0 (0.0%)	1 (1.2%)
Race				
White	15 (88.2%)	35 (85.4%)	26 (92.9%)	76 (88.4%)
Black	0 (0.0%)	2 (4.9%)	0 (0.0%)	2 (2.3%)
American Indian	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Asian	0 (0.0%)	1 (2.4%)	0 (0.0%)	1 (1.2%)
Pacific Islander	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Other	1 (5.9%)	0 (0.0%)	0 (0.0%)	1 (1.2%)
2 or more	1 (5.9%)	3 (7.3%)	2 (7.1%)	6 (7.0%)
Ethnicity				
Latino	3(17.6%)	2 (4.9%)	2 (7.1%)	7 (8.1%)
Non-Latino	14 (82.4%)	39 (95.1%)	26 (92.9%)	79 (91.9%)
Employment				
Full-Time	9 (52.9%)	18 (43.9%)	16 (57.1%)	43 (50.0%)
Part-Time	1 (5.9%)	8 (19.5%)	5 (17.9%)	14 (16.3%)
Contractual	1 (5.9%)	0 (0.0%)	0 (0.0%)	1 (1.2%)
Unemployed	6 (35.3%)	15 (36.6%)	7 (25.0%)	28 (32.6%)
Education				
High school (no diploma)	1 (5.9%)	0 (0.0%)	0 (0.0%)	1 (1.2%)
High School/GED	0 (0.0%)	7 (17.1%)	1 (3.6%)	8 (9.3%)

Variable	Injury Only (*n* = 17)	Health Condition Only (*n* = 41)	Injury and Health Condition (*n* = 28)	Full Sample (N = 86)
	n (%)	*n (%)*	*n (%)*	*n (%)*
College (no degree)	4 (23.5%)	5 (12.2%)	5 (17.9%)	14 (16.3%)
Associate's	1 (5.9%)	4 (9.8%)	1 (3.6%)	6 (7.0%)
Bachelor's	4 (23.5%)	10 (24.4%)	10 (35.7%)	24 (27.9%)
Master's	6 (35.3%)	8 (19.5%)	5 (17.9%)	19 (22.1%)
Doctoral	1 (5.9%)	6 (14.6%)	5 (17.9%)	12 (14.0%)
Vocational	0 (0.0%)	1 (2.4%)	1 (3.6%)	2 (2.3%)
Income (Household)				
$0-$19,999	3 (17.6%)	6 (14.6%)	2 (7.1%)	11 (12.8%)
$20,000-$34,999	1 (5.9%)	6 (14.6%)	2 (7.1%)	9 (10.5%)
$35,000-$49,999	1 (5.9%)	3 (7.3%)	2 (7.1%)	6 (7.0%)
$50,000-$74,999	2 (11.8%)	7 (17.1%)	6 (21. 4%)	15 (17.4%)
$75,000-$99,999	1 (5.9%)	4 (9.8%)	5 (17.9%)	10 (11.6%)
> $100,000	8 (47.1%)	9 (22.0%)	9 (32.1%)	26 (30.2%)
Declined	1 (5.9%)	6 (14.6%)	2 (7.1%)	9 (10.5%)
Financial Relief				
Yes	7 (41.2%)	6 (14.6%)	3 (10.7%)	16 (18.6%)
No	10 (58.8%)	34 (82.9%)	24 (85.7%)	68 (79.1%)
Declined	0 (0.0%)	1 (2.4%)	1 (3.6%)	2 (2.3%)

Table 2

Frequencies for Injuries Reported

Injury Location	Total Sample (*N* = 86) *n (%)*
Neck, back, hips, or spinal cord	31 (36.1%)
Arms	5 (5.8%)
Legs	12 (14.0%)
Hands	2 (2.3%)
Feet	8 (9.3%)
Eyes/Vision	1 (1.2%)
Ears/Hearing	3 (3.5%)
Head	1 (1.2%)
Other	2 (2.3%)

Table 3

Frequencies for Types of Health Conditions Reported

Health Condition Type	Total Sample (*N*=86) *n (%)*
Cardiovascular	11 (12.8%)
Pulmonary	8 (9.3%)
Gastrointestinal	19 (22.1%)
Reproductive	15 (17.4%)
Endocrine	12 (14.0%)
Immune	20 (23.3%)
Mental Health	34 (39.5%)
Musculoskeletal/Mobility	18 (20.9%)
Vision	8 (9.3%)
Hearing	7 (8.1%)
Skin	13 (15.1%)
Other	31 (36.1%)

Table 4

General Health Variables by Type of Acquired Disability

Variable	Injury Only (*n* = 17)	Health Condition Only (*n* = 41)	Injury and Health Condition (*n* = 28)	Full Sample (N = 86)
	n (%)	*n (%)*	*n (%)*	*n (%)*
Acquisition				
Illness	1 (5.9%)	33 (80.5%)	13 (46.4%)	47 (54.7%)
Violence	1 (5.9%)	1 (2.4%)	2 (7.1%)	4 (4.7%)
Accident	13 (76.5%)	3 (7.3%)	11 (39.3%)	27 (31.4%)
Neglect	0 (0.0%)	0 (0.0%)	1 (3.6%)	1 (1.2%)
Own Neglect	1 (5.9%)	4 (9.8%)	1 (3.6%)	6 (7.0%)
Other	1 (5.9%)	0 (0.0%)	0 (0.0%)	1 (1.2%)
Duration				
0-1 years	3 (17.6%)	4 (9.8%)	4 (14.3%)	11 (12.8%)
2-3 years	5 (29.4%)	9 (22.0%)	7 (25.0%)	21 (24.4%)
4-10 years	4 (23.5%)	14 (34.1%)	6 (21.4%)	24 (27.9%)
11-20 years	4 (23.5%)	10 (24.4%)	9 (32.1%)	23 (26.7%)
21-30 years	0 (0.0%)	2 (4.9%)	0 (0.0%)	2 (2.3%)
30+ years	1 (5.9%)	2 (4.9%)	2 (7.1%)	5 (5.8%)

Table 5

Post-Traumatic Growth Inventory Scores by Type of Acquired Disability

Variable	Injury Only (n = 17) M (SD)	Health Condition Only (*n* = 41) *M (SD)*	Injury & Health Condition (*n* = 28) *M (SD)*	Full Sample (N = 86) *M* (*SD*)
Overall PTGI	41.76 (32.64)	35.66 (22.70)	49.89 (25.19)	41.50 (26.16)
Domains				
Relate to Others	14.76 (11.14)	10.73 (8.40)	15.54 (9.16)	13.09 (9.40)
New Possibilities	8.47 (8.65)	7.93 (5.51)	11.93 (7.00)	9.34 (6.87)
Personal Strength	9.23 (7.69)	7.61 (5.70)	11.11 (6.12)	9.07 (6.38)
Spiritual Change	2.00 (3.16)	2.27 (3.07)	2.11 (2.90)	2.16 (3.00)
Appreciation of Life	7.29 (4.74)	7.12 (3.97)	9.21 (4.36)	7.84 (4.31)

Note. Overall PTGI = Post-Traumatic Growth Inventory Total Score; Relate to Others = Improved Relationships; New Possibilities = New Possibilities; Personal Strength = Personal Strength; Spiritual Change = Spiritual Growth; Appreciation of Life = Appreciation for Life.

Table 6

Short Form Survey-36 Scores by Type of Acquired Disability

Variable	Injury Only (*n* = 17) *M (SD)*	Health Condition Only (*n* = 41) *M (SD)*	Injury & Health Condition (*n* = 28) *M (SD)*	Full Sample (N = 86) *M (SD)*
Domains				
Phys Functioning	30.59 (24.93)	40.37 (31.21)	40.00 (25.60)	38.31 (28.26)
RL Phys Health	32.35 (39.29)	17.07 (33.74)	18.75 (32.36)	20.64 (34.55)
RL Emotional	52.94 (39.19)	41.46 (43.32)	55.95 (41.63)	48.45 (42.06)
Energy/Fatigue	35.59 (22.42)	22.56 (20.92)	32.32 (26.26)	28.31 (23.48)
Emotional Well-Being	58.59 (22.98)	50.44 (23.54)	58.14 (16.20)	54.56 (21.43)
Social Functioning	54.41 (18.72)	37.20 (27.31)	44.20 (20.55)	42.88 (24.37)
Pain	53.38 (21.40)	47.93 (29.19)	39.38 (23.03)	46.22 (26.13)
General Health	47.65 (20.40)	24.15 (19.20)	29.82 (17.77)	30.64 (20.75)
Average of Domains	45.69 (11.60)	35.15 (18.80)	39.82 (13.95)	38.75 (16.42)

Note. Phys Functioning = Physical functioning, RL Phys Health = Role Limitations Due to Physical Health, RL Emotional = Role Limitations Due to Emotional Problems, Energy/Fatigue = Energy/Fatigue, Emotional Well-Being = Emotional Well-Being, Social Functioning = Social Functioning, Pain = Pain, General Health = General Health. Average of Domains refers to the averaged score taken from all eight domains to create the global functional outcome score.

Table 7

Brief Resilience Scale Scores by Type of Acquired Disability

Variable	Injury Only (*n* = 17) *M (SD)*	Health Condition Only (*n* = 41) *M (SD)*	Injury & Health Condition (*n* = 28) *M (SD)*	Full Sample (N = 86) *M (SD)*
BRS Score	3.43 (0.94)	2.67 (1.01)	2.84 (0.92)	2.88 (1.00)

Table 8

Summary of Multiple Regression Analysis for Functional Outcomes

	R	R^2	*SE* of the Estimate	R^2 change	*b*	*B*	*SE*	*t*
Model 1	.45	.13	15.32	.20				
Age								
Ages 18-44					-5.94	-.17	3.96	-1.50
Gender								
Female					-11.73	-.36	4.45	-1.50*
Nonbinary/Other					-8.95	-.20	5.96	-1.50
Acquisition								
Illness					-3.36	-.10	-3.87	-0.87
Duration								
Longer					2.74	.08	3.93	0.70
Type								
Both					-1.38	-.04	3.71	-0.37
Improved Relationships					0.22	.13	0.19	1.16

*$p < .001$

Table 9

Two-Way Between Subjects ANOVA Results of Resilience and Functional Outcomes on Post-Traumatic Growth

Source	*SS*	*df*	*MS*	*F*
Between	3881.69	3	1293.90	1.95
Resilience	0.92	1	0.92	0.00
Functional Outcomes	1476.49	1	1476.49	2.23
Resilience*Functional Outcomes	3023.63	1	3023.63	4.57*
Within	54289.81	82	662.07	
Total	206285.00	86		

Note. *p <.001

Appendix A: Letter of Information and Informed Consent

Primary Investigator:

Dominique R. Ghirardi, M.S.
Department of Psychology, Florida Institute of Technology
(Email): dghirardi2020@my.fit.edu

Co-Investigator:

Vida L. Tyc, Ph.D.
Department of Psychology, Florida Institute of Technology
(Email): vtyc@fit.edu

Please read this consent document carefully before you decide to participate in this study.

Purpose of this Study

This study is being conducted to learn more about how adults who are 18 to 64 years old with a life-altering injury or chronic health condition perceive themselves after experiencing a loss in physical functioning as a result of injury or illness. This study will also look at how well individuals recover after experiencing stress and how well they are functioning physically, emotionally, socially, and occupationally after becoming injured or developing a chronic health condition. This information will be used to design future interventions to improve treatment outcomes among adults in this age range adjusting to changes in physical functioning.

Eligibility

To participate, you must be between 18-64 years of age. You must also be experiencing a significant change in *physical* functioning affecting your ability to work, socialize, or participate in enjoyed activities resulting from an injury or illness that occurred after you turned 18. You must be able to read and write in English fluently and complete the survey independently.

If you have an intellectual disability or have experienced a significant neurological event such as a stroke or traumatic brain injury or have a neurodegenerative condition such as cognitive impairment or dementia, you will not be included in the study. Participants who have experienced a loss of functioning related to mental health concerns without a history of physical injury or illness in adulthood will also not be eligible to participate in the study.

Procedures of the Study

If you are eligible to participate in the study, you will be asked to complete an online survey. The survey will consist of questions regarding your history of injury or illness, your reaction to past stressful events, your ability to respond to stressful events, and your physical, emotional, and social functioning. You will be able to change any of your responses by selecting the “Back” button to return to the previous page. We estimate that the questionnaire will take approximately 20 minutes to complete.

Potential Risks and Benefits

The risks of participating in this study are minimal. However, you will be asked about the history of your injury or illness, your perception of your injury or illness, and your experience adjusting to and reacting to stressful events. These questions may be stressful. You may choose not to respond to any question that makes you uncomfortable and are free to discontinue your participation at any point during the study. If you feel you need support, help is available through the phone on the Lifeline by dialing 988 or through text at Crisis Text Line at 741741-- please note that texting charges may apply. We will keep your study information private and confidential, and all data will be de-identified and kept in a database to which only researchers have access. There will be no direct benefits to you by taking part in this study. However, the information obtained from this study may be used to help other individuals adjusting to life-altering injury or chronic health conditions in the future.

Compensation

There will be no compensation offered to you as a result of participating in this study.

Discontinuation of the Study

Participation in this study is **voluntary**. You are under no obligations to participate in this study, and you are free to withdraw from this study at any time without consequences to you. There is no penalty for not participating. You may refuse to answer any questions that we ask you. If you decide to withdraw from the study, the information provided by you will not be retained.

Confidentiality

All responses obtained from you will be kept confidential. No identifying information will be collected during this survey. All data collected will be entered into a HIPAA-compliant database and stored on a password-protected server located in the Department of Psychology at Florida Institute of Technology. Only authorized researchers will have access to this information.

Information about Participating as a Study Subject

Any questions about study participation may be directed to Dominique R. Ghirardi (Principal Investigator) via email (dghirardi2020@my.fit.edu).

Consent

In order to keep your information confidential, your name or signature is not required. Please indicate your choice below. Should you choose to participate, you will be directed automatically to the survey.

a. I have read the information presented above about a study being conducted by Dominique R. Ghirardi (Principal Investigator) of the School of Psychology at Florida Institute of Technology. I am 18 years or older and I understand that I may withdraw from this study at any time. I agree to participate in this study.
b. I have read the information about this study, and I do not wish to participate.

Appendix B: Survey Questions

Demographics

(*Participant qualification question*)

1. Are you located in the United States?
    a. Yes
    b. No (*Excluded from study*)

(*Participant qualification question*)

2. Are you able to read and understand English?
    a. Yes
    b. No (*Excluded from study*)

(*Participant qualification question*)

3. Are you completing this survey about yourself or someone else?
    a. Myself
    b. Someone else (*Excluded from study*)

(*Participant qualification question*)

4. What best describes your age?
    a. Under 18 (*Excluded from study*)
    b. 18-24
    c. 25-34
    d. 35-44
    e. 45-54
    f. 55-64
    g. 65 or older (*Excluded from study*)

(*Participant qualification question*)

5. Have you experienced an injury that permanently changed your mobility or your ability to work, socialize, or do things you enjoy?

    (Examples include spinal cord injury, injury to arms or legs, amputation of a limb, or anything else involving damage to bones, muscles, or nerves affecting movement.)
    a. Yes *(Directed to 6)*
    b. No

6. Where were you injured? Please check all that apply. (*All responses direct to 10*)
    a. On my neck, back, hips, or spinal cord.
    b. On one or both of my arms.
    c. On one or both of my legs.
    d. On one or both of my hands.
    e. On one or both of my feet.
    f. In one or both of my eyes, affecting my vision.
    g. On one or both of my ears, affecting my hearing.
    h. On my head/brain
    i. Other (please describe) (*free text*)

(*Participant qualification question*)

7. Have you been diagnosed with a chronic health condition that permanently changed your mobility or your ability to work, socialize, or do things you enjoy?

    (Examples include hypothyroidism, asthma, diabetes, Crohn's disease, chronic fatigue syndrome, HIV, or anything else involving changes in functioning not related to an injury.)
    a. Yes *(Directed to 8)*
    b. No *(If 5 and 7 are both answered "no," excluded from study)*

(*Participant qualification question*)

8. Has being diagnosed with this health condition disrupted or altered your life at any time?
    a. Yes (*Directed to 9*)
    b. No (*If 5 and 7 are both answered "no," excluded from study*)

(*Participant qualification question*)

9. What type of chronic health condition(s) do you have?
   [The conditions in parentheses are examples only.]
   Please check all that apply: (*All responses direct to 10*)
   a. A condition that **affects** my thinking (Such as stroke, brain injury, or Parkinson's Disease) (*If "a" is selected, excluded from study*)
   b. A condition affecting my heart (Such as arrhythmia, congestive heart failure, or atrial fibrillation)
   c. A condition affecting my lungs (Such as Chronic Obstructive Pulmonary Disease, emphysema, or asthma)
   d. A condition affecting my digestion (Such as Celiac disease, Crohn's disease, or diverticulitis)
   e. A condition affecting my reproductive organs (Such as endometriosis or polycystic ovarian syndrome)
   f. A condition affecting my endocrine system (Such as hypothyroidism or Cushing's disease)
   g. A condition affecting my immune system or causing inflammation (Such as lupus, gout, rheumatoid arthritis, or HIV/AIDS)
   h. A condition affecting my mental health (Such as depression, anxiety, post-traumatic stress disorder, or schizophrenia) (*If only "h" is selected and 5 is answered as "no," excluded from study*)
   i. A condition affecting my muscles or movement (Such as cerebral palsy or multiple sclerosis)
   j. A condition affecting my eyes or my vision
   k. A condition affecting my ears or my hearing
   l. A condition affecting my skin
   m. Other-please describe (*free text*)

(*Participant qualification question*)

10. Did this happen after you turned 18?
    a. Yes (*Directed to 11*)
    b. No, it happened **before** I turned 18 (*If answered for both 5 and 7, excluded from study*)

11. How did this happen? (*All responses direct to 12*)
    a. Through illness
    b. Through an act of violence
    c. Through an accident
    d. Through another person's negligence
    e. Through not taking care of my health
    f. Other (please describe) (*free text*)

12. Do you feel responsible for your injury or health condition?
    a. No.
    b. Yes.

13. How long ago did the injury or health condition happen?
    a. 0-1 years ago
    b. 2-3 years ago
    c. 4-10 years ago
    d. 11-20 years ago
    e. 21-30 years ago
    f. 30+ years ago

14. Have you ever been diagnosed with cancer?
    a. Yes
    b. No

15. Did you develop your chronic health condition after having COVID-19? (*Only if 7 is answered "yes."*)
    a. Yes
    b. No

16. Were you born with a disability?
    Here, a disability is defined as a physical condition or chronic health condition that has caused a significant change in functioning.

    (Examples include difficulty walking, seeing, hearing, or any other condition that requires accommodation or assistance.)
    a. Yes
    b. No

17. Are you currently employed?
    a. Yes, full-time
    b. Yes, part-time
    c. Yes, contractual
    d. No

18. What is the highest level of education you have completed?
    a. Less than a high school diploma
    b. High school diploma or GED
    c. Some college, no degree
    d. Associate’s degree
    e. Bachelor’s degree
    f. Master’s degree
    g. Doctoral degree
    h. Vocational/technical training certification

19. What is your total household income?
    a. Less than $20,000
    b. $20,000 to $34,999
    c. $35,000 to $49,999
    d. $50,000 to $74,999
    e. $75,000 to $99,999
    f. Over $100,000
    g. I do not wish to provide this information.

20. Are you currently receiving any financial relief from government assistance programs, such as Social Security?
    a. Yes
    b. No
    c. I do not wish to provide this information.

21. What best describes your race?
    a. White or Caucasian
    b. Black or African American
    c. American Indian or Alaska Native
    d. Asian
    e. Native Hawaiian or Other Pacific Islander
    f. Other
    g. Two or More Races

22. What best describes your ethnicity?
    a. Hispanic or Latino
    b. Not Hispanic or Latino

23. What best describes your gender?
    a. Male
    b. Female
    c. Nonbinary/Non-Gender Conforming
    d. Other

Post-Traumatic Growth Inventory

Indicate for each of the following statements the degree to which this change occurred in your life as a result of the event leading to development of your life altering injury or chronic health condition.

Rating scale: (to be added to each question)

0 – I did not experience this as a result of this event.
1 – I experienced this change to a very small degree as a result of this event.
2 – I experienced this change to a small degree as a result of this event.
3 – I experienced this change to a moderate degree as a result of this event.
4 – I experienced this change to a great degree as a result of this event.
5 – I experienced this change to a very great degree as a result of this event.

Questions:

1. I changed my priorities about what is important in life.
2. I have a greater appreciation for the value of my own life.
3. I have developed new interests.
4. I have a greater feeling of self-reliance.
5. I have a better understanding of spiritual matters.
6. I more clearly see that I can count on people in times of trouble.
7. I established a new path for my life.
8. I have a greater sense of closeness with others.
9. I am more willing to express my emotions.
10. I know that I can handle difficulties.
11. I can do better things with my life.
12. I am better able to accept the way things work out.
13. I can better appreciate each day.
14. New opportunities are available which wouldn’t have been otherwise.
15. I have more compassion for others.
16. I put more effort into my relationships.
17. I am more likely to try to change things that need changing.
18. I have stronger religious faith.
19. I discovered that I’m stronger than I thought I was.

20. I learned a great deal about how wonderful people are.
21. I better accept needing others.

Brief Resilience Scale

Respond to each statement by circling <u>one answer per row.</u>

Rating scale: (to be added to each question)

1 – Strongly disagree
2 – Disagree
3 – Neutral
4 – Agree
5 – Strongly Agree

Questions:

1. I tend to bounce back quickly after hard times.
2. I have a hard time making it through stressful events.
3. It does not take me long to recover from a stressful event.
4. It is hard for me to snap back when something bad happens.
5. I usually come through difficult times with little trouble.
6. I tend to take a long time to get over setbacks in my life.

Short-Form Survey-36

Choose one option for each questionable item.

1. In general, would you say your health is:
    a. 1 – Excellent.
    b. 2 – Very good
    c. 3 – Good
    d. 4 – Fair
    e. 5 – Poor

2. **Compared to one year ago**, how would you rate your health in general **now**?
    a. 1 – Much better now than one year ago
    b. 2 – Somewhat better now than one year ago
    c. 3 – About the same
    d. 4 – Somewhat worse now than one year ago
    e. 5 – Much worse now than one year ago

The following items are about activities you might do during a typical day. Does **your health now limit you** in these activities? If so, how much?
Rating scale (to be added to each question)

1 – Yes, limited a lot
2 – Yes, limited a little
3 – No, not limited at all

3. **Vigorous activities**, such as running, lifting heavy objects, participating in strenuous sports
4. **Moderate activities**, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf
5. Lifting or carrying groceries
6. Climbing **several** flights of stairs
7. Climbing **one** flight of stairs
8. Bending, kneeling, or stooping
9. Walking **more than a mile**
10. Walking **several blocks**
11. Walking **one block**
12. Bathing or dressing yourself

During the **past 4 weeks**, have you had any of the following problems with your work or other regular daily activities **as a result of your physical health**?

13. Cut down the **amount of time** you spent on work or other activities
    a. Yes
    b. No

14. **Accomplished less** than you would like
    a. Yes
    b. No

15. Were limited in the **kind** of work or other activities
    a. Yes
    b. No

16. Had **difficulty** performing the work or other activities (for example, it took extra effort)
    a. Yes
    b. No

During the **past 4 weeks**, have you had any of the following problems with your work or other regular daily activities **as a result of any emotional problems** (such as feeling depressed or anxious)?

17. Cut down the **amount of time** you spent on work or other activities
    a. Yes
    b. No

18. **Accomplished less** than you would like
    a. Yes
    b. No

19. Didn’t do work or other activities as **carefully** as usual
    a. Yes
    b. No

20. During the **past 4 weeks**, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?
    a. 1 – Not at all
    b. 2 – Slightly
    c. 3 – Moderately
    d. 4 – Quite a lot
    e. 5 – Extremely

21. How much **bodily** pain have you had during the **past 4 weeks**?
    a. 1 – None
    b. 2 – Very mild
    c. 3 – Mild
    d. 4 – Moderate
    e. 5 – Severe
    f. 6 – Very severe

22. During the **past 4 weeks**, how much did **pain** interfere with your normal work (including both work outside the home and housework)?
    a. 1 – Not at all
    b. 2 – A little bit
    c. 3 – Moderate
    d. 4 – Quite a bit
    e. 5 – Extremely

These questions are about how you feel and how things have been with you **during the past 4 weeks**. For each question, please give the one answer that comes closest to the way you have been feeling.

Rating options (to be added to each question)

1 – All of the time
2 – Most of the time
3 – A good bit of the time
4 – Some of the time
5 – A little of the time
6 – None of the time

How much of the time during the **past 4 weeks**…

23. Did you feel full of pep?
24. Have you been a very nervous person?
25. Have you felt so down in the dumps that nothing could cheer you up?
26. Have you felt calm and peaceful?
27. Did you have a lot of energy?
28. Have you felt downhearted and blue?
29. Did you feel worn out?
30. Have you been a happy person?
31. Did you feel tired?

32. During the **past 4 weeks**, how much of the time has **your physical health or emotional problems** interfered with your social activities (like visiting with friends, relatives, etc.)?
    a. 1 – All of the time
    b. 2 – Most of the time
    c. 3 – Some of the time
    d. 4 – A little of the time
    e. 5 – None of the time

How TRUE or FALSE is **each** of the following statements for you.

Rating options (to be added to each question):

1 – Definitely true
2 – Mostly true
3 – Don’t know
4 – Mostly false
5 – Definitely false

33. I seem to get sick a little easier than other people
34. I am as healthy as anybody I know
35. I expect my health to get worse
36. My health is excellent