

EXAMINING THE RELATIONSHIP BETWEEN ACUTE STRESS AND PSYCHOSOCIAL
FUNCTIONING THROUGH THE LENS OF THE COVID 19 PANDEMIC

By

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ABSTRACT

Can acute stress lead to improvements in psychosocial functioning? The effects of acute stress on the social environment and the subsequent impact on psychological functioning is an important area of focus that has gained recent attention in the examination of individual responses to acute stress. It has been suggested that the stimulation of positive social behaviors and perceptions following acute stress can have enduring positive effects on psychological functioning (Mancini, 2019). The current study aimed to expand this line of research by examining the longitudinal effects of the COVID-19 pandemic on social behavior and psychological functioning. I hypothesized that the *acute* phase participants, relative to *recovery* phase participants, would report higher social support, communal orientation, compassion, and gratitude. In addition, I explored whether there were differences in meaning in life and loneliness. The current study utilized a quasi-experimental cohort design to examine these hypotheses. Acute phase participants ($N = 146$) completed assessments in the Spring of 2020 during the height of the COVID 19 pandemic, and a matched comparison recovery cohort ($N = 106$) completed assessments one year later during the Spring of 2021. Independent samples t-tests revealed that participants had significantly lower negative affect during the acute phase of the pandemic compared to the recovery phase. No difference in positive affect emerged. However, the hypothesized differences between acute and recovery cohorts did not emerge in perceived social support, communal orientation, compassion, or gratitude, though absolute differences indicated the acute phase had higher mean scores on all variables ($d = -.01$ to $d = -.16$). In addition, exploratory analyses indicated the acute phase reported higher levels of meaning of life ($d = -.40$). Findings are discussed in relation to the potential for the analysis to be underpowered; the importance of a null finding of no differences between cohorts, and widespread concerns that the

early COVID-19 pandemic lockdowns would have detrimental effects on psychological and social variables.

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CHAPTER 1

INTRODUCTION

Problem Statement

Human beings have a natural inclination to connect with, rely on and tend to others (Thoits, 2011). Both the quality and quantity of one's social relationships are correlated with positive physical and psychological health (Sun et al., 2020). Positive social relationships and interactions have been found to contribute to increased happiness and well-being, whereas limited social relationships and isolation contribute to greater levels of depression and distress. Additionally, social relationships and social support can help individuals manage and cope with stressful life events. Research has found that socially isolated individuals may have greater difficulty coping with stress and adversity than those who have supportive social networks (Diener & Seligman, 2002; Smith & Christakis, 2008).

Everyone faces adversity. People we love die, illnesses plague, accidents occur, relationships end, and natural disasters ensue. These unavoidable, acute, and highly aversive isolated events are referred to as 'potentially traumatic events' (PTE), acute stress and/or adversity (Bonanno & Diminich, 2013; Galatzer-Levy et al., 2018). Unfortunately, the majority of adults will experience at least one such event throughout their lifetime (Bonanno et al., 2006; Bonanno et al., 2011).

One of the most significant stressors in recent human history began on March 11th, 2020, when the World Health Organization declared the SARS-CoV-2, or COVID 19, a world pandemic (WHO, 2020). Following this declaration, countries around the world rushed to implement guidance and restrictions to help manage the spread of the mysterious deadly disease.

Among these preventative efforts, physical restrictions, including social distancing, quarantines and stay at home orders were put into effect. As individuals around the world were faced with mass uncertainty regarding the health and safety of themselves and their loved ones, they were additionally assigned the unprecedented task of isolating from others.

The current COVID 19 pandemic is unlike anything the world has ever seen, creating a plethora of physical and emotional distress for individuals across the world. As research has found increases in prosocial behavior and social support following acutely stressful events including loss, tragedy and disaster (Batsian et al., 2014; Mancini et al., 2016; Poulin et al., 2009; von Dawans et al., 2012; 2019) the effect that COVID 19 is having on individual social psychological functioning is still unknown. It has been presumed that the distress, uncertainty, and social restrictions associated with the pandemic would have detrimental effects on individual social-psychological functioning. However, it is likely that there will be substantial variation among individuals' responses to COVID 19 distress (Mancini, 2020). Given past research identifying connections between acute stress and increased prosocial behavior, it is possible that despite physical isolation, individuals' social perceptions, behaviors and psychological functioning may have increased during the height of the pandemic.

There is a vast amount of research analyzing the effects of acute stress on individual functioning. Despite historical associations between adversity and psychopathological outcomes, recent research has found evidence of heterogeneity among individual responses to acute stress (Bonanno et al., 2011; Mancini & Bonanno, 2009; Mancini, Bonanno & Clark, 2011). That is, although adverse life experiences are commonly associated with negative psychological outcomes, empirical evidence supporting this assumption is lacking. On the contrary, recent evidence suggests that most individuals show little to no enduring psychological impairments

following a PTE, a response referred to as resilience (Bonanno, 2004; Bonanno et al., 2011). Other potential responses to acute stress identified within the literature include chronic grief, delayed grief, recovery and even improvement (Bonanno, 2004; Mancini, 2019). Given the empirical evidence supporting differential responses to adversity, recent research has gained interest in understanding the variables associated with these responses.

To understand differential responses to adversity it is essential to understand the processes that underlie these responses. Researchers have suggested that factors such as personality traits, worldviews, coping styles and pre-event emotional functioning contribute to how one will respond to adversity (Mancini & Bonanno, 2009). For example, self enhancement has been correlated with resilient outcomes and pre-event positive worldviews have been associated with adaptive coping skills (Bonanno et al., 2011). As these and other factors have been well integrated into the literature, a factor that has been previously ignored is the impact adversity has on social behavior and the social environment, and the subsequent effects on individual functioning. A more recent body of growing literature has suggested that acute stress and adverse experiences have marked effects on these social variables, contributing to how one responds to the event. Further exploration and understanding into how acute adversity stimulates social behavior can help to further understand how adversity effects individual functioning.

In times of distress, human beings come together to support one another. This notion has been documented in response to a variety of stressful life events including death, natural disaster and mass tragedy. In the aftermath of these uncertain and distressing events, individuals have been found to display increased prosocial behavior, communal orientation, and perceived social support. Friends and family members join together after a loss, neighbors gather to rebuild after disaster strikes, and nations unite when faced with tragic threat (Bastian, Jetten, & Ferris, 2014;

Bastian, Jetten, Hornsey, et al., 2014; Kaniasty, 2012; Mancini et al., 2016; von Dawans et al., 2012). Given the well validated correlations between social relationships and positive psychological health, it has been suggested that the stimulated social environment following adversity can have positive effects on a subset of individuals' psychological functioning (Mancini, 2019). The current study sought to further explore these notions by analyzing the social behaviors of individuals throughout the ongoing COVID 19 pandemic.

This study analyzed differences in social behavior throughout the COVID 19 pandemic utilizing a cohort comparison of two time periods: spring 2020 (acute stress phase) and spring 2021 (recovery phase). It was hypothesized that higher levels of COVID 19 stress, defined by time, would be associated with higher levels of perceived social support, communal orientation, compassion, and gratitude. Furthermore, the study sought to examine the relationship between COVID 19 distress and psychological functioning. It was hypothesized that social behaviors and perceptions would mediate the relationship between distress and psychological functioning.

Literature Review

Social Relationships and Psychological Functioning

Human beings' innate need to form and maintain social relationships is well established in the psychological literature. Numerous aspects of social relationships have been positively correlated with physical and psychological health. Social support, social connection and quality and quantity of social interactions have been linked to various health outcomes including decreased mortality and disease, decreased depression, increased happiness and greater wellbeing (Baumeister & Leary, 1995; Diener & Seligman, 2002; House et al., 1988; Lakey & Orehek, 2011; Thoits, 2011; Umberson & Montez, 2010; Vinokur et al., 1987).

Belongingness Theory (Baumeister and Leary, 1995), identifies the need to belong as a fundamental human motivation. Within this theory, belongingness is defined as “a need to form and maintain at least a minimum quantity of interpersonal relationships” (p. 499). The belongingness theory posits that the formation of bonds is necessary and relatively easy, even under adverse or highly stressful circumstances. According to belongingness theory, two main features are embedded within the need to belong: individuals need frequent personal interactions with others, and individuals need to perceive that the interpersonal relationship is reciprocal and stable. The theory supports the association between social bonds and psychological wellbeing, stating that the formation of social bonds is associated with happiness and positive affect whereas the absence of social bonds is directly correlated to negative emotion including unhappiness, depression, anxiety, jealousy, and guilt (Baumeister & Leary, 1995).

In his comprehensive study on suicide, Emile Durkheim (1966) provided the first major empirical study to support the connection between social relationships and health. The findings of this study indicated that individuals who were less socially integrated and more socially isolated were more likely to commit suicide (Durkheim, 1966). Subsequent epidemiological studies further explored the correlation between social relationships and health, establishing causal relationships between unmarried and socially isolated individuals and increased rates of mortality, chronic illness and psychiatric disorders (House et al., 1988).

In addition to establishing the positive associations between social relationships and health, it is important to understand the various social aspects underlying these connections. Thoits (2011) described seven possible mechanisms by which social support and social relationships contribute to positive health and well-being: social influence and comparison; social control; behavioral guidance, purpose and meaning; self-esteem; sense of control,

belonging and companionship; and perceived social support. Each of these mechanisms offers understanding as to how one's quality and quantity of social functioning contribute to positive health outcomes.

Social influence refers to the tendency of individuals to assess the appropriateness of their own behaviors and attitudes through comparison with similar others, usually adapting to match the larger group. Behaviors concerning physical and emotional health are established through this process of social comparison. Individuals who see others in a larger comparison group engaging in healthy behaviors such as exercise and preventative care are likely to engage in those behaviors. Social control refers to overt attempts to monitor and encourage positive health behaviors of others within a social group. In the literature, social influence and social control are largely ignored as a mechanism through which social behaviors influence psychological health. However it is likely that individuals will adapt to the positive health behaviors modeled or encouraged by others, leading to positive health outcomes (Thoits, 2011).

Furthermore, Thoits suggests that 'mattering' (belief that one is important to another person(s), or fulfills one's specific needs) provides a sense of purpose and meaning in life, which contributes to increased mental health and well-being. The term belongingness refers to acceptance and inclusion within a social group. This sense of acceptance leads to a greater sense of companionship, which produces positive affect and psychological well-being. Self-esteem is referred to as one's self-evaluations in valued roles. One who views themselves as important in the eyes of close others tend to have higher levels of global self-esteem, which contributes to positive mental health. Finally, Thoits indicates that the receipt or perceived receipt of emotional support is directly related to positive physical health and psychological well-being, especially in times of increased stress (Thoits, 2011).

Social Interaction

Empirical evidence has established a positive relationship between social interaction and facets of psychological wellbeing indicating that happier individuals spend more time interacting with others (Sun et al., 2020). Watson (1988) explored the relationship between social interaction and positive affect and found that individuals with higher levels of daily and weekly socialization had higher levels of positive affect. Similarly, when examining mood and behaviors daily for ninety consecutive days, Clark and Watson (1988) found that positive affect was higher on days with higher social activity. Furthermore, past research has found main effects between low perceived social support and major depression, as well as high perceived social support and happiness. (Lakey & Orehek, 2011). To explain these main effects, Lakey and Orecheck, (2011) developed the Relational Regulation Theory, which suggests that the relationship between perceived social support and mental health is rooted in social interaction. The theory defines relational regulation as “desired affect, action, or thought that results from interacting with or thinking about specific other people” (Lakey & Orehek, 2011 p.485).

According to Relational Regulation Theory individuals benefit from ordinary, every day interactions and conversations with others. That is, relating to members of one’s social support system through shared activities and commonalities leads to increased ability to regulate affect, thought and action, leading to positive psychological outcomes. This theory further suggests that mutual interaction between provider and recipient, and the availability of various relationships facilitates improved psychological health. Woods et al. (2016) conducted three studies to examine whether ordinary social interaction can explain the relationship between perceived social support and affect. In studies one and two, participants completed measures of affect and levels of interaction, perceived social support, ordinary conversation, and shared activity with

close others (mothers, fathers and best friends). Results of both studies found that within these relationships, perceived support, ordinary conversation and shared activity were strongly linked to positive affect. To strengthen these findings, study three examined whether these effects would remain significant between strangers. After completing similar measures to studies one and two, participants were assigned to engage in video game play with strangers. Analyses showed significant main effects between perceived social support and affect, indicating that the shared activity was sufficient to produce the effect between social support and affect (Woods et al., 2016).

Sun et al. (2016) utilized both observer based (Electronically Activated Recorder) and self-report measures to examine the relationship between quantity and quality of social interactions and well-being. Analyses of both observer-rated interactions and self-report measures indicated a correlation between social connection and happiness. Overall, individuals who had greater amounts of social interaction throughout the day had higher levels of happiness and social connectedness. Moment to moment analyses found that individuals felt happier and more socially connected when they interacted with others in the previous hour than when they did not. Additionally, conversational depth (deeper conversations that included self-disclosure) and relationship context (knowing and/or liking their interaction partner) were associated increased levels of happiness and social connectedness.

Much of the research on social interaction and psychological outcomes consists of individuals interacting with members within their social network, referred to as 'strong social ties'. Sandstrom and Dunn (2014) examined whether social interactions with peripheral members of individuals' social network, or 'weak ties' would also lead to positive psychological outcomes. To do this, college students were asked to keep track of their daily social interactions

for three days at two different time periods during a semester, specifying whether the interactions were with ‘weak’ or ‘strong’ ties. On these days, participants also completed measures of affect and subjective happiness to assess subjective well-being. Between subject results indicated that participants who interacted with more ‘weak ties’ than others reported higher average subjective well-being. Additionally, within subject analyses indicated that on the amount of daily ‘weak tie’ interactions was associated with greater subjective well-being.

Social Support

Social support is a factor of social behavior and relationships associated with a wide variety of positive psychological outcomes. Social support is defined as the emotionally sustaining qualities of relationships such as love, care, and compassion (Thoits, 2011; Umberson & Montez, 2010). Various studies have established connections between social support and wellbeing, however there are differences in the mechanisms that underlie these connections. Research supports two hypotheses of causal relationships between social support and wellbeing: The buffering effects hypothesis and the main effects hypothesis. The buffering hypothesis proposes that social support is related to wellbeing primarily when individuals are faced with significant life stressors. The effects of stress on social support may enhance individual feelings of positive emotions through the reduction of the stressor, an increased sense of ability to manage the stressor and increased sense of meaning and purpose in life (Cohen & Wills, 1985; Flannery & Wieman, 1989; Thoits, 2011; Umberson & Montez, 2010; Vinokur et al., 1987). Conversely, the main effects hypothesis posits that social support has a positive effect on wellbeing regardless of whether stress is present or not. The main effect of social support elicits increased sense of wellbeing due to stable environments, group acceptance, and reciprocal aid (Cohen & Willis, 1985, Flannery & Wieman, 1989). Whether via stress buffering or main

effects, the evidence supporting the positive effects of social support on human health and wellbeing persists throughout the literature.

When considering social support, it is important to distinguish between received and perceived social support. Received social support is the actual or measurable helping behaviors that are provided, whereas perceived social support refers to the belief that such helping behaviors would be available if needed (Norris & Kaniasty, 1996). Comparatively, the psychological literature has found perceived social support to be a stronger indicator of emotional well-being. For example, research has found main effects between low perceived social support and major depression, as well as high perceived social support and happiness. (Lakey & Orechek, 2011). To investigate patterns among ‘very happy’ people, Diener & Seligman (2002) compared participants who met the criteria of being ‘very happy’ to participants with average and low levels of happiness. Results found that interpersonal relationships were significantly related to happiness levels. Participants in the ‘very happy’ group reported good quality social relationships and were found to spend the least amount of time alone, and the most amount of time with other people (Diener & Seligman, 2002).

To explore the relationship between social connection and major depression, Werner-Seidler et al. (2017) surveyed a large representative sample of 8,841 participants. Looking at both emotional and instrumental support, the study analyzed the relationship between social interactions and 12-month prevalence of major depressive disorder. Results indicated that having no family to confide in or rely on was associated with increased levels of depression in the past year, while having three or more family members to confide in or rely on was associated with decreased odds of major depression in the past year. Furthermore, lower frequency of contact within friendship networks was associated with higher odds of major depressive disorder in the

past year. Having no friends to rely on or confide in significantly increased these odds (Werner-Seidler et al., 2017). Similarly, when examining the relationship between perceived social support and the mental health among incarcerated men, Valera and Boyas (2019) found that former inmates who reported higher levels of perceived social and community support displayed lower mental health symptomatology.

Communal Orientation

Communal orientation refers to an individual's dispositional inclination to be sensitive to the needs of and give care to others. The term individual communal orientation developed from research about the differentiation between communal and exchange relationships. Whereas exchange relationships are defined by reciprocal interactions between individuals in which both parties' benefit, communal relationships are exemplified by an individual's desire and/or obligation to meet the needs of and demonstrate concern for another's welfare (Clark et al., 1987; Le et al., 2013). A key distinction between communal and exchange relationships is the lack of expectation to receive anything in return for giving help to others within the former. Despite the lack of a desired exchange, research has found that there are consequential intrinsic benefits of giving help to others, such as positive emotion and relationship satisfaction (Clark et al., 1987; Kogan et al., 2010; Le et al., 2013).

Le et al. (2013) utilized a daily diary design to examine the relationship between communal orientation, personal rewards, and positive emotion. As hypothesized, the results indicated that individuals high in communal orientation experienced greater personal rewards defined by a greater sense of self-worth, greater feelings of love and satisfaction in close relationships and a greater sense of love for humanity. They further found that communal orientation was associated with higher levels of positive emotion, and that this positive emotion

mediated the relationships between communal orientation and personal rewards. To investigate the effects of communal orientation on happiness, Dunn et al. (2008) studied the ways in which participants spent their money. Results indicated that prosocial spending, such as buying gifts for others or donating to charity, was correlated with greater levels of happiness compared to personal spending, such as purchasing gifts for the self or bills. Strengthening these findings, Dunn et al. (2014) experimentally manipulated spending by assigning participants to spend five to twenty dollars on themselves (a bill, expense, or personal gift) or others (a gift for someone else or a charitable donation). Between subject analyses revealed that spending direction (personal vs. prosocial) had a significant effect on happiness. Participants who were assigned to spend the money on others had significantly higher levels of post spending happiness than participants who were assigned to spend money on themselves (Dunn et al., 2014).

Utilizing a more naturalistic setting, Raposa et al. (2016) utilized a daily diary method to examine whether the effects of prosocial behavior buffers the negative impact of daily stressors. Participants in this study completed daily measures of mood, stress and prosocial behavior. Findings indicated a significant relationship between prosocial behavior and positive affect as well as mental health. Furthermore, prosocial behavior moderated the effects between stress and affect. That is, individuals who had higher prosocial behavior were less likely to experience negative affect in response to stress.

To examine the effects of communal orientation and sacrifice in romantic relationships on positive emotion, Kogan et al. (2010) found that the higher one was in communal orientation, the more likely they were to experience positive emotions when making sacrifices for their partner. Furthermore, higher levels of communal orientation were associated with greater relationship satisfaction, specifically on days in which sacrifices were made.

Compassion

Within the psychological literature, compassion is conceptualized as an affective state defined by a specific subjective feeling that arises in response to witnessing another's suffering. Being that compassion is a facet of perceived social support and an other-focused emotion (Thoits, 2011) it is sensible to incorporate compassion into the examination of social relationships. The feeling of compassion, distinct from associated emotional states such as empathy, sympathy and love, antecedes altruistic behavior (Gilbert, 2015; Goetz et al., 2010; Weng et al., 2015). While empathy is the vicarious experience of another's suffering or pain and sympathy is the feeling of sadness for another, compassion is the feeling of personal emotional distress in response to another's suffering, and the subsequent desire to alleviate that suffering through action (Gilbert, 2015; Goetz et al., 2010). Compassion, often viewed from an evolutionary perspective, is considered a positive emotional state associated with caring for offspring, attracting mates and forming and maintaining cooperative relationships with nonkin (Condon & Feldman Barrett, 2013; Ekman, 2010; Goetz et al., 2010). Recent research has revealed that feeling compassion for others (as well as the self) can have positive effects on an individual's psychological functioning, physical health and social relationships (Gilbert, 2015).

Recognized as a positive emotion, compassion has been found to contribute to positive health benefits and life experiences including friendship development, higher incomes, marital satisfaction and even longer life (Frederickson et al., 2008; Post, 2005). Frederickson (1998) posits that positive emotions broaden individuals' outlooks of situations, leading to consequential long-term personal gains. As individuals experience increased positive emotions, they experience personal growth that allows for increased personal benefits. To explore the effects of compassion on helping behaviors, Weng et al. (2015) conducted a game paradigm study in which a short-

term compassion training program preceeded participants engagement in a behavioral economic game. Results indicated that participants who received the training, compared to those who did not, were more likely to offer help to the ‘victim’ within the game (Weng et al., 2015).

In a longitudinal study of college roommates, Canavello and Cocker (2011) examined the differences between self and compassionate goals on interpersonal relationships and self esteem. This study found that participants who had higher self image goals were less responsive to their roommate, leading the roommate to have lower regard for the participant. Participants with compassionate goals were more responsive to their roommate, leading the roommate to have higher regard for the participant. Therefore, participants who’s goals were more compassionately oriented had more positive relations with their roommates as the roommates had higher regard for them. On an individual level, compassionate goals were directly related to higher levels of self-esteem, and on weeks when participants reported higher levels of compassionate goals, they also reported higher levels of self esteem (Canavello & Cocker, 2011). To examine the effects of compassion on physical health, Ironson et al. (2018) conducted a longitudinal study of HIV positive participants comparing participants’ levels of compassion giving, compassion receiving and self compassion to survival status. Findings indicated that compassionate love giving, as well as self compassion, predicted increased survival rates (Ironson et al., 2018)

Gratitude

Gratitude is a positive emotion characterized by one’s appraisal that another has intentionally engaged in behavior(s) to benefit the recipient (Algoe & Algoe et al., 2008; Algoe & Haidt, 2009; Algoe et al., 2020). Gratitude has been found to contribute to increased social functioning on both individual and dyadic levels (Algoe et al., 2020). The find-remind-and-bind theory (Algoe & Stanton, 2012) suggests that gratitude promotes high quality social relationships

via the identification of, and binding to high quality relational partners. The recipient of the gracious act experiences thoughts of the positive qualities of the benefactor, leading to feelings and expressions of gratitude. In turn, expression of gratitude from the recipient elicits positive emotions of support and acknowledgement within the benefactor. (Algoe, 2012, Algoe et al., 2020). Additionally, it has been suggested that the exchange of gratitude can have positive effects on a third party witness. That is, witnessing the bidirectional exchange of beneficial behaviors and the subsequent expression of gratitude will enhance positive emotion and desire to engage in prosocial behavior within the witness (Algoe et al., 2020).

Characterization as a positive and other focused emotion, as well as its connection to social relations has prompted research to examine the relationship between gratitude and psychological health and wellbeing. In a meta analysis of 158 independent samples, Portocarrero et al. (2020) found significant relationships between gratitude and several indicators of psychological well-being including happiness and life satisfaction (Portocarrero et al., 2020). Furthermore, gratitude has been found to be associated with lower levels of mental health problems including depression, anxiety, substance use and posttraumatic stress disorder (Wood et al., 2010). In an examination of the relationship between gratitude and positive affect and well-being, McCullough et al. (2002) found significant positive relationships between self and informant reports of participant gratitude and a variety of positive outcomes including positive affect, prosociality and life satisfaction (McCullough et al., 2002). Utilizing a weekly diary paradigm, Emmons and McCullough (2003) examined the relationship between gratitude and well-being compared to hassles and life events. At the beginning of a semester, undergraduate students were assigned one of the three conditions (gratitude, hassles, life events) and given weekly packets that included the condition prompt as well as measures of well-being including

mood, reactions to aid and physical symptoms. Results indicated that participants in the gratitude group rated their lives more favorably and experienced fewer symptoms of physical illness and increased hours of exercise compared to the hassles and life events groups. Additionally, gratitude was associated with higher levels of optimism for the upcoming week (Emmons & McCullough, 2003).

Meaning in Life and Loneliness

Meaning in life has been conceptualized in a variety of ways throughout the psychological literature however recently has been viewed as subsuming three different dimensions; comprehension, purpose and mattering. According to this view, meaning in life is defined by the extent to which a person's life can be understood, guided by valuable goals, and considered important to the world (George & Park, 2016). There has been empirical evidence linking meaning in life to social relationships and psychological wellbeing. For example, Thoits (2011), as previously discussed, defined 'mattering' as a 'belief that one is important to another person(s), or fulfills one's specific needs', suggesting this dimension of meaning in life as having a social foundation. Additional research has supported the connection between a sense of belonging and meaning in life (Lambert et al, 2013) as well as meaning in life and subjective wellbeing (Krok, 2018).

Loneliness is a subjective distress that one's desired quality and/or quantity of social relationships is unfulfilled. While social relationships and social support have been correlated with increased positive health, research indicates that loneliness is associated with a variety of mental and physical health problems such as increased rates of depression and anxiety, cardiovascular disease, sleep problems and obesity (Macià et al., 2021). Additionally, research

has found connections between loneliness and lower levels of well-being, meaning, and purpose in life (Macià et al., 2021; Shankar et al., 2015; Stillman et al., 2009).

Social Responses to Acute Stress

Much of the early research on potentially traumatic events (PTE) and acute stress has focused on either a psychopathological or event approach. The psychopathological approach focuses on individual pathology as a result of PTE, namely post-traumatic stress disorder, depressive disorder and complicated grief. The event approach focuses on comparing exposed individuals to non-exposed individuals to analyze posttraumatic impacts of the event (Bonanno et al., 2011). Despite these approaches having well-established support, they focus exclusively on conceptualized diagnostic criteria, failing to account for individuals who do not meet diagnostic criteria of psychopathology following PTE (Bonanno et al., 2011; Galatzer-Levy et al., 2018). Recent research has begun to address the limitations of this binary approach, identifying that individual reactions to trauma are in fact widely variable.

Recent research utilizing latent growth mixture modeling suggests an ‘individual-differences’ model, supporting heterogeneity among individual responses to trauma (Bonanno et al., 2010; 2011; Mancini & Bonanno, 2009; Mancini, 2011). Four trajectories have been identified as prototypical responses to trauma; chronic, delayed, recovery and resilience (Bonanno et al., 2010; Galatzer-Levy et al., 2018; Mancini, 2011). Chronic distress refers to the onset of pathological symptoms and impairment in functioning in the wake of the PTE, persisting for years following the PTE. Delayed distress is defined by a gradual onset of symptomology following the PTE and worsening over time. Recovery is characterized by an onset of pathological symptoms triggered by the event, followed by a gradual return to baseline functioning. Resilience has been identified as the most common PTE response trajectory, and is

characterized by little to no changes in symptoms and/or functioning (Galatzer-Levy et al., 2018).

A possible response to acute stress that is largely ignored in the literature is the notion that some individuals experience *improvements* in psychological functioning following exposure to a potentially traumatic event. Termed Psychosocial Gains from Adversity (PGA), Mancini (2019) defines this improvement outcome as “favorable and reliable change on an index of psychological functioning from before to after exposure to adversity” (Mancini, 2019). Given that traumatic events and acute stress are often associated with immediate distress and varying reactions to such distress, it makes sense that the idea that one can experience immediate improvements has been largely ignored. However, recent empirical evidence indicates that a subset of people do in fact experience reliable and at times enduring improvements in psychological functioning following adversity (Mancini, 2019).

It is important to distinguish psychosocial gains from adversity from other responses to adversity such as resilience and post traumatic growth (PTG). Resilient individuals experience little to no change in psychological functioning following exposure to a potentially traumatic event. These individuals exhibit a relatively stable trajectory of psychological functioning, often experiencing brief distress/disruptions in functioning, followed by a return to baseline functioning (Bonanno, 2004; Mancini 2019). On the contrary, PGA suggests that some individuals experience immediate positive changes in functioning following exposure to a PTE. Additionally, PGA is considerably different from the ideas of post traumatic growth. Whereas PTG emphasizes internal-psychological processes leading to growth over time, PGA argues that social-contextual changes following adversity lead to improvements in functioning soon after the event (Mancini, 2019).

In a pre-post examination of individuals exposed to the Virginia Tech campus shooting, data collected pre-event and two, six and twelve-months post event, showed 13.2% of participants experienced marked improvements in anxiety symptoms, and 7.4% of participants experienced a marked improvement in depressive symptoms from pre to post shooting. (Mancini, 2016). Additionally, in a prospective study examining bereaved individuals at pre loss and 6 and 18 months post lost, Bonanno et al. (2002) found that 10.2% of respondents exhibited an improvement in depressive symptoms following the loss. Similarly, when examining differential response trajectories in divorced and bereaved individuals, a small subset of participants in each category with low subjective wellbeing pre-event displayed sharp increases in subjective wellbeing post-divorce (9.1% divorce, 5.4% bereavement; Mancini, 2011). Considering this empirical evidence, it is likely that although the acute stress associated with the COVID 19 pandemic has thus far been associated with negative psychological and social functioning (Best et al., 2020), there most likely will be differences in how individuals respond to the crisis. While some may experience increases in psychological distress, others may experience little to no alterations in functioning, and possibly even experience beneficial gains (Mancini, 2020).

When considering how one responds to acute stress, it is essential not only to look at outcomes in functioning but to also understand the mechanisms underlying these outcomes. Throughout the literature, facets of social support have been recognized as contributing factors to various response trajectories of acute stress including resilience, growth and improvement. Numerous studies and theories support the notion that adverse situations and acute stress stimulate positive social interactions and behaviors (Bonanno et al., 2010).

Social Support and Acute Stress

During the immediate aftermath of an acute stressor, individuals often see increases in both perceived and received social support, which in turn can have positive effects on their ability to cope with the stressor. It has been well documented that disaster and adversity elicit an abundance of social support and community assistance in the immediate aftermath of the event. This immediate mobilization of helping behavior has been referred to as “democracy of distress”, “postdisaster utopia”, “stage of euphoria”, “altruistic community”, and “heroic and honeymoon phases” (Bonanno et al., 2010).

Individual adversity, such as loss and bereavement, has been found to stimulate support from close family and friends (Didion, 2007 as cited by Mancini, 2019). Likewise, large scale trauma has shown to increase social support on both individual and community levels (Buhrmester et al., 2015; Kaniasty & Norris, 1993; 1995; Norris et al., 2005; Mancini, 2019). The increased social support following disaster is referred to as a mobilization of social support (Kaniasty, 2012). In a meta-analysis of 68 empirical studies examining predictors of PTSD following disaster, Ozer et al. (2003) found a significant negative relationship between post event perceived social support and PTSD levels. Individuals across studies who reported lower levels of perceived social support following the event reported higher levels of PTSD. This finding was strengthened by the amount time elapsed between the event and the assessment of PTSD. Studies in which three or more years had passed between the traumatic event and the assessment of PTSD showed the highest levels of PTSD, compared to studies with less amount of time passed (six months to three years, and one to six months) (Ozer et al., 2003).

In the wake of the September 11th terrorist attacks, Morgan et al. (2011) found that Americans drew closer to friends and loved ones as well as to fellow citizens. Sixty percent of

individuals reported increased positivity in personal relationships one month following the attacks, and forty percent reported increased desire to do nice things for friends and family (Morgan et al., 2011; Skitka et al., 2004). In a longitudinal analysis of individuals' perceptions of social benefits following the September 11th terrorist attacks, Poulin et al. (2009) found that 57.8% of the sample surveyed two months following the event reported perceived societal benefits, and 15.8% reported perceived prosocial benefits.

Mancini et al. (2016) utilized a pre post longitudinal design to assess change in victims social support, interpersonal resources, and psychological functioning before and after the Virginia Tech campus shooting. Latent growth mixture modeling showed that a subset of victims displayed improvements in anxiety and depression 12 months following the shooting. Further analyses of the role of social support and interpersonal gains on these improvements indicated that the improvement groups showed significant increases in social support and interpersonal gains over time. A number of victims experienced substantial and enduring increases in perceived social support and gains in social resources following the shooting, which contributed to improved psychological functioning (Mancini et al., 2016).

Another study examined the effects of hurricane exposure on social perceptions and behaviors (Mancini, et al., 2021). Participants were assessed before and after exposure to Hurricane Sandy. This hurricane cohort was compared to two subsequent cohorts who did not experience Hurricane exposure over the course of the assessments. Findings indicated that individuals in the hurricane exposure cohort saw increases in social support and decreases in attachment avoidance over the course of the assessments. These increases were not detected in the non-exposure cohorts (Mancini et al., 2021).

Communal Orientation and Acute Stress

One of the major theoretical models explaining how adversity stimulates positive social and affiliative behavior is the tend and befriend model (Taylor, 2000). In an exploration of how human beings respond to stress, Taylor (2000) suggested an alternative response to the well accepted ‘fight or flight’ response; A biologically regulated affiliative response. Whereas previous literature on biological responses to stress focused solely on males, this model was developed from female stress responses. Given the natural investment in and protection of offspring, females are innately more connected to other human beings. Therefore, females are more apt to affiliate and establish bonds with others. When faced with threat, females are more likely to ‘tend’ to their offspring and ‘befriend’ (affiliate with) others in order to maximize resources and protection (Taylor, 2000; 2006).

In line with the tend and befriend model, experimental research has found that acute stress can have beneficial effects on prosocial behavior in both males and females. Von Dawans et al. (2012) experimentally manipulated psychosocial stress, and analyzed participants subsequent biological and behavioral responses. Biological stress levels were measured via cortisol levels, and behavioral responses were measured through socially interactive, decision making paradigms. Results indicated that individuals who had higher stress levels exhibited higher levels of trust, trustworthiness and sharing behaviors, supporting the hypothesis that human beings have an innate tendency to support one another in times of stress (von Dawans, et al., 2012). Similar results were found among women. In a replication study, von Dawans et al. (2019) utilized the same stress manipulation and decision making paradigms among a group of 120 healthy females. Again, findings revealed that stress significantly increased women’s rates of trustworthiness and sharing.

Bastian, Jetten, and Ferris (2014) experimentally tested the effects of physical pain on bonding behaviors. They utilized cold pressor tasks (submerging a hand in ice water vs room temperature water) to experimentally induce physical pain. Participants then completed questionnaires regarding feelings toward fellow participants in their group. A one way analysis of variance indicated that participants who experienced physical pain reported higher levels of bonding than participants who did not experience pain, indicating that shared pain promoted positive social behaviors (Bastian, Jetten, & Ferris, 2014). In a follow up study, these researchers replicated the same pain induction to see if results would extend to cooperative behavior (Bastian, Jetten, & Ferris, 2014). They utilized an economic game paradigm in order to measure levels of cooperation with other participants. Once again, results were significant; participants in the pain condition showed higher levels of cooperative behaviors than those in the control condition (Bastian, Jetten, & Ferris, 2014).

Like social support, large scale trauma has been found to influence affiliative behaviors. Studies examining the effects of disaster and mass tragedy on prosocial behaviors and communal orientation have indicated that human beings automatically affiliate in the wake of adversity (Buhrmester et al., 2015; Kaniasty & Norris, 1993; 1995; Norris et al., 2005; Mancini, 2019). For example, Morgan et al. (2011) found that following the September 11th terrorist attacks, Americans displayed an increased willingness to engage in prosocial community behaviors such as donating blood, volunteering and likelihood to display the American flag (Morgan et al., 2011).

Compassion and Acute Stress

Given that compassion is defined as the experience of emotional distress in response to witnessing another's suffering, and a subsequent desire to relieve that suffering, it is sensible that

adversity would stimulate compassion. Jamil Jaki (2020) refers to the emotional identification, connection and empathy elicited in response to experiencing and witnessing another's suffering as 'catastrophe compassion'. These compassionate responses following negative circumstances stimulate positive social behaviors. To explore this notion, Lim and DeStano (2016) examined the relationship between past adverse experiences, compassion, and prosocial behavior. Initial analyses indicated that severity of one's past adverse experiences was a predictor of dispositional compassion. Furthermore, increased levels of compassion were associated with increased tendency for prosocial behavior (donating to the Red Cross).

To strengthen these findings, a laboratory replication design was utilized in which participants were exposed to a subject in distress (confidant assigned to complete a set of tasks while feeling ill). Results indicated that increased severity of adverse experiences predicted enhanced dispositional and state compassion. Subsequently, increased levels of state compassion predicted increased prosocial behavior, as those with higher levels of compassion spent greater time helping the individual in need (Lim & DeStano, 2016).

In further exploration of the effects of adversity on compassion as well as the deleterious effects of compassion on the numeracy bias (the idea that compassion collapses in response to a greater number of sufferers), Lim and DeStano (2020) utilized an alternative laboratory paradigm in which participants were exposed to either one or eight suffering children, subsequently completing assessments measuring compassionate feelings towards the children and life adversity. Results were significant, showing that the severity of past adversity not only predicted increased levels of compassion towards the children but also protected against the numeracy bias. Whereas participants with lower levels of past adversity experienced the typical failure of compassion levels that increase with the number of those suffering, compassion levels

of participants with higher levels of adversity increased significantly with the number of victims (Lim & DeStano, 2020).

Gratitude and Acute Stress

Research indicates that acutely stressful events may elicit increased feelings and expressions of gratitude, and pre-event gratitude levels can help to alleviate the negative effects of acute stress (Taylor et al., 2021; Vieselmeyer et al., 2017). Vieselmeyer et al. (2017) examined the relationship between trauma exposure, post-traumatic stress and gratitude and resilience among students and faculty exposed to the Seattle Pacific University shooting. Results indicated that participants with higher levels of post shooting gratitude had lower levels of post-traumatic stress and higher levels of post traumatic growth, suggesting that gratitude may act as a protective mechanism following trauma. Furthermore, Vernon (2012) examined the relationship between exposure to traumatic events, proactive coping, gratitude, and negative psychological outcomes. Participants completed the Life Events Checklist along with measures of post-traumatic stress disorder, depression and anxious arousal. Results indicated that PTSD symptoms were negatively associated with post trauma levels of gratitude. Finally, in a longitudinal analysis of life stress and gratitude on mental health of single mothers prior to (time one, T1) and during the COVID-19 pandemic (time two, T2), Taylor et al. (2020) found that although all mothers displayed increased stress levels at time T2, participants with higher levels of gratitude at T1 displayed lower levels of depression and anxiety at T2 (Taylor et al., 2021).

SARS-CoV-2

On March 11th 2020, the World Health Organization declared the novel coronavirus SARS-Cov-2 (referred to as COVID19 throughout this document) a world Pandemic (World Health Organization, 2020). This novel virus, that was first recognized in Wuhan, China in

December 2019, and first identified in the United States in January 2020, has affected nearly every country in the world, and has wreaked physical and emotional havoc on hundreds of millions of individuals. In March of 2020, states across the United States began to impose lockdowns and stay at home orders, contributing to increased fear, isolation and job loss. The novelty of the virus and associated attempts to manage it created unprecedented challenges in nearly all aspects of life, leaving individuals across the world with numerous unanswered questions. To name a few, impacts of the pandemic include personal loss and bereavement, physical illness/complications, loss of employment/financial difficulties, and forced distance from loved ones (Best et al., 2020; Polozzo et al., 2020). While government officials and medical professionals attempt to understand and manage the virus, psychological researchers and practitioners attempt to understand the impacts of the virus on psychological health and well-being.

Social Responses to COVID 19

Aside from experimentally manipulated designs, a majority of the research examining the effects of acute stress on psychosocial functioning focuses on natural disasters and mass tragedy. Although illness and disease often elicit acute stress, the effects of such stressors are typically not widespread and therefore not well examined. However, when the transmission of a disease becomes simultaneous and worldwide, so to do the effects, leading to acutely stressful circumstances around the world. Over the past two decades, the world has seen an increase in the emergence and re-emergence of a variety of novel diseases including Severe Acute Respiratory Syndrome (SARS) in 2003, H1N1 in 2009 and Ebola in 2014 (Lau et al., 2005; O'Neil & Naumova, 2007; Pruyt et al., 2015; World Health Organization). Despite the negative

consequences of such events, they have given researchers the opportunity to further explore the effects of acute stress on social psychological functioning through an alternate lens.

Like research on disaster and tragedy, research on past pandemics has established a relatively stable response trajectory among effected individuals, and a stimulation of positive social interactions and behaviors in response to the increased stress. For example, in examining the effects of the SARs pandemic on subjective wellbeing, Lau et al., (2008) found that as participants' overall levels of subjective wellbeing remained remarkably stable and their satisfaction with community connectedness increased. Furthermore, Bonano et al. (2008) found that the response trajectories of hospitalized SARs patients closely resembled trajectories observed in Western trauma studies (delayed, chronic, recovery and resilience). Findings also indicated that the recovered and resilient groups had greater levels of social support than the chronic and delayed groups (Bonano et al., 2008). Similarly, when examining potential positive mental health effects of the SARs pandemic, Lau et al. (2006) found that participants reported an increased sense of social support from family and friends as well as an increased sense of caring for family.

Since the declaration of a world pandemic on March 11th, 2020, there have been a plethora of measures put into place to better understand and manage the spread of COVID 19. As scientists learned more about the management and prevention of the disease, these measures, including complete shutdowns of nations and states as well as mask mandates and quarantine protocols, have waned (Centers for Disease Control; World Health Organization). As the uncertainty, risk and associated measures began to decrease, so too has the associated stress. There is no doubt that the COVID 19 pandemic has and will continue to have a variety of

psychological effects on individuals across the world. However, these effects are still unknown, and it is likely that such effects will vary considerably from person to person (Mancini, 2020).

Research thus far has largely associated the pandemic and related lockdown measures with psychological distress. In an examination of the effects of pandemic related distress and isolation measures during the initial stages of the pandemic (March 31, 2020 – April 15, 2020) Best et al. (2020) found that participants saw significant increases in psychological distress including increased worry, panic, and depression. Similarly, a two wave (w1 = initial stage, w2 = under control) examination of college students throughout the pandemic in China found increases in acute stress, anxiety, and depressive symptoms during the initial stage of outbreak which persisted into the second wave and thereafter for some students (Li et al., 2021).

Furthermore, in a three-wave representative cohort comparison in the United States beginning March 18th, 2020, and spanning 30 consecutive days, Holoman et al. (2020) found increases in acute stress and depressive symptoms over time. Levels of acute stress and depressive symptoms were significantly progressively higher in wave three (April 8th – April 18th, 2020) compared to waves one (March 18th – March 28th, 2020) and two (March 29th – April 7th, 2020).

Despite initial research indicating the negative psychological consequences of the COVID 19 pandemic, there have also been studies identifying resilience and affiliative behaviors in response to the pandemic. For example, Park et al. (2021) surveyed participant levels of distress, coping styles, social support, and wellbeing at three timepoints during the pandemic (April 8 – 25, 2020; May 15 – 29, 2020 and June 30 - July 14, 2020). Results of various analyses indicated that overall, participants displayed average levels of depression, anxiety, and stress symptoms at time three. Notably, these levels were lower than levels typically reported by trauma exposed samples.

Compared to a pre lockdown group, Sibley et al. (2020) found post lockdown participants to have increased rates of patriotism, higher levels of satisfaction with the government and higher levels of trust in institutions. Fino et al. (2020) found increases in affiliative responses among healthcare workers in Italy during the heightened stage of the pandemic. Specifically, there were significant increases in willingness to help patients connect to loved ones via virtual communications, despite increased time and cost associated with these communications.

Research has also begun to explore social connection and support in light of the pandemic. Numerous studies have identified the potential effects of perceived and received social support on resilience and psychological distress during the pandemic (Elchereth et al., 2020; Saltzman, Hansel & Bordnick, 2020). For example, Nitschke et al. (2021) found a significant negative relationship between social connectedness and perceived stress, COVID 19 worry, and general worry among a sample of Austrian citizens. Despite initial findings, more research is needed to address the effects of COVID 19 stress on social behaviors, psychological functioning, and the possible interaction between these variables.

Positive and Negative Affect as Measures of Social Psychological Functioning

Positive affect and negative affect are two independent factors comprising the dominant dimensions of emotional experience (Watson, 1988). Throughout the psychological literature, positive and negative affect have been widely used to effectively measure individuals' levels of psychological functioning. Positive affect (PA) reflects one's level of pleasurable engagement with the environment and others, encompassing feelings of enthusiasm, high energy, alertness and determination. High positive affect is often used as a measure of adaptive functioning. Negative affect reflects a general dimension of emotional distress and unpleasurable engagement, subsuming a variety of negative emotional states including anger, guilt, disgust,

fear and distress. While high negative affect is often used as a measure of distress, low negative affect is indicative of calmness and serenity (Watson, 1988; Watson et al., 1988).

Baumeister and Leary's (1995) belongingness theory connects the formation of social bonds with positive affect and emotion. The theory suggests that the formation of social bonds is directly responsible for positive emotions, often exemplified by celebrations of marriage, new employment and childbirth. Further research has established the correlations between social relations and positive affect. Clark and Watson (1988) examined the relationship between everyday life events and mood (defined by affect) using a daily activities recording paradigm. Participants recorded their daily activities for 90 consecutive days, as well as daily measures of mood (using the PANAS). Analyses indicated that social events had the highest relationship to mood (defined by positive affect), and that positive affect was heightened across participants on days in which social activity was present (Clark & Watson, 1988).

To examine the relationship between positive affect and negative affect, Watson (1988) collected participants' daily measures of mood, perceived stress, physical complaints and social activity for a period of six to eight weeks. Within subject analyses indicated that social activity was significantly correlated to higher mean positive affect scores. Furthermore, between subject analyses revealed that socializing was related to individual differences in positive affect but not negative affect. Individuals who had higher mean levels of daily social activity were more enthusiastic and excited about life, however levels of socializing did not affect general levels of distress (Watson, 1988). To further these analyses, Watson et al. (1992) conducted two studies utilizing in depth weekly social activity surveys to comprehensively assess participants' overall levels of socialization. Results of both studies indicated that social activity was more strongly

related to positive affect than negative affect, and that higher mean levels of social activity correlated to higher mean levels of positive affect.

Berry and Hansen (1996) explored the relationship between quality of social interactions and affect. To do this, a dyad interaction paradigm was utilized in which two strangers interacted with one another for a period of time, followed by completing assessments of perception of the interaction and affect (PANAS). Results showed that levels of positive affect predicted quality of social experiences. Participants with higher levels of positive affect perceived their social interactions to be more pleasant, enjoyable and comfortable. Likewise, partners and observers rated their experiences with high PA participants to be more enjoyable and of higher quality than low experiences with low PA participants. In a subsequent study, Berry and Hansen (1996) further examined these results by using a daily diary paradigm to assess the relationship between participants quantity and quality of daily interaction and affect. Participants recorded and rated their daily interactions for a period of one week, followed by completing self assessments of affect and personality. Here, the PANAS was utilized as an outcome measure to assess participants positive and negative affect in relation to social interaction. Findings indicated a significant positive relationship between positive affect and quantity and quality of interactions. Higher PA participants recorded spending more time in social interactions, as well as having more enjoyable interactions.

Due to the connections between affect and social perceptions and behaviors, recent research examining the relationship between social factors and psychological functioning widely utilizes the PANAS as an outcome measure. For example, to determine whether prosocial behavior mitigates the negative effects of everyday stress, Raposa (2016) utilized the PANAS to measure same day affect compared to levels of social interaction and stress. Here, the PANAS

showed the relationship between prosocial behavior and affect (participants with higher levels of prosocial behavior had higher levels of positive affect) as well as the function of prosocial behavior as a buffer between stress and affect (prosocial behavior moderated the effects of stress levels on both positive and negative affect). To longitudinally assess the relationship between relationship quality and affect among adolescents, Griffith et al. (2021) utilized the PANAS as an outcome measure of positive and negative affect. Latent growth curve modeling supported a significant association between growth in positive relationship quality and growth in positive affect over the course of 3 years, further validating the correlation between social variables and affect.

Finally, in an examination of the effects of acute stress on attachment, social support and possible improved psychological functioning, Mancini et al. (2021) utilized the PANAS as an outcome measure of positive and negative emotion. The PANAS helped to illuminate the effects of distress on positive and negative emotion, specifically highlighting a decrease in negative emotion following hurricane exposure. Of particular significance was the role of the PANAS in indicating a mediation effect of social support on decreased negative emotion and increased positive emotion in the hurricane exposure cohort.

Given the correlations between interpersonal relationships and positive affect, the use of the PANAS as a validated measure of psychological functioning, mood and emotion in relation to social variables, and the current study's examination of the effects of social behaviors on psychological outcomes in the context of acute stress, the current study utilized the PANAS scales to assess psychological functioning.

The Current Study

The current study sought to expand on previous research findings demonstrating that a subset of individuals can and do experience improvements in psychological functioning following adversity via improvements in the social environment. The study compared a cohort of participants assessed during the initial acute phase of the pandemic (May 1st 2020 – May 16th 2020), soon after lockdowns were implemented, with a cohort assessed one year later when restrictions were relaxed (April 2020 - May 2020). The current study focuses on social variables that operationalize both other focused emotions and a belief that others were available, including perceptions of social support, communal orientation, compassion, and gratitude. An additional focus is on outcomes related to psychological functioning, specifically positive and negative affect.

The current study had two aims. The first aim was to examine the effects of the acute phase of the COVID-19 pandemic on social perceptions, social behaviors, and psychological functioning via comparisons to a subsequent matched cohort of participants assessed one year later. The second aim was to use a cohort comparison to examine whether there were potential beneficial consequences of COVID-19 stress on psychological functioning through increased social behavior and improved social perceptions. A multiple mediational framework is used to examine the possibility that changes in social perceptions and behaviors among participants during the acute phase of the pandemic served as a mechanism of improved psychological functioning relative to the normative phase of the pandemic.

Hypotheses

Based on these aims, the following research questions and hypotheses will be examined.

Research Question 1: What is the effect of the acute phase of the COVID-19 pandemic (Spring 2020) on social behavior and social perceptions?

Hypothesis 1a. The acute phase cohort (Spring 2020) will report a higher level of perceived social support than the recovery cohort (Spring 2021).

Hypothesis 1b. The acute phase cohort (Spring 2020) will report a higher level of communal orientation than the recovery cohort (Spring 2021).

Hypothesis 1c. The acute phase cohort (Spring 2020) will report a higher level of compassion than the recovery cohort (Spring 2021).

Hypothesis 1d. The acute phase cohort (Spring 2020) will report a higher level of gratitude than the recovery cohort (Spring 2021).

Research Question 2: Is the acute stress of the COVID 19 pandemic associated with adaptive psychological functioning?

Hypothesis 2a. The acute phase cohort (2020) will report higher levels of positive affect than the recovery cohort (Spring 2021).

Hypothesis 2b. The acute phase cohort (2020) will report lower levels of negative affect than the recovery cohort (Spring 2021).

Research Question 3: Do improved social perceptions and behaviors serve as mechanisms of increased positive affect and reduced negative affect?

Hypothesis 3a. Perceived social support, communal orientation, compassion and gratitude will mediate the relationship between the acute phase cohort (Spring 2020) and increased positive affect.

Hypothesis 3b. Perceived social support, communal orientation, compassion, and gratitude will mediate the relationship between the acute phase cohort (Spring 2020) and reduced negative affect.

CHAPTER 2

METHOD

The aim of the current study was to examine the effects of acute stress on individuals' social perceptions and behaviors through the lens of the COVID 19 pandemic. A subsequent aim was to examine whether increases in social perceptions and behaviors, in response to COVID 19 acute stress, effect adaptive psychological functioning. A cohort comparison allows for the evaluation of change over time. Therefore, the current study utilized a cohort comparison to evaluate changes in social perceptions, social behaviors, and adaptive psychological functioning throughout the COVID 19 pandemic. Social perceptions, social behaviors and adaptive psychological functioning were measured at two different time points throughout the COVID 19 pandemic. Participants in wave one (the acute stress cohort) completed assessments in the spring of 2020 (May 1st, 2020 – May 16th, 2020), during the height of the pandemic when stringent precautionary guidelines were enforced. Participants in wave two (the recovery cohort) completed assessments one year later in the spring of 2021 (April - May 2021) when knowledge of the virus itself was greater, and guidelines were relaxed.

Participants and Procedure

The sample for the current study is comprised of students from a private University in New York. Students enrolled during two subsequent spring semesters (2020 and 2021) participated in the study. The study was given to introduction to psychology students for course credit, and was open to the entire student body for optional participation. The total sample consisted of 252 participants. Spring 2020 participants (N= 146) were 61.6% female (34.2% male), averaged 21.7 years of age ($SD = 7.2$), and were 51.4% Caucasian/White, 12.3% Asian

American, .7% South Asian, 15.1% Latino, 8.2% Black/African American, 5.5% multi-racial and 4.8% other. 48.6 % of participants in the spring 2020 cohort were freshman, 17.8% were sophomores, 5.5% were juniors, 13% were seniors and 13% were graduate students. Of the participants in the spring 2020 cohort, 30.1% reported losing a job due to the COVID 19 pandemic.

Spring 2021 participants (N= 106) were 69.9% female (28.2% male), averaged 19.8 years of age ($SD = 4.2$), and were 43.1% Caucasian/White, 4.9% Asian American, 1.0% South Asian, 24.5% Latino, 14.7% Black/African American, 7.8% multi-racial and 3.9% other. 70.9 % of participants in the spring 2021 cohort were freshman, 17.5% were sophomores, 4.9% were juniors, 5.8% were seniors and none were graduate students. Of the participants in the spring 2021 cohort, 29.8% reported losing a job due to the COVID 19 pandemic.

An online survey platform, Qualtrics, was used to administer the survey. Students were provided access to the survey through the University's introduction to psychology course page, and/or via email. If for any reason students did not want or feel comfortable participating in the study, an option to complete an alternative assignment to meet the course requirement was provided. Once students accessed the link for the survey, electronic consent was provided. Information regarding instructions, purpose, procedures, risks, benefits, and confidentiality were provided in the consent form. Once consent was given, students were brought to the survey page. Once all measures and questionnaires within the survey were completed in full and submitted, students whom were participating for course credit received credit for their participation.

Measures

The Multidimensional Scale of Perceived Social Support (MSPSS)

The MSPSS was used to assess participants' perceptions of social support. The MSPSS is a 12 item self-report measure developed by Zimet et al. (1988) to subjectively measure individuals' perceptions of social support from three different sources: friends, family and significant other. Items were generated to directly assess ones' perceptions of social support from these three sources (*"I can count on my friends when things go wrong"*) (*"I get the emotional help and support that I need from my family"*) and (*"There is a special person around when I am in need"*). The MSPSS is rated on a 5-point Likert type scale ranging from (1) *Strongly disagree* to (5) *Strongly agree*. Reliabilities were calculated yielding high reliability for the total scale ($\alpha = .93$) as well as each subscale friends ($\alpha = .92$), family ($\alpha = .91$), and significant other ($\alpha = .94$).

Communal Orientation

Communal orientation was measured using the Communal Orientation Scale, developed by Clark et al. (1987). The Communal Orientation Scale is a 14-item scale used to assess the degree to which individuals behave in a communally oriented fashion towards others (*"When making a decision, I take other people's needs and feelings into account"*) and the degree to which individuals expect others behave in a communally oriented fashion towards them (*"It bothers me when other people neglect my needs"*). Each item is answered regarding the degree to which the participant feels the statement is (un)characteristic of s/he based on a 5-point Likert type scale ranging from (1) *Extremely uncharacteristic of me* to (5) *Extremely characteristic of me*. Reliability for the communal orientation scale was calculated and was adequate for the current sample ($\alpha = .60$).

Santa Clara Brief Compassion Scale

The Santa Clara Brief Compassion Scale (SCBCS) (Hwang et al., 2008) is a short version of the Compassionate Love Scale (Spreecher and Fehr, 2005) developed in response to the need to conveniently and reliably measure the construct of compassion. The SCBCS is a self report five item scale measuring one's general feelings and behaviors of compassion toward non-intimate others. Items, chosen through factor analysis of the Compassionate Love Scale, capture one's feelings compassion and tenderness towards non-intimate others: (*"When I hear about someone (a stranger) going through a difficult time, I feel a great deal of compassion for him or her"*)(*"I tend to feel compassion for people, even though I do not know them"*). Items are rated on a 7 point Likert type scale ranging from (1) *not at all true of me* to (7) *very true of me*. Reliability of the five-item scale was calculated ($\alpha = .90$). Internal internal reliability between the five items was also calculated, indicating all five items were significantly and positively correlated (r's ranging from .50 - .81).

Gratitude

Three items were included to assess gratitude (thankful, appreciative, and grateful). Items are rated on a 5-point Likert-type scale ranging from (1) *very slightly or not at all* to (5) *extremely*. Internal reliability for the three items was calculated, ($\alpha = .93$).

Meaning in Life

The Meaning in Life Questionnaire (Steger et al., 2006) is a 10 item scale designed to measure one's presence of meaning in life (*"I understand my life's meaning"*) and search for meaning in life (*"I am looking for something that makes my life feel meaningful"*). Items are rated on a 7 point Likert type scale ranging from (1) *Absolutely Untrue* to (7) *Absolutely True*. Calculated reliability for the scale was adequate ($\alpha = .75$).

Loneliness

Loneliness was measured using 13 items from the UCLA Loneliness Scale, Version 3 (Russell, 1996). The UCLA Loneliness Scale, Version 3 is a simplified version of the UCLA Loneliness Scale (Russell et al., 1978) used to assess individuals' subjective feelings of loneliness and social isolation. This study utilized seven negatively worded (lonely) items (*"How often do you feel alone?"*) and six positively worded (non lonely) items (*"How often do you feel close to people?"*). Items are rated on a 4 point Likert type scale ranging from (1) *Never* to (4) *Always*. Calculated reliability for the total scale was adequate ($\alpha = .55$), and reliability for positive items was high ($\alpha = .88$) as was reliability for negative items ($\alpha = .88$).

Positive and Negative Affect

The Positive Affect Negative Affect Schedule (PANAS), developed by Watson et al. (1988) assesses individuals' emotionality through the distinct dimensions of positive affect and negative affect. These orthogonal dimensions have proven to be strong indicators of individual mood. Positive affect (PA) reflects enthusiasm, activity, and alertness. Whereas high PA is characterized by pleasurable engagement, full concentration and high energy, low PA is characterized by lethargy and sadness. Negative affect (NA) is a general dimension of subjective distress, subsuming a verity of negative mood states including anger, disgust, guilt, fear, and anxiety. Low NA is characterized by calmness and serenity.

The short version PANAS consists of 10 items; 5 descriptors of positive affect (strong, enthusiastic, proud, attentive, and inspired) and 5 descriptors of negative affect (upset, scared, irritable, nervous, and afraid). For the current study, moment time instructions were utilized (*please indicate to what extent you feel this way **right now***) to capture participant emotions at the time of the survey. The PANAS has high levels of internal consistency reliability for both PA (α

= .88) and NA (α = .86). Intercorrelations between the two variables are low, α ranging from -.19 to -.003, indicating valid discriminate validity.

Data Analysis

The analytic goals of the current study were to a) examine change in social perceptions, social behaviors and adaptive psychological functioning in response to acute COVID 19 stress over time using a cohort comparison and b) examine whether changes in social perceptions and behaviors mediate the relationship between COVID 19 acute stress and adaptive psychological functioning. SPSS version 26 was used to address these aims. Preliminary analyses including descriptive statistics and Pearson's correlations were conducted to examine the sample and the relationships between variables. Between group differences were analyzed using a planned contrast analysis weighting the acute stress cohort (Spring 2020) against the subsequent recovery cohort (Spring 2021). This allowed us to see the differences between the two levels of the independent variable (acute stress phase vs. recovery phase) on the outcome variables (perceived social support, communal orientation, and compassion).

To address the second analytic goal, multiple mediation analyses were conducted using Hayes PROCESS. Acute stress, characterized by the Spring 2020 cohort, was the predictor variable (X). Social perceptions and behaviors (defined by perceived social support, communal orientation, compassion, and gratitude) were used as mediator variables (M), and adaptive psychological (defined by positive and negative affect) were used as outcome variables (Y). Mediation analyses allow us to examine whether change in the mediation variables account for change in the outcome variables. Specifically, this study examined (c), the direct effect of acute stress (X) on positive and negative affect (Y), (a), the effect of acute stress (X) on social perceptions and behaviors (M), and (b), the effect of social perceptions and behaviors (M) on

positive and negative affect (Y). A 95% confidence interval and 5,000 bootstrap samples were used to examine the total effect (c') of acute stress (X) on positive and negative affect (Y) through social perceptions and behaviors (M).

CHAPTER 3

RESULTS

Descriptive Analyses

To better understand the data and the relationships among study variables, a series of descriptive statistics and correlational analyses were conducted. First, a series of chi square analyses were conducted to examine any differences between the cohorts. Frequencies of demographic variables and chi square analyses are presented in table 1, and correlations among primary study variables with means and standard deviations are presented in table 2.

Cohort Demographic Differences

To examine demographic differences between cohorts, a series of chi-square analyses were conducted. As shown in Table 1, chi-square tests indicated a significant difference in year in school $\chi^2(4, 245) = 21.68, p < .001$, and living arrangement $\chi^2(3, 240) = 28.1, p < .001$. Within year in school, the proportion of freshman was significantly higher in the Spring 2021 cohort compared to the Spring 2020 cohort (71.6% vs. 49.7%) and the proportion of graduate students was significantly higher in the Spring of 2020 compared to the spring of 2021 (13.3% v. 0%). There were no significant differences between cohorts for sophomores, juniors or seniors. Differences were identified within all categories of living arrangement; the proportion of participants living alone was significantly higher in Spring 2021 compared to Spring 2020 (7.1% v. 1.4%), living with family was significantly higher in Spring 2020 compared to Spring 2021 (87.2 v. 67.7%) living with a romantic partner or spouse was higher in Spring 2020 compared to Spring 2021 (7.1% v. 2.0%), and living with a roommate was significantly higher in Spring 2021 compared to Spring 2020 (9.6% v. 2.5%). The ethnicity category did not reveal a significant

overall model, however within the ethnicity category there were significant differences between cohorts for Asian, Black and Latino participants. The proportion of Asian participants was significantly higher in Spring 2020 compared to Spring 2021 (12.6 % v. 4.9%), the proportion of African American students was significantly higher in Spring 2021 compared to Spring 2020 (14.7 % v. 8.4%) and the proportion of Latino participants was higher in the Spring 2021 cohort compared to the Spring 2020 cohort (24.4% v. 15.4%). There were no significant differences between cohorts for any other ethnic group.

Bivariate Correlations

As shown in table 2, bivariate correlations revealed several significant relationships between variables. In line with previous research, perceived social support ($r = .34, p < .001$), compassion ($r = .17, p < .001$) and gratitude ($r = .68, p < .001$) were significantly positively correlated with positive affect. Additionally, perceived social support was significantly negatively correlated with negative affect ($r = -.14, p = .03$). There was no significant relationship between communal orientation and positive affect ($r = .13, p = .07$), nor were there significant correlations between communal orientation ($r = .03, p = .67$), compassion ($r = .07, p = .29$) or gratitude ($r = -.04, p = .6$) and negative affect. Perceived social support was strongly correlated with communal orientation ($r = .27, p < .001$), compassion ($r = .25, p < .001$) and gratitude ($r = .4, p < .001$). Communal orientation was strongly correlated with compassion ($r = .58, p < .001$), and gratitude ($r = .25, p < .001$), and gratitude and compassion were also strongly correlated ($r = .28, p < .010$). Finally, communal orientation ($r = .29, p < .001$), compassion ($r = .25, p < .001$) and negative affect ($r = .16, p < .05$) were significantly correlated.

Table 1.*Frequencies for Spring 2020 and Spring 2021*

Variable	Spring 2020		Spring 2021		Full Sample		Test
	<i>n</i> 146	%	<i>n</i> 106	%	<i>n</i> 252	%	
Gender							
Female	90	62.9	72	70.6	162	66.1	$\chi^2 p = .41$
Male	50	35.0	29	28.4	79	32.2	
Other	3	2.1	1	1.0	4	1.6	
Ethnicity							
White/Caucasian	75	52.4	44	42.7	119	48.6	$\chi^2 p = .18$
Black/African American	12	8.4	15	14.7	27	11.0	
Latino	22	15.4	25	24.5	47	19.2	
Asian	18	12.6	5	4.9	23	9.4	
South Asian	1	0.7	1	1	2	0.8	
Multi Racial	8	5.6	8	7.8	16	6.5	
Other	7	4.9	4	3.9	11	4.5	
Year In School							
Freshman	71	49.7	73	71.6	144	58.8	$\chi^2 p < .001^{**}$
Sophomore	26	18.2	18	17.6	44	18.0	
Junior	8	5.6	5	4.9	13	5.4	
Senior	19	13.3	6	5.9	25	10.2	
Graduate	19	13.3	0	0	19	7.8	
Employment Status							
Full Time	13	9.1	6	5.9	19	7.8	
Part Time	45	31.5	38	37.2	83	33.9	
Unemployed	85	59.4	58	56.9	143	58.4	
Loss of Employment							
Yes	44	30.8	31	30.4	75	30.6	$\chi^2 p < .001^{**}$
No	99	69.2	71	69.6	170	69.4	
Live Alone							
Yes	2	1.4	7	7.1	9	3.8	
No – with family	123	87.2	67	67.7	190	79.2	
No – with spouse	10	7.1	2	2.0	12	5.0	
No – with roommate	6	4.3	23	23.2	29	12.1	

Note. $^{**}p < .001$

Table 2*Descriptive Statistics and Correlations Among Variables for Total Sample*

Variable	<i>N</i>	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9
1. Gender	245	--	-	1								
2. Age	245	20.9	6.20	-.05	1							
3. Cohort	249	--	--	-.05	.15*	1						
4. Social Support	238	3.93	0.84	.05	.09	.08	1					
5. Comm. Orientation	238	3.61	0.49	.29**	.14*	.07	.28**	1				
6. Compassion	237	3.82	0.84	.25**	.04	.05	.25**	.58**	1			
7. Gratitude	238	3.64	1.07	.07	.09	.01	.40**	.25**	.28**	1		
8. Positive Affect	238	2.86	1.02	-.09	.05	-.07	.34**	.13	.17**	.68**	1	
9. Negative Affect	238	2.64	1.02	.16*	-.07	-.15*	-.14*	.03	.07	-.04	-.10	1

Note. Comm. = Communal. * $p < .05$, ** $p < .01$. Gender coded as 1 = Male, 2 = Female.

Hypotheses 1 and 2: Does Acute Stress Affect Social Behaviors, Social Perceptions and Psychological Functioning?

The first and second research questions examined whether the stress of the acute phase affected social behaviors and perceptions, (perceived social support, communal orientation, compassion, and gratitude) and psychological functioning (positive and negative affect). It was hypothesized that perceived social support, communal orientation, compassion, gratitude, and positive affect would be higher in the acute stress cohort (Spring 2020) compared to the recovery cohort (Spring 2021), and negative affect would be lower in the acute stress cohort (Spring 2020) compared to the recovery cohort (Spring 2021). To analyze between group differences, a series of independent sample t-tests were performed. As shown in Table 3, these analyses revealed no significant differences in perceived social support, communal orientation, compassion, gratitude, and positive affect in the acute phase compared to the recovery phase. Despite t-tests not revealing significant results, there were slightly higher mean values in the acute phase compared

to the recovery phase of social support ($M_{\text{acute}} = 3.99$, $SD_{\text{acute}} = .86$; $M_{\text{recovery}} = 3.85$, $SD_{\text{recovery}} = .81$) communal orientation ($M_{\text{acute}} = 3.64$, $SD_{\text{acute}} = .5$; $M_{\text{recovery}} = 3.58$, $SD_{\text{recovery}} = .48$) compassion ($M_{\text{acute}} = 3.86$; $SD_{\text{acute}} = .84$ $M_{\text{recovery}} = 3.78$, $SD_{\text{recovery}} = .84$) and gratitude ($M_{\text{acute}} = 3.65$; $SD_{\text{acute}} = 1.13$, $M_{\text{recovery}} = 3.63$, $SD_{\text{recovery}} = .99$). However, there was a significant difference in negative affect between cohorts, with the acute cohort reporting lower levels of negative affect, $t(236) = 2.35$, $p = .02$, $d = -.31$.

Table 3

Cohort Comparisons of Social and Affect Variables

Variable	Spring 2020		Spring 2021		t	p	Cohen's d
	M	SD	M	SD			
Social Support	3.99	0.86	3.85	0.81	-1.22	.22	.16
Comm. Orientation	3.64	0.5	3.58	0.48	-1.20	.27	.14
Compassion	3.86	0.84	3.78	0.85	-0.68	.49	.10
Gratitude	3.65	1.13	3.63	0.99	-0.11	.91	.01
Positive Affect	2.80	1.11	2.94	0.88	1.07	.29	-.14
Negative Affect	2.51	1.03	2.82	0.99	2.35	.02*	-.31

Note. Comm. = communal. * $p < .05$

Hypotheses 3a and 3b: Does Changes in Social Behaviors and Social Perceptions Mediate the Relationship Between Acute Stress and Psychological Functioning?

Research question three intended to examine whether changes in social perceptions and behaviors were mechanisms of improved psychological functioning. I hypothesized that changes in social variables would mediate the relationship between acute stress and increased positive and decreased negative affect. Hayes Process was utilized to conduct two multiple mediation analyses using cohort (Acute Stress vs. Recovery) as the predictor variable (X), positive/negative

affect as the dependent variable (Y) and each social variable (perceived social support, communal orientation, compassion, and gratitude) as mediator variables (M).

Positive Affect

In the first model, I examined whether perceived social support, communal orientation, compassion, and gratitude mediated the relationship between cohort and positive affect. Cohort was entered as the predictor variable (X), perceived social support, communal orientation, compassion, and gratitude were entered as mediator variables (M), and positive affect was entered as the dependent variable. The overall model including all four mediators and the independent variable cohort was not significant $F(1, 234) = 1.17, p = .28$. The amount of variation accounted for by the cumulative set of predictors was 1% $R^2 = .01$. There was no significant direct effect of cohort on positive affect $b = -.16, SE = .01, 95\% CI = [-.36 - .04], p = .11$ (path c, figure X). See table 4 for a summary of indirect effects, see figure 1 for direct effect of cohort on positive affect.

Table 4.

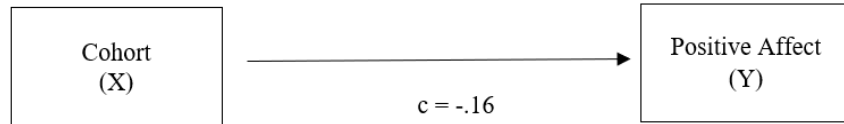
Summary of Bootstrapped Indirect Effects in Mediation Analyses Predicting Positive Affect

Mediation Variable	Indirect Effect, b	Boot SE	95% CI	Partially Standardized Indirect Effect
Total	.01	.09	[-.18 , .19]	.01
Perceived Social Support	.02	.02	[-.01 , .06]	.02
Communal Orientation	-.01	.01	[-.02 , .02]	-.01
Compassion	.00	.01	[-.02 , .02]	.00
Gratitude	.01	.09	[-.02 , .18]	.01

Note. Direct effect, $b = -.16, SE = .01, 95\% CI = [-.36 , .04], p = .11$

Figure 1.

Direct Effect of Cohort on Positive Affect



Note. Cohort coded as, 1 = acute, 0 = recovery

When looking at perceived social support as the mediator, there was no significant effect of cohort on perceived social support $b = .14$, $SE = .11$, 95% CI = [-.08 , .36], $p = .22$ (path a1) nor was there a significant effect of perceived social support on positive affect $b = .12$, $SE = .06$, 95% CI = [-.01 , .25], $p = .10$ (path b1). Finally, there was no significant mediating effect (indirect effect) of perceived social support on the relationship between cohort and positive affect $b = .02$, $SE = .02$, 95% CI = [-.01 , .07] (path c'1).

With communal orientation as the mediator, there was no significant effect of cohort on communal orientation $b = .07$, $SE = .07$, 95% CI = [-.06 , .19], $p = .31$ (path a2) nor was there a significant effect of communal orientation on positive affect $b = -.14$, $SE = .12$, 95% CI = [-.38 , .11], $p = .28$ (path b2). Additionally, there was no significant mediating effect of communal orientation on the relationship between cohort and positive affect $b = -.01$, $SE = .01$, 95% CI = [-.04 , .01] (path c'2).

With compassion entered as the mediator, there was no significant effect of cohort on compassion $b = .08$, $SE = .11$, 95% CI = [-.14 , .30], $p = .50$ (path a3) nor was there a significant effect of compassion on positive affect $b = .00$, $SE = .07$, 95% CI = [-.14 , .15], $p = .95$ (path b3). Finally, there was no significant mediating effect of compassion on the relationship between cohort and positive affect $b = .00$, $SE = .01$, 95% CI = [-.02 , .02] (path c'3).

Finally, when examining gratitude as the mediator, there was no significant effect of cohort on gratitude $b = .01$, $SE = .14$, 95% CI = $[-.27, .29]$, $p = .95$ (path a4). There was a significant effect of gratitude on positive affect $b = .63$, $SE = .05$, 95% CI = $[.53, .73]$, $p < .00$ (path b4). There was no significant mediating effect of gratitude on the relationship between cohort and positive affect $b = .01$, $SE = .09$, 95% CI = $[-.17, .18]$ (path c'4). See table 5 for a summary of specific pathways, see figure 2 for full multiple mediation model.

Table 5.

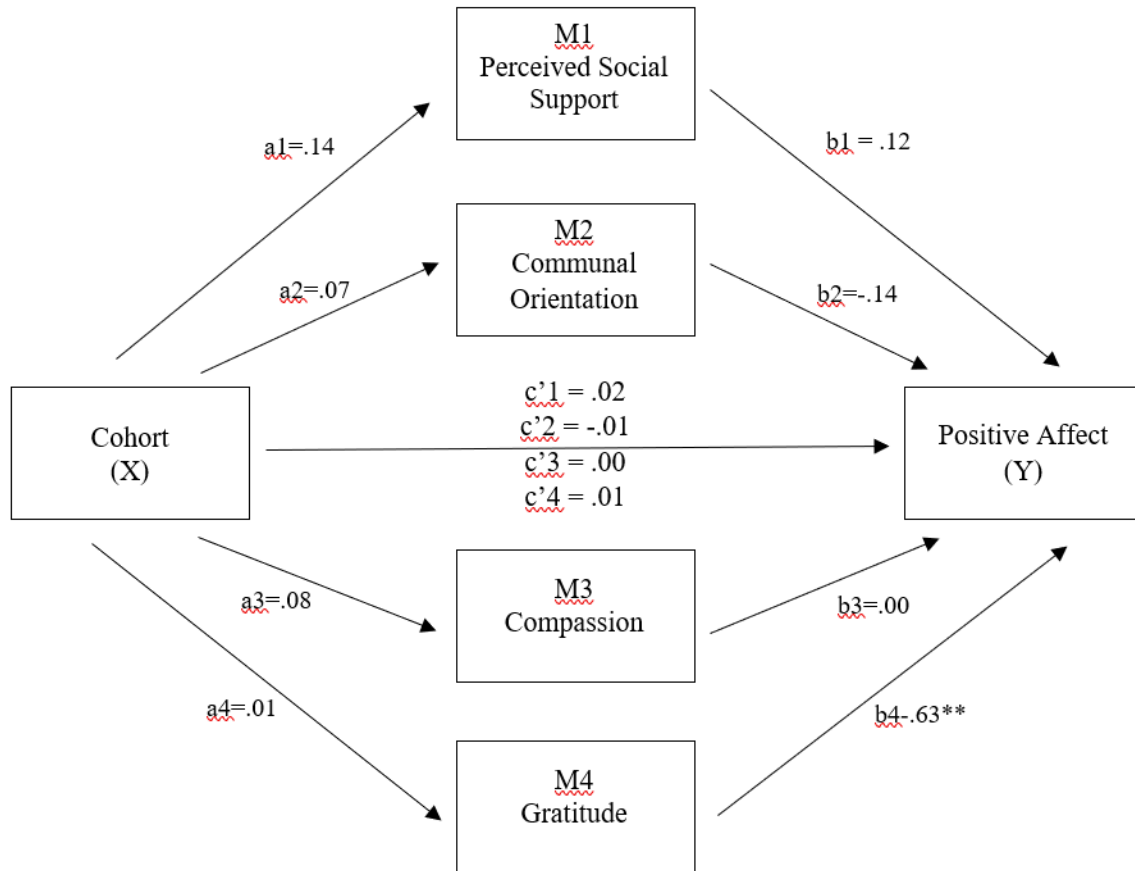
Pathways for Multiple Mediation Analyses Predicting Positive Affect

Path		<i>B</i>	<i>SE</i>	<i>p</i>
a				
	PSS	.14	.11	.22
	CO	.07	.07	.31
	Comp.	.08	.11	.50
	Grat.	.01	.14	.95
b				
	PSS	.12	.34	.10
	CO	-.14	.12	.28
	Comp.	.00	.07	.95
	Grat.	.63	.05	.00***
c	X→Y	-.16	.01	.11
c'				
	PSS	.02	.02	-
	CO	-.01	.01	-
	Comp.	.00	.01	-
	Grat.	.01	.09	-

Note. *** $p < .001$. PSS = Perceived social support, CO = Communal Orientation, Comp. = Compassion, Grat. = Gratitude

Figure 2.

Multiple Mediation Analyses Predicting Positive Affect



Note. Cohort coded as, 1 = acute, 0 = recovery $^{**}p < .01$

Negative Affect

In the second model, I examined whether perceived social support, communal orientation, compassion, and gratitude mediated the relationship between cohort and negative affect. Cohort was entered as the predictor variable (X) perceived social support, communal orientation, compassion, and gratitude were entered as mediator variables (M), and negative affect was entered as the dependent variable. The overall model including all four mediators and the independent variable cohort was significant $F(1, 234) = 5.77, p = .02$. The

amount of variation accounted for by the cumulative set of predictors was 2% $R^2 = .02$. There was also a significant direct effect of cohort on negative affect $b = -.31$, $SE = .13$, 95% CI = $[-.57, .30]$, $p = .02$ (path c, see figure X). See table 6 for a summary of indirect effects, and figure 3 for direct effect model.

Table 6.

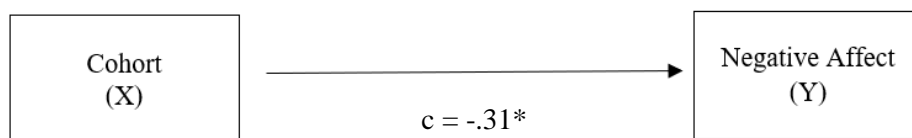
Summary of Bootstrapped Indirect Effects in Mediation Analyses Predicting Negative Affect

Mediation Variable	Indirect Effect, b	Boot SE	95% CI	Partially Standardized Indirect Effect
Total	-.01	.03	$[-.08, .05]$	-.01
Perceived Social Support	-.03	.03	$[-.08, .01]$	-.03
Communal Orientation	.00	.02	$[-.03, .04]$.04
Compassion	.00	.02	$[-.02, .02]$.00
Gratitude	.00	.01	$[-.02, .02]$.01

Note. Direct effect, $b = -.31$, $SE = .13$, 95% CI = $[-.57, .30]$, $p = .02^*$

Figure 3.

Direct Effect of Cohort on Negative Affect



Note. Cohort coded as, 1 = acute, 0 = recovery. $*p < .05$

When looking at perceived social support as the mediator, there was no significant effect of cohort on perceived social support $b = .14$, $SE = .11$, 95% CI = $[-.08, .36]$, $p = .22$ (path a1). There was a significant effect of perceived social support on negative affect $b = -.19$, $SE = .09$,

95% CI = [-.36 , -.02], $p = -.02$ (path b1). There was no significant mediating effect of perceived social support on the relationship between cohort and negative affect $b = .02$, $SE = .02$, 95% CI = [-.01 , .07] (path c'1).

With communal orientation as the mediator, there was no significant effect of cohort on communal orientation $b = .07$, $SE = .06$, 95% CI = [-.06 , .19], $p = .31$ (path a2) nor was there a significant effect of communal orientation on negative affect $b = .04$, $SE = .17$, 95% CI = [-.29 , .37], $p = .81$ (path b2), Finally, there was no significant mediating effect of communal orientation on the relationship between cohort and negative affect $b = .00$, $SE = .02$, 95% CI = [-.03 , .04] (path c'2).

With compassion entered as the mediator, there was no significant effect of cohort on compassion $b = .08$, $SE = .11$, 95% CI = [-.14 , .30], $p = .50$ (path a3) nor was there a significant effect of compassion on negative affect $b = .13$, $SE = .10$, 95% CI = [-.06 , .32], $p = .18$ (path b3), Finally, there was no significant mediating effect of compassion on the relationship between cohort and negative affect $b = .01$, $SE = .02$, 95% CI = [-.03 , .06] (path c'3).

Finally, when examining gratitude as the mediator, there was no significant effect of cohort on gratitude $b = .01$, $SE = .14$, 95% CI = [-.27 , .29], $p = .95$ (path a4). There was also no significant effect of gratitude on negative affect $b = -.01$, $SE = .07$, 95% CI = [-.14 , .13], $p = .91$ (path b4). Finally, there was no significant mediating effect of gratitude on the relationship between cohort and negative affect $b = .00$, $SE = .01$, 95% CI = [-.02 , .02] (path c'4). See table 7 for a summary of specific pathways, see figure 4 for full multiple mediation model on negative affect.

Although no evidence for mediation was found, there were unexpected demographic differences between cohorts. Next, we investigated whether controlling for demographic

covariates that differed across cohorts influenced the findings for social variables and psychological functioning.

Table 7.

Pathways for Multiple Mediation Analyses Predicting Negative Affect

Path		<i>B</i>	<i>SE</i>	<i>p</i>
a				
	PSS	.14	.11	.22
	CO	.07	.06	.31
	Comp.	.08	.11	.50
	Grat.	.04	.14	.29
b				
	PSS	-.19	.09	.03*
	CO	.04	.17	.81
	Comp.	.13	.10	.18
	Grat.	-.01	.07	.91
c				
	X→Y	-.31	.13	.02*
c'				
	PSS	-.03	.03	-
	CO	.00	.02	-
	Comp.	.01	.01	-
	Grat.	.00	.01	-

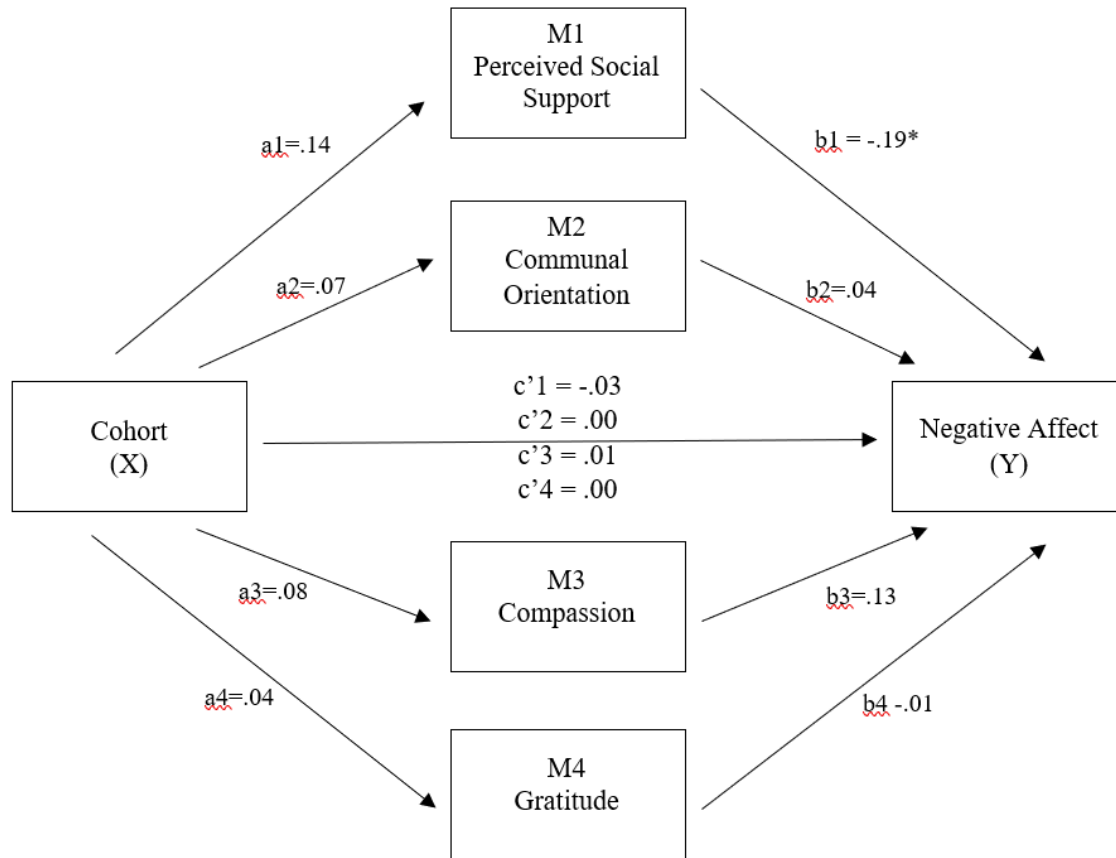
**p* < .05

Multivariate Regression Analyses for Cohort Differences

A series of multiple hierarchical regression analyses were conducted to examine whether demographic cohort differences influenced the predictive capacity of cohort. Specifically, chi-square tests indicated significant differences between cohorts in demographic variables, including ethnicity (Asian, Black and Latino), year in school (freshman and graduate students), and living arrangement (living alone, living with family and living with a roommate). See Table 1. Therefore, dummy coded variables for each of these were entered into a four-step hierarchical linear regression model to determine their effects on the predictability of cohort on positive affect, negative affect, perceived social support, communal orientation, gratitude, and compassion.

Figure 4.

Multiple Mediation Analyses Predicting Positive Affect



Note. Cohort coded as, 1 = acute, 0 = recovery. $*p < .05$

Simple dummy coding was used to transform categorical variables ethnicity, year in school and living arrangement into dichotomous variables using values one and zero. Each predictor variable of interest was coded '1' and weighted against all other variables within that category coded '0'. For example, when coding freshman within the category 'year in school', freshman was coded as one and sophomore, junior, senior, and graduate were each coded as zero. This coding method was applied to each level within each demographic category, providing a new set of dichotomous predictor variables. Cohort was entered on a first step, ethnicity

variables Asian, Black and Latino were entered on a second step, year in school variables freshman and graduate were entered on a third step and living arrangement variables living alone, living with family, and living with a roommate were entered on a fourth step. This model was run for each outcome variable. Results for regression analyses are shown in Tables 8 and 9.

Negative Affect

In the first step of the hierarchical regression model predicting negative affect, the model was statistically significant with cohort alone predicting 2.5% of the variance $F(1, 234) = 6.07, p = .014, R^2 = .025$. In step two of the model, dummy coded variables for Asian, Black, and Latino participants were added yielding a statistically significant model, $F(3, 231) = 2.96, p = .02$. The addition of ethnicity variables led to an increase in variance accounted for by 2.4% ($\Delta R^2 = .024$) with a total of 4.9% variance in total model ($R^2 = .049$). Further analyzing individual predictor variables indicated that Asian was a significant predictor in the model ($\beta = -.14, p = .03$). The other ethnicity variables were not significant predictors in the model. The addition of year in school variables freshman and graduate status in step three of the model explained an additional 3.3% of the variance with 8.2% of the variance explained by the total model $F(6, 229) = 3.39, p = .003, R^2 = .082, \Delta R^2 = .033$. Further analyzing individual predictor variables indicated that Asian ($\beta = -.14, p = .03$), and freshman ($\beta = .13, p = .05$) were significant predictors in the model. Finally, living arrangement variables added in step four produced a significant overall model accounting for 8.8% of the total variance $F(6, 229) = 3.39, p = .003, R^2 = .082$. The addition of living arrangement variables only added .7% to the total variance ($F \Delta = .55, p = .65, \Delta R^2 = .007$), indicating no significant effect of living arrangement compared to ethnicity and year in school. None of the living arrangement variables were significant predictors in the model.

Communal Orientation

In the first step of the hierarchical regression model predicting communal orientation, the model was not statistically significant with cohort alone predicting only .4% of the variance $F(1, 234) = .85, p = .36, R^2 = .004$. In step two of the model, dummy coded variables for Asian, Black, and Latino participants were added yielding a nonsignificant model $F(4, 231) = 2.08, p = .09$. However, the addition of ethnicity variables led to an increase in variance accounted for by 3.1% ($\Delta R^2 = .031$) with a total of 3.5% variance in the total model, ($R^2 = .035$). Further analyzing individual predictor variables indicated that Latino was a significant predictor in model two ($\beta = -.17, p = .01$). The other ethnicity variables were not significant predictors in the model. The addition of dummy coded year in school variables freshman and graduate status yielded a statistically significant model $F(6, 229) = 3.37, p = .003$ explaining an additional 4.6% of variance, with the total model accounting for 8.1% of the variance ($\Delta R^2 = .046, R^2 = .081$). Graduate was a significant predictor in the model ($\beta = -.23, p < .001$), freshman was not a statistically significant predictor in the model. Finally, living arrangement variables added in step four produced a significant overall model accounting for 9% of the total variance $F(9, 226) = 2.61, p = .01, R^2 = .09$. The addition of living arrangement variables only added .1% to the total model, ($F \Delta = 1.10, p = .35, \Delta R^2 = .01$) indicating no significant effect of living arrangement compared to ethnicity and year in school. None of the living arrangement variables were significant predictors in the model.

Positive Affect, Perceived Social Support, Compassion and Gratitude

The hierarchical regression analyses with the additional outcome variables positive affect, perceived social support, compassion and gratitude did not yield statistically significant

results. This indicates that inclusion of the demographic variables did not significantly affect cohort's ability to predict these outcomes.

Exploratory Interaction Effects

Univariate general linear regressions were conducted to examine if there were any interaction effects between covariates on outcome variables. Displayed in Figure 5, results indicated a significant interaction effect of cohort by gender for perceived social support $F(2, 232) = 3.17, p = .04$. The interaction effect revealed that males ($M_{\text{MalesAcute}} = 3.97, SD_{\text{MalesAcute}} = .88; M_{\text{MalesRecovery}} = 3.67, SD_{\text{MalesRecovery}} = .84$) saw a decrease in perceived social support from the acute phase to the recovery phase, whereas females saw no change in perceived social support ($M_{\text{FemalesAcute}} = 3.98, SD_{\text{FemalesAcute}} = .86; M_{\text{FemalesRecovery}} = 3.94, SD_{\text{FemalesRecovery}} = .77$). There were no other significant interactions identified within the analyses.

Figure 5

Interaction Effects of Cohort by Gender Predicting Perceived Social Support

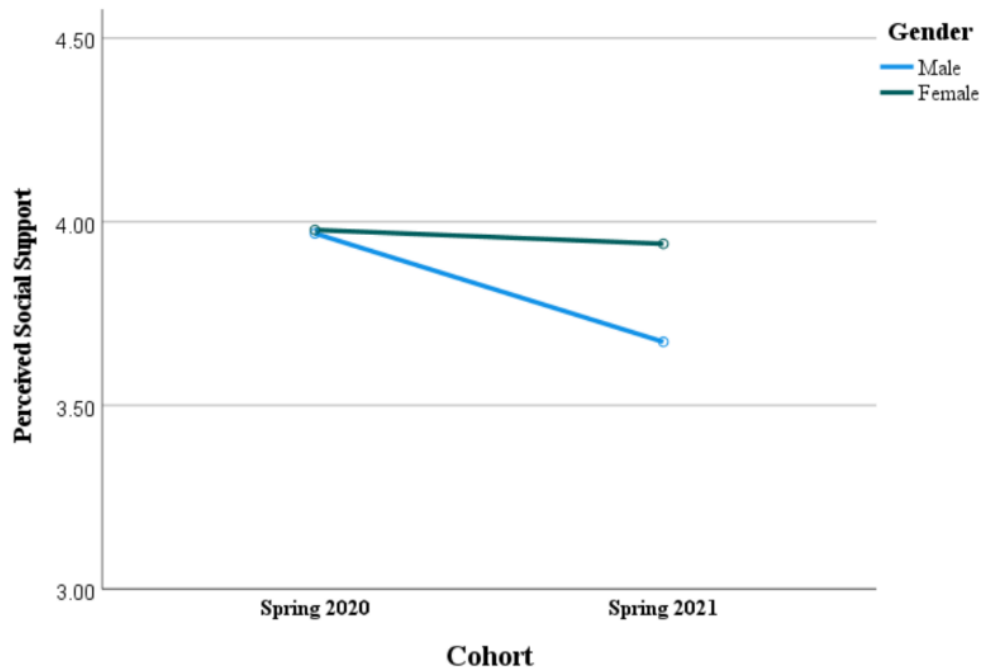


Table 8

Results of Multiple Hierarchical Regressions for Positive and Negative Affect and Perceived Social Support, Controlling for Demographic

Variables

		Negative Affect			Positive Affect			Perceived Social Support		
		<i>b</i>	95% CI ^a	<i>p</i>	<i>b</i>	95% CI ^a	<i>p</i>	<i>b</i>	95% CI ^a	<i>p</i>
Step 1										
	Cohort	-0.33	[-0.60 , 0.07]	0.01*	-0.152	[-.42 , .12]	0.263	0.11	[-.11 , .32]	0.31
Step 2										
	Cohort	-0.20	[-0.57 , -0.04]	0.03*	-0.18	[-.45 , .01]	0.21	0.01	[-.13 , .31]	0.42
	Asian	-0.48	[-0.94 , -0.04]	0.03*	0.4	[-.05 , .86]	0.08	0.02	[-.35 , .38]	0.93
	Black	-0.23	[-.68 , .18]	0.25	-0.03	[-.46 , .41]	0.91	-0.12	[-.47 , .23]	0.49
	Latino	0.01	[-.33 , .35]	0.96	0.1	[-.25 , .45]	0.57	-0.12	[-.40 , .16]	0.39
Step 3										
	Cohort	-0.2	[-.48 , .07]	0.15	-0.19	[-.47 , .09]	0.19	0.02	[-.22 , .23]	0.95
	Asian	-0.48	[-0.93 , -0.04]	0.03*	0.42	[-.05 , .88]	0.08	0.04	[-.32 , .41]	0.82
	Black	-0.23	[-.65 , .20]	0.29	-0.03	[-.46 , .41]	0.1	-0.13	[-.48 , .21]	0.44
	Latino	0.01	[-.33 , .34]	0.97	0.1	[-.25 , .44]	0.57	-0.11	[-.39 , .17]	0.43
	Freshman	0.27	[-.01 , .55]	0.05*	0.03	[-.26 , .31]	0.86	-0.08	[-.31 , .15]	0.49
Table 8 Continued										

		Negative Affect			Positive Affect			Perceived Social Support		
		<i>b</i>	95% CI ^a	<i>p</i>	<i>b</i>	95% CI ^a	<i>p</i>	<i>b</i>	95% CI ^a	<i>p</i>
Step 4	Graduate	-0.42	[-.98 , .14]	0.14	.019	[-.39 , .77]	0.53	0.52	[.08 , .96]	0.02*
	Cohort	-0.22	[-.51 , .08]	0.15	-0.14	[-.44 , .17]	0.38	-0.02	[3.14 , 4.33]	0.89
	Asian	-0.48	[-0.93 , -0.04]	0.03*	0.41	[-.05 , .88]	0.08	0.05	[-.32 , .41]	0.81
	Black	-0.24	[-.66 , .19]	0.28	0	[-.44 , .44]	0.1	-0.14	[-.49 , .21]	0.42
	Latino	-0.01	[-.35 , .33]	0.95	0.14	[-.22 , .49]	0.44	-0.12	[-.40 , .16]	0.41
	Freshman	0.28	[.00 , .57]	0.05*	0.04	[-.25 , .33]	0.78	-0.1	[-.34 , .13]	0.38
	Graduate	-0.55	[-1.19 , .10]	0.10	0.16	[-.51 , .83]	0.64	0.66	[.15 , 1.16]	0.01*
	Live Alone	-0.05	[-1.0 , .90]	0.92	-0.07	[-1.05 , .91]	0.89	0.01	[-.76 , .77]	0.98
	Family	-0.26	[-.98 , .46]	0.48	-0.1	[-.84 , .64]	0.79	0.29	[-.28 , .86]	0.31
	Roommate	-0.43	[-1.24 , .38]	0.30	0.16	[-.68 , .99]	0.71	0.3	[-.35 , .95]	0.37

Note. Asian was coded 1 = Asian, 0 = all other ethnicities, Black was coded 1 = Black, 0 = all other ethnicities, Latino was coded 1 = Latino, 0 = all other ethnicities. *Family* = lives with family, Family was coded 1 = family, 0 = all other living arrangements, *Roommate* = lives with roommate, Roommate coded 1 = Roommate, 0 = all other living arrangements. * $p \leq .05$, ** $p \leq .01$.

Table 9

Results of Multiple Hierarchical Regressions for Communal Orientation, Compassion and Gratitude, Controlling for Demographic Variables

		Communal Orientation			Compassion			Gratitude		
		<i>b</i>	95% CI ^a	<i>p</i>	<i>b</i>	95% CI ^a	<i>p</i>	<i>b</i>	95% CI ^a	<i>p</i>
Step 1										
	Cohort	.60	[-.07 , .19]	.36	.05	[-.17 , .26]	.67	-.00	[-.28 , .28]	.99
Step 2										
	Cohort	.03	[-.10 , .16]	.65	.03	[-.19 , .25]	.78	.01	[-.27 , .30]	.93
	Asian	.03	[-.19 , .24]	.81	.04	[-.33 , .41]	.84	.20	[-.28 , .68]	.41
	Black	-.12	[-.32 , .09]	.25	-.06	[-.41 , .29]	.72	.24	[-.21 , .70]	.29
	Latino	-.21	[-.37 , -.05]	.01*	-.08	[-.36 , .20]	.58	.17	[-.20 , .53]	.37
Step 3										
	Cohort	-.02	[-.14 , .12]	.91	-.01	[-.23 , .22]	.97	-.02	[-.31 , .28]	.91
	Asian	.06	[-.16 , .27]	.60	.09	[-.28 , .45]	.65	.20	[-.29 , .68]	.43
	Black	-.12	[-.32 , .08]	.23	-.07	[-.41 , .28]	.70	.24	[-.22 , .69]	.31
	Latino	-.20	[-.36 , -.04]	.01*	-.07	[-.35 , .21]	.61	.17	[-.20 , .53]	.37
	Freshman	.08	[-.05 , .21]	.23	.19	[-.04 , .42]	.10	-.10	[-.39 , .21]	.54
	Graduate	.45	[.19 , .71]	<.01*	.67	[.21 , 1.13]	<.01**	.10	[-.51 , .71]	.74

Table 9 Continued

	Communal Orientation			Compassion			Gratitude		
	<i>b</i>	95% CI ^a	<i>p</i>	<i>b</i>	95% CI ^a	<i>p</i>	<i>B</i>	95% CI ^a	<i>p</i>
Step 4									
Cohort	-.01	[-.15 , .13]	.89	-.04	[-.28 , .20]	.75	.02	[-.30 , .34]	.91
Asian	.05	[-.16 , .27]	.62	.09	[-.28 , .45]	.64	.19	[-.29 , .68]	.43
Black	-.13	[-.33 , .07]	.20	-.09	[-.44 , .26]	.61	.26	[-.20 , .72]	.27
Latino	-.22	[-.38 , -.05]	.01**	-.10	[-.38 , .18]	.48	.19	[-.18 , .56]	.31
Freshman	.09	[-.05 , .220]	.21	.18	[-.05 , .42]	.12	-.07	[-.37 , .24]	.68
Graduate	.48	[.18 , .77]	<.01**	.70	[.17 , 1.23]	.01**	-.12	[-.82 , .57]	.73
Live Alone	.32	[-.13 , .77]	.16	.26	[-.52 , 1.02]	.51	-.32	[-1.34 , .71]	.54
Family	.01	[-.24 , .43]	.58	.12	[-.48 , .71]	.70	-.51	[-1.29 , .26]	.19
Roommate	.01	[-.37 , .39]	.95	-.09	[-.76 , .58]	.78	-.45	[-1.32 , .43]	.32

Note. Asian was coded 1 = Asian, 0 = all other ethnicities, Black was coded 1 = Black, 0 = all other ethnicities, Latino was coded 1 = Latino, 0 = all other ethnicities. . *Family* = lives with family, Family was coded 1 = family, 0 = all other living arrangements, *Roommate* = lives with roommate, Roommate coded 1 = Roommate, 0 = all other living arrangements * $p \leq .05$, ** $p \leq .01$.

Post-Hoc Exploratory Analyses

Further exploratory analyses were conducted to examine additional variables included in data collection including meaning in life and loneliness. Both meaning and life and loneliness are connected to social relationships and psychological functioning, warranting importance to the current study. Independent samples *t* tests were conducted to examine the differences in meaning in life and loneliness between the acute phase cohort and the recovery phase cohort. As shown in table 6, results indicated significant differences in meaning in life, with participants in the acute stress cohort reporting significantly higher levels of meaning in life compared to the recovery cohort $t(234) = -3.021, p = .003, d = -.40$. There were no significant differences for loneliness $t(234) = 1.12, p = .26, d = .15$. In line with the data analytic plan for the current study, I conducted a mediation analysis using Hayes Process to further explore whether the significant differences in meaning in life mediated the effects of cohort on psychological outcomes. Cohort was entered as the independent variable and positive affect and negative affect were entered as separate dependent variables with meaning in life entered as the mediator variable. Results did not yield support of an indirect effect for either model.

Table 10

Cohort Comparisons of Meaning in Life and Loneliness

Variable	Spring 2020		Spring 2021		<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
MIL	3.62	0.65	3.36	0.59	-3.02	.003**	.40
Lonely	2.55	0.37	2.61	0.45	-1.20	.27	.15

Note. MIL = meaning in life, Lonely = loneliness. ** $p < .01$

CHAPTER 4

DISCUSSION

Summary of Results

The innate need to form and maintain social relationships, and the inevitability of facing acute adversity are two fundamental experiences of the human condition that can have significant effects on psychological health (Baumeister & Leary, 1995; Bonanno et al., 2006; Bonanno et al., 2011; Thoits, 2011). As aspects of social relationships including social support, communal orientation, compassion, and gratitude have been found to have significant positive effects on individuals' psychological health (Baumeister & Leary, 1995; Diener & Seligman, 2002; House et al., 1988; Lakey & Orechek, 2011; Sun et al., 2020; Thoits, 2011; Umberson & Montez, 2010; Vinokur et al., 1987), it has been previously assumed that acute adversity can accomplish just the opposite, leading to post-traumatic stress disorder, depressive disorder and complicated grief (Bonanno et al., 2011). Despite the opposite effects these two experiences can separately have on individuals' psychological functioning, research has demonstrated the connection between the two through analyzing the effects of acute adversity on the social environment. It has been well documented that acute adversity, such as natural disasters, mass tragedy, illness, and death, has profound positive effects on individuals' and communities prosocial and affiliative behaviors. That is, when misfortune ensues, human beings unite (Batsian et al., 2014; Mancini et al., 2016; Poulin et al., 2009; von Dawans et al., 2012; 2019).

Given the well-established findings supporting the correlation between positive social relationships and psychological health, research has recently begun to explore how a stimulated social environment following acute adversity affects individuals' psychological functioning

(Mancini, 2019). While past research has associated acute adversity with psychopathological outcomes, recent research has confirmed heterogeneous responses to such events. That is, how one responds to acute stress differs between individuals. Findings of this research indicate that significant psychological distress following exposure to acute adversity is actually seen in a minority of individuals, while a resilient response trajectory is most commonly displayed.

Research examining the validated relationships between adversity and a stimulated social environment poses an alternative response to acute adversity; is it possible, that through a stimulated positive social environment, acute adversity may *improve* psychological functioning (Mancini, 2019). The aim of the current study was to contribute to this line of questioning within the psychological literature by examining the effects of the ubiquitous acute stress associated with the COVID-19 pandemic on individuals' social behaviors, perceptions, and psychological functioning. Specifically, this study aimed to examine individuals' levels of social perceptions, behaviors, and psychological functioning during an acute stress phase of the pandemic (Spring 2020) compared to a recovery phase one year later (Spring 2021). A subsequent aim was to explore whether changes in the social perceptions and behaviors would mediate the relationship between acute stress and psychological functioning. Although most of the current study's results did not support the proposed hypotheses, analyses did yield some interesting and important findings.

Did the Acute Cohort Report Increased Social Behaviors, Perceptions and Psychological Functioning Compared to the Recovery Cohort?

Participants in the acute cohort, compared to the recovery cohort, reported lower levels of negative affect (defined as a dimension of general distress subsuming emotions such as anger, disgust, guilt, fear, and anxiety) during a period of acute COVID 19 stress (Spring 2020) and

higher negative affect during a period one year later when COVID 19 stress was significantly lower (Spring 2021). As discussed previously, low negative affect is associated with calmness and serenity and has been associated with increased psychological functioning (Watson, 1988; Watson et al., 1988). In line with past research, such as Mancini et al. (2021) who found that attachment avoidance was lower when students were exposed to the acute stress of a hurricane compared to two groups of students who were not exposed to natural disaster, and Mancini (2016) who found that a percentage of participants displayed lower levels of anxiety and depression following a mass shooting, this finding supports the notion that psychological functioning may be better during times of acute stress compared to times of little or no stress. (Mancini, 2019, Mancini et al., 2016; Mancini et al., 2021).

Although there were no statistically significant differences between cohorts in the other study variables, it is important to note that across variables the means were higher in the acute stress cohort than they were in the recovery phase cohort for key social variables. The magnitude of these differences was in the small to medium range (from $d = -.01$ to $d = -.16$). That is, although there was not enough of a difference between cohorts to detect a statistically significant result, means were trending in the direction of the current study's hypotheses further supporting previous research (Mancini, 2019; Mancini et al., 2016; Mancini et al., 2021). Thus, there was some evidence indicating positive effects of acute stress on social behaviors and perceptions. This finding aligns with previous research such as Poulin et al. (2009), who found that following the September 11th attacks, individuals felt increased perceived prosocial benefits and Morgan et al. (2011) who found that individuals following the attacks reported higher levels of positivity in social relationships and an increased desire to do nice things for others.

These findings lend support to the overall notion of the current line of research; Not all individuals' psychological functioning is *worse* during times of acute stress. It has been widely assumed that the stress of the COVID 19 pandemic has had detrimental effects on individuals' psychosocial functioning. Initial research has supported this assumption with findings indicating increases in worry, panic, depression, anxiety, and acute stress in response to the pandemic (Best et al., 2020; Holoman et al., 2020; Li et al., 2020). Additionally, much of the current research on the isolation measures associated with the pandemic points to decreases in social connection and subsequent negative psychological outcomes. For example, Plangger et al. (2022) supports the negative effects of social isolation on older adults' mental health and quality of life, and Nogueira et al. (2022) identified increased feelings of loneliness, social isolation, and perceived quality of life among participants in response to social restraining measures.

However, the results of the current research support an alternate notion: Individuals are displaying heterogeneous responses to the COVID 19 pandemic (Mancini, 2020). That is, the effects of the pandemic on individuals' social psychological functioning are not linear, and whilst some individuals are experiencing increased mental health symptoms, others are displaying alternate responses such as resilience and *improvements* in psychosocial functioning (Elcherorth et al., 2020; Nitschke et al., 2021; Park et al., 2021; Sibley et al., 2020). Though it is valid that some individuals have experienced negative social and psychological effects in response to COVID 19 pandemic, it is critical to recognize that this is not the case for *all* individuals. The current findings provide evidence contrary to the general assumptions that individuals' social relationships and psychological functioning have been negatively affected by the COVID 19 pandemic.

Nevertheless, despite small effect size differences, the absence of statistically significant results highlights a limitation of the current study: the relatively modest degree of power. Power is a critical component of any statistical analysis as it is the probability of rejecting the null hypothesis when it is false; essentially the probability of obtaining a statistically significant result (Cohen, 1992). Power is dependent upon the sample size (N), the significance criterion (α) and the effect size (ES) which are each a function of one another. Within research planning, the sample size (N) necessary to obtain a specified level of power is usually identified prior to data collection (Cohen, 1992; 1993). Due to the nature of the data collection for the current study, increasing the sample size after initial collection to meet a certain power threshold was not possible, leading to a smaller sample size than desired and thus a small level of power. The desired power to detect a statistically significant result is 80%. The current study had 32% power to detect a small effect. This discrepancy between ideal and actual power within the current study increases the risk of type II error (accepting the null hypothesis when it should be rejected, i.e., not detecting a result that is actually there). Given that the data was trending in the right direction, it is possible that the sample size was not large enough to detect a statistically significant result between these differences. A larger sample size thus would have provided a more definitive test of differences between cohorts.

Additional variables including meaning in life and loneliness were included during data collection however were not incorporated into the current study's hypothetical inquiry. Although these variables are not directly perceived as social variables within the psychological literature, they both have links to social connectedness and psychological functioning. Because of these connections, I was interested in exploring these variables in the context of the current study. In line with the studies hypothetical and data analytic plan, I conducted independent samples t tests

to examine the differences in meaning in life and loneliness between cohorts. Interestingly, results revealed that meaning in life was significantly higher during the acute phase of the cohort compared to the recovery cohort. There were no significant effects found for loneliness, however like social variables and positive affect the means of loneliness were trending in support of the current research; Participants displayed higher mean values of loneliness in the spring of 2021 compared to the spring of 2020, with effects in the small to medium range.

These findings demonstrate further support for the theoretical notion that elements of individuals' psychological functioning may improve during times of acute stress. Participants had higher levels of meaning in life during the height of the pandemic compared to the recovery phase and were less lonely during the acute phase compared to the recovery phase. These interesting findings, contrary to general assumption, present the important question of *why?* Why may meaning in life increase during a time of acute stress, and why may loneliness be lower during a time when we were unable to physically be together? Could it be that meaning in life was higher and loneliness was lower during the acute phase of the pandemic because individuals had greater levels of social connectedness despite physical isolation? Or perhaps the slower pace of life associated with lockdowns allowed individuals to focus more on what truly matters (social relationships, health, safety etc.), allowing for increased social connection and reflection on life's meaning? Such questions are critical to consider to further understand the effects of acute stress on individual psychosocial functioning and should be incorporated into future research.

Meditation analyses examining whether meaning in life mediated the relationship between acute stress and psychological functioning (positive and negative affect) were not statistically significant in the current exploration. However, incorporating additional variables that are not solely focused on social functioning, such as meaning in life and loneliness, into

analyses in future studies can contribute to further understanding the effects of acute stress on individuals psychological functioning.

Did Social Behaviors and Perceptions Influence the Relationship Between Acute Stress and Psychosocial Functioning?

It was hypothesized that changes in social perceptions and behaviors would be mechanisms of change in the relationship between acute stress and positive and negative affect. Mediation analyses did not reveal any significant mediation effects of perceived social support, communal orientation, gratitude, or compassion on positive affect. This finding suggests that these social variables did not affect the relationship between acute stress and positive affect. Additionally, there was no direct effect of cohort on positive affect, indicating that acute stress did not independently predict positive affect.

When looking at the mediation effects of social variables on the relationship between acute stress and negative affect, the total model was significant, indicating that there was a cumulative effect of cohort and all mediators on negative affect. Additionally, there was a significant direct effect of cohort on negative affect. These findings suggest that acute stress, both with and without social variables, predicted negative affect. However, the individual social variables as mediators did not significantly affect the relationship between acute stress and negative affect, indicating that the social variables were not mechanisms of change in the relationship between acute stress and negative affect. It is important to consider that there were no significant differences in social variables between cohorts, which could have influenced the lack of effect on the relationship between acute stress and positive and negative affect. This again brings into question the power of the study. If there was enough power to detect a significant change in social variables between cohorts, it is possible that these variables may

have also had a significant mediation effect. It will be beneficial to further explore the notion of social variables being mechanisms of change between acute stress and psychological outcomes with larger sample sizes and additional social variables.

Demographic Differences Between Cohorts

Initial descriptive statistics conducted for the total data set revealed unexpected differences between cohorts. Given that this was a matched cohort comparison, it was expected that demographic variables across the two cohorts would be similar. However, this was not the case. These differences led to an exploration of possible covariates that may have contributed to non-significant results within hypothesis testing. To further explore which demographic variables had significant proportional differences between cohorts, a series of chi square analyses were conducted. These analyses revealed significant differences in year in school (specifically freshman and graduate), ethnicity (specifically Asian, Latino and Black) and living arrangement (all variations). These demographic differences between cohorts revealed that the cohorts were not matched as expected, and that these differences may have an impact on outcomes.

Therefore, a series of hierarchical multiple regression analyses were conducted to further examine the effects of demographic differences on outcome variables. Regressing cohort and covariates on outcome variables in a multi-step model allows for an increased understanding of the individual effects of each covariate and takes into consideration any overlap between effects of cohort and covariates. These analyses indicated that demographic differences between cohorts may have influenced the link between cohort and negative affect and communal orientation. We did not find that controlling for demographic differences revealed additional findings. The links between cohort and negative affect and communal orientation were slightly increased by the inclusion of variable for ethnicity (specifically Asian and Latino) and slightly attenuated by the

inclusion of demographic differences for year in school (specifically Freshman and Graduate student status).

There were no significant effects of demographic variables on any of the other outcome variables within the study (positive affect, perceived social support, compassion or gratitude) meaning that while holding these covariates constant, cohort still did not predict the outcome variables of interest. Controlling for demographic variables, and/or ensuring that cohort comparison groups are properly matched is imperative for future research to ensure minimal risk of covariation.

In addition to hierarchical linear regression analyses, univariate general linear modeling was conducted to examine interaction effects of demographic variables and cohort on outcome variables. These analyses indicated a significant interaction effect of gender by cohort on perceived social support. Specifically, males reported higher levels of perceived social support during the acute phase of the pandemic compared to the recovery phase, whereas females reported relatively consistent levels of social support in both cohorts. Furthermore, levels of social support for males and females were relatively similar during the acute phase, while males reported lower levels of social support compared to females during the recovery phase. This finding suggests that the amount of social support reported between cohorts may be dependent on gender. This finding is of interest considering the theoretical underpinnings of the stimulation of positive social behavior in response to acute stress, the-tend-and befriend model (Taylor, 2006).

This theory suggests a biological affiliative response to acute stress and posits the increased likelihood for females to tend to others under acute stress due to their innate investment in offspring and connection to other human beings. Here, we see that males had an

increased stimulation in social support during the acute phase of the pandemic, while females' levels of social support remained relatively stable in both cohorts. This generates further inquiry into the differences between male and female responses to acute stress. Do males have a greater likelihood to affiliate during times of acute stress compared to females, or do females simply have a higher baseline level of affiliation leading to a less significant change? Incorporating questions of gender and other demographic variables into future research will help to better understand not only how these variables affect outcomes, but also the differences between individuals' responses to acutely stressful events.

Relationships Among Study Variables

Correlation analyses revealed several significant correlations between study variables. Specifically, perceived social support was significantly positively correlated with positive affect, and significantly negatively correlated with negative affect. Furthermore, compassion and gratitude were also significantly positively correlated with positive affect. In line with previous research that has utilized the PANAS to measure psychological functioning in relation to acute stress and psychological functioning (Berry & Hansen, Griffith et al., 2021; 1996; Mancini, 2021; Raposa, 2016), these correlations provide support for the relationship between social variables and affect and the utilization of affect as a measure of psychological functioning. On the other hand, communal orientation was not significantly correlated with positive affect, and communal orientation, compassion, and gratitude were not significantly negatively correlated with negative affect. This lack of correlation between social variables and measures of psychological functioning may indicate that an alternate or additional measure of psychological functioning should be used for future studies. Additional measures that may be beneficial to incorporate when measuring psychological outcomes associated with acute stress and social

functioning may include the CES-D to specifically measure depressive symptoms (Hamza et al. 2020; Mancini, 2016), the Brief Symptom Inventory (Ellis et al. 2020; Valera et al. 2019), or the Satisfaction with Life Scale (Best et al. 2020).

Limitations and Suggestions for Future Research

Limitations identified within the current study are noted. Namely, as discussed prior, the current study did not have the desired power to detect a statistically significant effect, leading to possible type II error. Given the nature of data collection for studies analyzing acute stress, (typically under time constraints) it is not always possible to obtain the desired number of participants. Future studies examining acutely stressful events should consider ways of expanding data collection to obtain a desired sample size and therefore higher power. The current study showed data trending in support of the hypotheses, further emphasizing the importance of power and sample size. It is likely that with a larger sample size, statistically significant results would have been found within the current data.

A second limitation of the current study is that data was collected via self-report measures which can lead to biased responses. Subjective measures of participants' personal social relationships and affect can be biased in either direction and/or misinterpreted. It is likely that someone may report a higher or lower level of positive affect than is actually experienced. Likewise, it is likely that participants may perceive questions and answers differently. For example, in the MPSS, questions 3 and 6 refer to receiving 'help' from friends and family. Although this is a well validated measure, the ways in which 'help' is understood may differ substantially from one participant to the next. Although majority of measures are self-report, it would be highly beneficial to incorporate a more objective measure when examining individuals' social behaviors, perceptions, and psychological functioning. This may include something such

as dyadic data collection, in which participants are paired (with a close other) and rate one another, in addition to the self-report measure.

A third limitation is that there were demographic differences between cohorts. Despite the intent for cohorts to be matched demographically, there were differences identified between cohorts that may have interfered with the study's findings. Future research would benefit from engaging participants in a longitudinal study, in which the same group of participants are followed and measured at different time points during and after an acute stressor. In addition, there was no pre-event data collection. As with most research examining acute stress, collecting pre-event data is extremely rare given that acute stressors are almost always unpredictable. However, this prevents having baseline measures and leaves questions unanswered. Ongoing longitudinal data collection would promote the possibility of a pre-post design and help further contribute to the research.

Additionally, the categorization of 'acute' and 'recovery' cohorts within the current study is not definitive. Although the 'recovery' phase of the current study was examined a year after the initial panic and distress of the pandemic ensued, it can be argued that for some, there was no real 'recovery' period. As we have seen, there has been an immense amount of ambiguity over the past two years, warranting oscillating levels of fear, panic, distress, and relief for individuals across the world. Therefore, it is extremely difficult to define acute stress versus recovery in the context of the COVID 19 pandemic. Finally, the study's sample consisted of college students, generating an age range of 18-21 for majority of the participants. This small age range of young participants makes it difficult to generalize the results to a larger population, leading to additional research questions, essentially, does age affect how individuals respond to acute stress? Future research would benefit from collecting data from a wider sample inclusive of a

wider age range, and/or looking at psychosocial responses to acute stress for different age brackets (young, middle aged, elder) and comparing them to one another.

Accepting the null effects of hypotheses one, two a. and three brings to light further important inquiries, one being the nature of the stressor being examined. Past research on acute adversity has largely examined isolated events (mass shootings, natural disasters, loss of a loved one, etc.) i.e., events that happen at a single point in time, creating distress among a certain set of individuals for a measurable amount of time. The COVID 19 pandemic however is a stressor quite distinct from others previously studied. One major difference is that past events have allowed for the mobilization of physical social support in response to disaster, while the current event produced just the opposite: Social isolation. A major facet to the current theoretical notion is that the stimulation of the social environment in light of adversity leads to improvements in psychological functioning. Given that the current acute stressor denied individuals the ability to give and receive physical support, it is sensible to question how this may have impeded results.

Additionally, the pandemic was widespread. Past events have allowed for the natural dispersion of affected individuals, leaving those less affected (for example members of the town over from the site of a mass shooting or natural disaster) in a position to help those more affected (victims directly affected by the event). However, COVID 19 has affected the entire world, leaving everyone in a disadvantageous position to offer and receive support adding further question as to whether the distinctive nature of the pandemic may have hindered support of the current theoretical notions.

Despite limitations, the current study adds to the literature on social psychological responses to acute stress. First, it supports the idea that psychological functioning may be increased during times of acute stress via the differences in negative affect. In line with previous

research analyzing these relationships, the current study used positive and negative affect as measures of psychological functioning, and hypothesis 2b. (*the acute stress cohort will report lower levels of negative affect compared the recovery cohort*) was supported, indicating that when participants were experiencing higher levels of acute stress, they were experiencing lower levels of negative affect. Furthermore, means of social variables were trending in support of hypotheses 1a. through 1d., offering support to theoretical notions that social perceptions and behaviors, as well as positive affect, may be increased during times of acute stress. Additionally, exploratory analyses further supported the ideas of the current research revealing significantly higher levels of meaning in life in the acute stress cohort compared to the recovery cohort. This finding suggests that future research may incorporate additional study variables when examining social psychological responses to acute stress to further strengthen evidence. Overall, the current findings provide evidence contrary to the popular assumption that individuals' psychological functioning was negatively affected by the COVID 19 pandemic.

This study took a unique approach to examining acute stress via the COVID 19 pandemic. Prior to the current research, studies have examined the effects of acute stress on psychosocial behavior in response to isolated events (mass tragedy, natural disasters, death etc.). This study took on the complex nature of the ongoing COVID 19 pandemic, offering insight into psychosocial responses to an unprecedented and prolonged acute stressor. Future research examining individual responses to acute stress would benefit from continued efforts to further explore a wider scope of acute stressors.

Implications for Mental Health Counselors

The current research can contribute greatly to the mental health counseling field. As mental health counselors, we strive to help clients attain psychological functioning, fulfillment

and well-being. As it is inevitable that all individuals will experience at least one acutely stressful event during his/her lifetime (Bonanno et al., 2006; Bonanno et al., 2011), understanding both the positive and negative psychosocial responses to acute stress will allow clinicians to better serve various clinical populations. In addition, I believe that it would behoove mental health counselors to begin to explore how the stimulation of prosocial and affiliative behavior in response to acute stress can be capitalized. That is, considering the positive and lasting effects social support, social connectedness, compassion, and communal orientation have on psychological functioning, why are such behaviors typically elicited solely in response to highly stressful events?

As we have seen in the research, and most likely in personal experiences, it has become commonplace to expect a flood of support when we experience individual acute stress (loss of a loved one, divorce/separation, job loss, illness etc.) as well as widespread acute stress (natural disaster, terrorism, mass tragedy etc.). However, when the initial shock of the stress wears off, support tends to decline, which has been seen within the social support deterioration model (Kaniasty, 2012; Kaniasty & Norris, 1993; Norris & Kaniasty, 1996). Additionally, when things are stable or even positive (i.e., there is no significant recent or present stressor), support appears to be minimal. Namely, it seems that when things are bad, support is abundant, yet when things are good, support is lacking. Research indicates that an overall increase in the amount of social support and affiliation can help to increase individuals overall psychological functioning and well-being. The question that remains is *how* can we increase lasting support and affiliative behavior among individuals without the stimulation of a tragic event? Further examining this line of questioning can help mental health counselors better understand critical mechanisms of

psychosocial longevity and incorporate this understanding into treatment for clients experiencing a variety of mental health illnesses.

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APPENDIX A: THE MULTIDIMENSIONAL SCALE OF PERCEIVED SOCIAL SUPPORT

Instructions: We are interested in how you feel about the following statements. Read each statement carefully. Indicate how you feel about each statement.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. There is a special person who is around when I am in need					
2. There is a special person with whom I can share joys and sorrows.					
3. My family really tries to help me.					
4. I get the emotional help & support I need from my family.					
5. I have a special person who is a real source of comfort to me.					
6. My friends really try to help me.					
7. I can count on my friends when things go wrong.					
8. I can talk about my problems with my family.					
9. I have friends with whom I can share my joys and sorrows.					
10. There is a special person in my life who cares about my feelings.					
11. My family is willing to help me make decisions.					
12. I can talk about my problems with my friends.					

APPENDIX B: COMMUNAL ORIENTATION SCALE

Clark, M.S., Ouellette, R., Powell, M., & Milberg, S. (1987). Recipient's mood, relationship type, and helping. *Journal of Personality and Social Psychology*, *53*, 94-103.

SCALE

1. It bothers me when other people neglect my needs.
2. When making a decision, I take other people's needs and feelings into account.
3. I'm not especially sensitive to other people's feelings.*
4. I don't consider myself to be a particularly helpful person.*
5. I believe people should go out of their way to be helpful.
6. I don't especially enjoy giving others aid.*
7. I expect people I know to be responsive to my needs and feelings.
8. I often go out of my way to help another person.
9. I believe it's best not to get involved taking care of other people's personal needs.*
10. I'm not the sort of person who often comes to the aid of others.*
11. When I have a need, I turn to others I know for help.
12. When people get emotionally upset, I tend to avoid them.*
13. People should keep their troubles to themselves.*
14. When I have a need that others ignore, I'm hurt.

NOTE: Subjects rate each item on a **5-point scale from extremely uncharacteristic of them (1) to extremely characteristic of them (5)**. Items with an * are reversed prior to summing the ratings for an overall score.

APPENDIX C: SANTA CLARA BRIEF COMPASSION SCALE

Please answer the following questions honestly and quickly using the scale below:

	Not at all true of me	Mostly true of me	Neutral	Mostly true of me	Very true of me
1. When I hear about someone (a stranger) going through a difficult time, I feel a great deal of compassion for him or her					
2. I tend to feel compassion for people, even though I don't know them.					
3. One of the activities that provide me with the most meaning to my life is helping others in the world when they need help.					
4. I would rather engage in actions that help others, even though they are strangers, than engage actions that would help me.					
5. I often have tender feelings toward people (strangers) when they seem to be in need.					

APPENDIX D: POSITIVE AND NEGATIVE AFFECT SCHEDULE

Please indicate to what extent you feel this way **right now** using the scale below.

	Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
1. Upset					
2. Strong					
3. Scared					
4. Enthusiastic					
5. Proud					
6. Irritable					
7. Attentive					
8. Inspired					
9. Nervous					
10. Afraid					

APPENDIX E: GRATITUDE

Three items were included to assess gratitude Please indicate to what extent you feel this way **right now** using the scale below.

	Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
1. Thankful					
2. Appreciative					
3. Grateful					

APPENDIX F: MEANING IN LIFE QUESTIONNAIRE (MLQ)

Scale

Please take a moment to think about what makes your life and existence feel important and significant to you. Please respond to the following statements as truthfully and accurately as you can, and also please remember that these are very subjective questions and that there are no right or wrong answers. Please answer according to the scale below:

Absolutely Untrue	Mostly Untrue	Somewhat Untrue	Can't Say True or False	Somewhat True	Mostly True	Absolutely True
1	2	3	4	5	6	7

- ____ 1. I understand my life's meaning.
- ____ 2. I am looking for something that makes my life feel meaningful.
- ____ 3. I am always looking to find my life's purpose.
- ____ 4. My life has a clear sense of purpose.
- ____ 5. I have a good sense of what makes my life meaningful.
- ____ 6. I have discovered a satisfying life purpose.
- ____ 7. I am always searching for something that makes my life feel significant.
- ____ 8. I am seeking a purpose or mission for my life.
- ____ 9. My life has no clear purpose.
- ____ 10. I am searching for meaning in my life.

Scoring:

Item 9 is reverse scored.

Items 1, 4, 5, 6, & 9 make up the Presence of Meaning subscale

Items 2, 3, 7, 8, & 10 make up the Search for Meaning subscale

Scoring is kept continuous.

APPENDIX G: UCLA LONELINESS SCALE VERSION 3

Scale:

INSTRUCTIONS: Indicate how often each of the statements below is descriptive of you.

Statement	Never	Rarely	Sometimes	Often
*1. How often do you feel that you are "in tune" with the people around you?	1	2	3	4
2. How often do you feel that you lack companionship?	1	2	3	4
3. How often do you feel that there is no one you can turn to?	1	2	3	4
4 How often do you feel alone?	1	2	3	4
*5. How often do you feel part of a group of friends?	1	2	3	4
*6. How often do you feel that you have a lot in common with the people around you?	1	2	3	4
7. How often do you feel that you are no longer close to anyone?	1	2	3	4
8. How often do you feel that your interests and ideas are not shared by those around you?	1	2	3	4
*9. How often do you feel outgoing and friendly?	1	2	3	4
*10. How often do you feel close to people?	1	2	3	4
11. How often do you feel left out?	1	2	3	4
12. How often do you feel that your relationships with others are not meaningful?	1	2	3	4
13. How often do you feel that no one really knows you well?	1	2	3	4
14. How often do you feel isolated from others?	1	2	3	4
*15. How often do you feel you can find companionship when you want it?	1	2	3	4
*16. How often do you feel that there are people who really understand you?	1	2	3	4
17. How often do you feel shy?	1	2	3	4
18. How often do you feel that people are around you but not with you?	1	2	3	4
*19. How often do you feel that there are people you can talk to?	1	2	3	4
*20. How often do you feel that there are people you can turn to?	1	2	3	4

Scoring:

The items with an asterisk are reverse scored. Keep scoring on a continuous basis.

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