INDUCING AWE WITH NATURE ENVIRONMENTS: IMPLICATIONS FOR MENTAL HEALTH

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ABSTRACT

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The purpose of this study was to further investigate if 360-degree-degree nature videos can produce similar positive mental health outcomes associated with real-life nature environments. Specifically, this study measured participant levels of hope, well-being, and stress after viewing either a 360-degree mountain environment, a 360-degree water environment, or neutral environment. Originally this study aimed to use virtual reality (VR) environments, that had been validated to produce awe. However, the global COVID-19 pandemic prevented the use of VR in the research setting. An alternative procedure, in line with COVID-19 precautions, was developed to create a similar study using 360-degree nature videos. The use of 360-degree videos was an attempt to induce at least some degree of awe. This study used a large, generalizable sample with standardized measures for replicability, and the findings were based off self-reported measures. A multivariate analysis of variance (MANOVA) and an analysis of variance (ANOVA) were utilized to test hypotheses one, two, and three with hope, well-being, and stress being the three dependent variables. No significant differences were found among the three groups on well-being, stress, or hope. The lack of significant results indicates

the need for a more immersive awe experience; the use of VR environments that have been validated to produce awe is suggested in future studies.

Introduction

This thesis was developed in the context of nature-based experiential therapy which has historically included outdoor, wilderness, and adventure approaches. The current study focuses on the idea that awe is not an emotional state; it is an experience. Furthermore, it proposed that awe is an experience that can be induced. Specifically, this thesis examined the use of 360-degree nature videos as a means to induce awe. These concepts are most closely related to humanist schools of psychology and philosophy and are ultimately connected to spirituality and states of consciousness. In the following sections, the broad historical concepts of philosophy and spirituality is addressed and then the content will narrow to focus more specifically on psychological paradigms.

As early as 4000 B.C., humans, as a species, have recorded alternative states of consciousness (Bynum, 1992). Early Greek scientists favored what they deemed more rational dimensions and deemphasized the role of the transpersonal dimension. By the 7th century A.D., beliefs involving psychospiritual dimensions were actively persecuted. For example, mystery schools that were created to preserve ancient traditions rooted in the psychospiritual were suppressed after the Romans conquered Egypt. These schools re-arose in West Africa and Europe as secret sects, like the Free Masons, and played a major role in the Renaissance and Enlightenment periods. As a result of this suppression, transpersonal ideologies faded within many scientific communities. However, these ideologies resurfaced in the field of psychology. Evidence of this resurfacing can be seen in 19th century psychologists like Sigmund Freud and Carl Jung who were particularly interested in states of consciousness. Pioneers in the field like William James, dubbed the

Father of American Psychology, attempted to study transpersonal experiences (Bynum, 1992).

Early Schools of Psychological Thought

Two major schools of thought dominated Western Psychology by the mid-twentieth century: Psychoanalysis and Behaviorism (Grof, 1998). Psychoanalysis was pioneered by Sigmund Freud in the 19th century and focused on the unconscious mind and its influence on behavior. Psychoanalysis contrasted Behaviorism. Behaviorism was made popular by psychologists such as B.F. Skinner, Ivan Pavlov, John Watson, and others who sought to explain human behavior solely based on observation (Bynum, 1992). Behaviorism had the allure of being more precise than other theories that involved people's perceptions and emotions (Grof, 2008). However, both schools of thoughts incurred due criticisms. Broadly, Psychoanalysis was criticized for its lack of empirical data and focus on pathology, whereas Behaviorism was criticized for neglecting the cognitive processes involved in behavior (Grof, 2008).

Humanist Psychology

Psychologists like Abraham Maslow saw clear limitations to both Psychoanalysis and Behaviorism (Grof, 2008). In 1969, Maslow's book *The Farther Reaches of Human Nature*, addressed these limitations. Maslow criticized Psychoanalysis for focusing on theories associated with the abnormal and neglecting to examine well adjusted, normal, human beings. In response to Behaviorism, he criticized it for reducing uniquely human experiences and behaviors to observable behaviors in rats and pigeons. He believed that the richness of the human experience was lost by neglecting aspects such as love, self-consciousness, art, religion, and even science (Grof, 2008).

In light of the shortcomings he associated with Psychoanalysis and Behaviorism, Maslow introduced what he dubbed The Third Force: Humanistic Psychology (Grof, 2008). Humanists studied positive human experiences and people thought to have constructive, normal personalities. Humanistic Psychology was a shift from the traditional psychological approaches and made way for more effective therapeutic approaches to treat a wide range of mental health issues. One of the most important aspects of Humanism was its emphasis on interconnectedness of mind and body. However, later on in his life and studies, Maslow, and other Humanists like Stanislav Grof and Anthony Sutich agreed that the human experience could not be wholly understood without the recognition of an even greater interconnectedness. From this discontentment, Transpersonal Psychology was born (Grof, 2008).

Transpersonal Psychology

Transpersonal Psychology was created to broaden the scope of the dominating psychological perspectives of the 20th century (Grof, 2008). Rather than asserting that self-awareness and self-actualization was the pinnacle of the human experience, Transpersonal Psychology exalted an ego-less state that reflected the interconnectedness of more than just mind and body (Koltko-Rivera, 2006). In the former, the complete understanding of self was seen as the apex of human enlightenment whereas, in the latter, the focus went beyond just understanding yourself but, understanding yourself in the greater context of the world and even the universe i.e. your place in things. This higher state of consciousness, according to transpersonal theory, can lead to healing beyond a person's psyche and into a spiritual realm of healing (Koltko-Rivera, 2006). Transpersonal theorists believe that this higher state of consciousness is the very essence

of mental health (Besthorn, 2001). Besthorn (2001) references the potential transpersonal theory has to alter an individuals' view of self, society, and even, the universe. One of the most illustrative examples of transpersonal theory's emergence in psychology can be seen in Maslow's decision to alter his Hierarchy of Needs theory (Koltko-Rivera, 2006).

Maslow's Hierarchy of Needs

One of Maslow's well-known contributions to the field of psychology is his hierarchy of needs. His hierarchy contained five basic human needs, wherein even experiencing a need is contingent of the fulfillment of the previous need (Koltko-Rivera, 2006). At the base of this pyramidal theory are physiological needs, followed by safety needs, love and belonging needs, esteem needs, and apexes with self-actualization. The first and most basic needs of Maslow's hierarchy include food, shelter, and water. The second tier is safety needs. According to Maslow, a person cannot experience a need for safety until his basic needs are satisfied. The apex, self-actualization is personal fulfillment (Koltko-Rivera, 2006). Maslow asserted that self-actualization is individualistic by nature, in that one person's ideal could be quite different from another person's (Cowley, 1993).

As noted above, Maslow and others became discontent with the humanistic model, citing that the model neglected spirituality, a critical aspect of the human experience. Maslow's recognition of the spiritual self-led him to question his hierarchy of needs model. Within his research of self-actualization as the highest need, he originally cited peak/transcendent experiences to be a key factor during this stage (Maslow, 1943). Peak experiences, according to Maslow, are moments in which a person feels ultimate joy, happiness, and one-ness with self (Maslow, 1962). However, by the end of his life,

Maslow had begun to question his own construct noting that, peak experiences are characterized by feeling a transcendence of self, a "oneness with the universe" (Maslow, 1962, p. 9). Rather than lumping self-actualization and self-transcendence together, he amended his pyramid to apex with self-transcendence; this is where peak experiences truly belong, according to Maslow (Koltko-Rivera, 2006; Maslow, 1943).

In his amendment, he distinguished these two states by defining self-transcendence, or Being Cognition, as “the very highest and most inclusive or holistic levels of human consciousness, behaving and relating, as ends rather than means, to oneself, to significant others, to human beings in general, to other species, to nature, and to the cosmos” (Maslow, 1971, p 269). Transcendence of self requires individuals to expand their awareness of self by seeing themselves as an indivisible part of the whole (Besthorn & Canda, 2002). Maslow touted the role of nature in creating these peak experiences. He asserted that emotional experiences with nature were quite likely to produce a transcendent state thus, lending the person to experience an ultimate sense of well-being (Maslow, 1971). The idea that nature could play a major role in a person’s sense of well-being is the foundation of many nature-based therapies throughout history and in the present.

History of Nature-based Therapy

The use of the nature to increase positive outcomes in mentally ill patients dates back to the 1800’s. A group of Quakers began implementing nature, such as greenhouses and animals, into the treatment plans of patients at Friends Hospital in Philadelphia, PA (Association for Experiential Education, 2016). In the early 1900s, the Manhattan State Hospital as overcapacity and began setting up tents outside the hospital to house the

overflow of patients (Berman & Berman, 1994). Specifically, 40 tuberculosis patients were moved to tents on the hospital grounds. The staff noticed dramatic improvements in the physical and mental health of these patients. They cited that the patients outlook on life and overall attitudes were notably more positive. After these observations, 60 more patients were moved into the tents on the grounds. Again, these patients dramatically improved physically and mentally with many being discharged. After the summer months, patients who had experienced improvements in the tents were moved back into the hospital for the upcoming winter season. Many of these patients reverted to destructive habits like the tendency to isolate themselves and be generally discontent. They also reverted physically to incontinence and weight loss. Although the early literature is sparse, in 1906 the *American Journal of Insanity* published Dr. Andrew Hoisholt's account of remarkable differences seen in the patients. Tent therapy began popping up in other places like Binghamton State Hospital, an asylum in New York geared towards the treatment of alcoholics. Another hospital, Bloomington Hospital in White Plains noted the improvement in patients treated in tent camps. Despite the surge in positive outcomes experienced in tent camps, by 1920, Berman and Berman (1994) note the almost mysterious disappearance of this innovative approach entirely from the psychiatric literature of the time.

In spite of their disappearance, these early programs made way for a new approach to therapy namely, camping therapy (Berman & Berman, 1994). Founded in 1926, Camp Ahmek, a camp for adolescent boys in Canada was the first camp to state therapeutic goals of the camping experiences. It was also a pivotal point in outdoor therapy because the camp attempted to measure the effectiveness of the program through

observation, self-reports, and rating scales. Although this particular camp was created for mentally healthy boys, other camps would soon emerge in the treatment of those with mental illness. While the literature was generally theoretical, some important foundations of outdoor therapy were observed and introduced. Many outcomes of these camps noted groups and group processes, but another outcome began to emerge: the uniqueness of the natural environment. Later programs, such as The University of Michigan's Fresh Air Camp and the Salesmanship Club Camp had strong therapeutic foci but lacked empirical research on outcomes (Berman & Berman, 1994).

Populations served by Nature-based Therapy. In the 1940's, Outward Bound, one of the most widely known outdoor programs, emerged and is still in existence today. Outward Bound proved to be the impetus for wilderness and outdoor therapy research and practice (Association for Experiential Education, 2016). Outward Bound was and is primarily focused on the treatment of adolescents suffering from a myriad of issues (Association for Experiential Education, 2016). Adolescents are notorious for being a difficult to treat demographic within traditional counseling settings (Hill, 2007). Thus, there is a demand for therapeutic interventions of varying styles to meet the needs of struggling youth (Norton et al., 2014). Alternative treatments, especially ones that involve "getting out of the office," are the preferred modalities for treating adolescents (Hanna et al., 1999, p. 396). Among treatment options, nature-based programs are a promising and evidence-informed treatment modality for at-risk youth (Dobud, 2017). Existing research supports the use of nature-based programs as a treatment modality for adolescents from a variety of racial/ethnic, gender, and economic backgrounds struggling with mental, physical, and social health challenges. (Bowen et al., 2016; Gass et al.,

2012; Norton et al., 2014; Tucker & Norton, 2013). Outdoor therapy is used to treat adolescent sex offenders, anti-social youth, youth suffering from substance misuse issues, depression, anxiety, and attachment disorders (Bettman & Tucker, 2011; Gass & Gillis, 2010; Glass & Benshoff, 2002; Norton, 2010; Russell, 2006).

In addition to adolescents, there is an ever-increasing amount of research being conducted on outdoor therapy's effects on families, women, and military veterans (Harper & Russell, 2008; Powch, 2008; Ragsdale et al., 1996). For example, the use of nature in treating a multitude of issues facing women has been shown to be effective due to the intangible spiritual healing they experience by feeling a new or renewed sense of connection with nature (Powch, 2008).

In reference to military veterans, outdoor therapy has been used to treat military veterans suffering from PTSD. Hyer et al.'s (1996) study on military veterans, using Outward Bound as an adjunct to therapy, linked the outdoor experience to increases in emotional control and social connectedness. Gelgopf et al.'s (1996) study found that nature adventures aided in the reduction of PTSD symptoms in military veterans. A more recent study conducted by The Sierra Club found that military veterans who participated in prescriptive outdoor experiences reported significant increases in well-being, social functioning, and outlook on life. (Duvall & Kaplan, 2013). The growing body of research on outdoor therapy continues to broaden the reach of this unique therapy towards many other populations as well, including college students, trauma survivors, victims of abuse, and people suffering from physical diseases (Tucker & Norton, 2013).

Limitations of Nature-based Therapy Research. Despite gains in the rigor of the research on nature-based therapy, the field has yet to specify with certainty what

component or combination of components is contributing to the effectiveness of this treatment modality (Bloomfield, 2017). Although, many outdoor and nature-based therapies have linked the outdoors to positive mental health outcomes, there remains haziness to exactly what it is about being outdoors in nature that produces these outcomes. A group of health practitioners ran a free program that prescribed eight different nature-based interventions for members of the community. As the program developed all recruited participants had a diagnosis of mild to moderate depression. The interventions ran for 12 weeks and each group differed in the details of delivery and the natural environments involved. Some groups walked in the woods while others practiced silent mediation outdoors; another group engaged in conservation efforts. Some of the groups were located in the woods, some on farmland, and some in green spaces in urban environments. Despite the variations in programming, it seems the common outdoor element played a major role in the reported success of this program. Sixty-nine percent of patients experienced an increase in self-reported well-being; participants reported an increase in social skills, confidence, and an improved self-worth and agency (Bloomfield, 2017).

Bloomfield's (2017) results, similar to the results seen in other outdoor based interventions still leave the question of *what* worked? Was it the natural environments, the social interaction, the learning of new skills, or was it a combination? This example is one of a multitude of studies on outdoor based therapies that claim positive results; it is not a templar by any means. However, it serves to simplify the main problem that outdoor therapy research faces which is the lack of control needed to correlate nature with positive outcomes. Even without the specific foci of the groups, such as walking,

conservation, and meditation the outdoors is comprised of an infinite number of elements that could be at work in creating these outcomes (Bloomfield, 2017).

Aesthetic Qualities of Nature

Lack of specificity and control is undoubtedly an issue in outdoor based therapies but a growing body of research touts the influence of the aesthetic qualities of nature on positive mental health outcomes (Russell & Gillis, 2017). This research suggests that merely being in nature, seeing nature, and simply experiencing nature could be a significant influence on the success of these programs. Ulrich (1981) addresses this theory of aesthetics directly by acknowledging the multisensory perception involved in nature experiences while highlighting the dominating role that vision plays in gathering information about a natural environment. A major study corroborating this idea was conducted by the Shafer and Richards (1974) where participant's verbal responses were recorded after viewing an actual nature scene, an 8x10 color photograph of that same scene, and a projection of a small portion of that scene. No significant difference was found between the group who viewed the actual scene in nature and those that viewed a photograph of the same scene (Shafer & Richards, 1974).

The benefit of merely seeing nature is accounted for in various other environments: patients recovering from surgery experience multiple positive benefits such as shorter postoperative stays when placed in a room with a view of nature through the windows as opposed to the patients who had a view of a brick wall (Ulrich, 1984). Patients in a coronary and pulmonary rehabilitation center with panoramic views of nature from their bedrooms reported an increase in physical and mental health (Raanaas et al., 2011). Workers whose offices have nature views through the window report higher

job satisfaction than those with no nature views (Kaplan, 1993; Ulrich, 1984). Pictures of nature have also been used to decrease stress, increase arousal, increase positive affect, and restore attention (Bratman, 2012; Honeyman, 1990; Ulrich, 1979, 1981). Thus, research in vast and varying areas, supports the idea that the visual components of nature are, at least in part, responsible for many of the positive outcomes noted in research and theory.

The current study seeks to further explore what specific visual aspects of nature are the most likely to trigger a peak experience. In creating the theory of peak experiences, Maslow attempted to answer this query. In doing so, he specified water, wild animals, sunsets, and mountains as potential visual triggers for peak experiences (Maslow, 1968). Ulrich (1981) attempted to answer this question as well in their study on participant response to pictures of natural environments versus participant response to pictures of urban environments. In this study, all participants were exposed to three different groups of pictures: nature with water, nature dominated by green vegetation, and urban environments without water or vegetation. Before and after viewing each category, participant's baseline measures on semantic (mood and feelings) and personal reaction (fear, arousal, positive affect, anger/aggression, attentiveness, and sadness). In addition, participant's heart rate and alpha amplitude (cortical arousal) were measured before, during, and after the viewing of each category. Psychological results showed that participant's feelings of attentiveness, well-being, and positive affect were higher in the nature scenes. In addition, the alpha frequency power showed positive influences on well-being with the nature scenes (Ulrich, 1981).

Most notable for the current study is that the water environment showed more positive outcomes than the vegetation environment. These finding supports Ryback and Yaw's (1976) assertion that water has a mesmerizing effect on humans. Additional research on the specific types of natural environments Maslow listed corroborates the positive effect of these types of natural environments. Laski (1961) and DeMares and Krycka (1998) note transcendent experiences triggered by wild animals while Vogler (2012) and Ebersole (1972) note sunsets within the narrative accounts of peak experiences. Williams and Harvey (2001) also note the transcendent effect of forest environments including mountains and trees in. Thus, it seems that Maslow's original theory of what types of natural environments act as catalyst for peak experiences is supported in the current and past literature on aesthetics. The question that follows then, is what commonality do these visual stimuli share?

Awe as an Experience not an Emotion

By further exploring literature on peak and transcendent experiences, common emotional and/or experiential themes prominent within those documented experiences have been extracted in hopes of applying the findings to specific natural environments. Firstly, the following terms have been extracted from previous articles seeking to describe peak and transcendent experiences: a highly valued moment (Laski, 1961; Maslow, 1962, 1964, 1971; Privette, 2001), a moment of highest happiness and fulfillment (Maslow, 1962), moment of ecstasy (Laski, 1961), absorption in moment (Williams & Harvey, 2001). Privette (2001) identifies six qualities of a peak experience, one of these qualities is positive affect. The definition she gives for positive affect summates the essence of all the aforementioned explanations: "through the experience,

percipients report feeling great, joy, peace, happiness, and absence of fear, wonder, awe, reverence, a sense of total acceptance, compassion, love, and forgiveness of ignorance and wrongdoing, a sense of perfection and sacredness of the universe" (Privette, 2001, p. 602).

Of all of these seeming emotional states, specific attention was placed on awe. This attention is directly related to recent emphasis in current research on the construct of awe, as less of an emotion and more of an experience; this made it stand out in the list as potentially different from the others (Chirico, 2018). Indeed, current constructs of awe define it as, "the ultimate humanistic moment" which highlights its applicability to the previously listed terms associated with peak and transcendent experiences due to their emphasis on the momentary aspect (Konecni, 2005; Laski, 1961; Maslow, 1971; Privette, 2001; Williams & Harvey, 2001). In addition, Konecni (2005) purports that awe is a central player in psychological aesthetics, a discipline whose focus is on human's perception and response.

Defining Awe. This literature review emphasized the visual aspects of nature and the experience that follows a person's perception of that visual stimulus. By extracting awe as a unique and potentially significant player in peak experiences, it is important to apply its significance to the previously stated natural environments that trigger peak experiences. To accomplish this however, awe must be well-defined. Exploration and interpretation of awe dates back to the philosophical musings of Edmund Burke and Immanuel Kant in the 1700's (Bonner & Friedman, 2011). However, until Keltner and Haidt's (2003) prototype, aimed at operationally defining awe, the definition was not consistent amongst philosopher or researchers (Bonner & Friedman, 2011). In fact,

Keltner and Haidt (2003) insist that the lack of psychological research on awe is due to the lack of a widely accepted construct of the term.

Keltner and Haidt's (2003) prototype for awe includes two basic features: vastness and accommodation. Firstly, vastness refers to the perception that something is bigger than the self, either in sheer size or in reference to power dynamics. Accommodation references Piaget's theories on assimilation of new experiences. Accommodation is when a person has to expand their current mental schema in order to accurately place the new stimuli (Keltner & Haidt, 2003).

Awe and Nature. Consider awe in relation to the various natural settings proposed by Maslow to trigger peak experiences. Mountains for instance, are indeed vast, in that they dwarf humans. The same could be said for the Giant Redwoods in California or Niagara Falls. Many narrative accounts of natural environments recollect sentiments of a diminishing self, a small self, which challenges most human's previously accepted schema of their place in things. The implication of these findings on psychological research is substantial in that previous research on peak and transcendent experiences has been primarily confined to qualitative research using personal narratives (Anderson et al., 2018; Campos et al.; Rudd et al., 2012; 2013; Schneider, 2009; Williams & Harvey, 2001). For example, Williams and Harvey (2001) studied people who live or work in forest environments and extracted themes from written samples, Anderson et al. (2018) took military veterans, at-risk youth, and college students on rafting nature adventures and extracted themes from their daily journals, and Powch's (1994) book about women in the wilderness relies heavily on case studies. However, by specifying the role awe has in these narrative experiences and identifying specific natural environments that induce

awe, researchers can now attempt to induce awe in a more controlled environment to better understand its effects on mental health.

Inducing Awe with Pictures of Nature. Previous laboratory research attempting to illicit awe with pictures of the sky and space have been successful at inducing low intensity versions of awe (Silvia et al., 2015). They exposed 103 adults to a series of 14 images of the sky and space and measured the awe subscale on the Dispositional Positive Emotion Scales and found that participants did experience self-reported awe after viewing. Additionally, experimental research has used nature videos to elicit awe (Gorson et al., 2017; Piff et al., 2015). For example, Gordon et al. (2017) were able to elicit awe within their participants by depicting the earth, space, and other stars, along with ominous music on a 44-inch TV screen. Similarly, Piff et al. (2015) and Valdesolo and Graham (2014) utilized 5-minute clips from The BBC's Planet Earth to successfully elicit awe in their participants. Although these methods have been successful at eliciting awe in the participants, they still lack the sense of presence that actually being in nature affords (Chirico et al., 2018)

Clinical Implications of Awe-Inducing Videos

The focus of the current study is applicability within the clinical setting. With nature as an appropriate vehicle to deliver awe-inducing stimuli to viewers, the question becomes whether this type of stimuli can produce the same positive mental health outcomes seen in previous qualitative studies on awe. The implications are vast within the clinical setting if findings suggest videos can successfully produce similar positive mental health outcomes as actual nature experiences. Accessing nature environments may be difficult for some clients and/or clinicians. For example, clients with physical

differences due to chronic or acute disability or age may not be able to access actual nature environments easily. Furthermore, clinicians are likely not able to support nature experiences for all the clients that might benefit due to client load, accessibility to natural environments, organizational policy, or any number of other limitations. The prospect of bringing those nature experiences into the traditional office setting may offer clinicians an adjunctive therapy to produce or support positive mental health outcomes that are beneficial to their clients and their therapeutic journeys. With clinical applicability in mind, the current study examined positive mental health outcomes noted or related to outcomes in previously published awe research: Well-being, stress, and hope.

Well-being. Well-being is defined as a state of happiness and contentment, with low levels of distress, overall good physical and mental health, outlook and good quality of life (APA, 2020). Current awe research is rich with studies that link the experience of awe to a greater feeling of well-being. Gordon et al. (2017) conducted a qualitative study on awe where they had college students keep a daily awe diary. They also collected daily self-reports of specific emotions and well-being. They found that self-reported well-being was significantly higher on days that the participants experienced non-threat-based awe compared to the days they did not experience awe, or experienced threat-based awe. A recent study on college students, at-risk youth, and military veterans yielded similar results. Anderson et al. (2018) took a sample of these populations on white-water rafting trips. They kept narrative diaries of these experiences and also completed self-report measures on well-being, stress, and life satisfaction. They found that well-being was significantly higher in the participants who experienced awe on the rafting trips compared to their well-being score at baseline before the rafting experience. As an additional part of this study, the researchers took a sample of college students and measured their

baseline well-being scores. Afterward the participants were asked to recollect awe experience in narrative style. Participants who recollected nature-induced awe experiences reported significantly higher levels of daily life satisfaction and well-being.

Hope. Hope is defined as the perceived capability to obtain desired goals and motivate oneself to initiate and sustain forward trajectory towards those goals (Snyder et al., 2000). The construct of hope contains both *agency* and *pathways.* Agency is defined as setting goals and pathways, are defined as making plans to meet those goals. Frank (1975) and Frank and Frank (1991) made the observation that clients entering into therapy, often do so in a state of demoralization. This demoralization is brought on by exhausting their current capacity to reach the goals in their life. In short, these clients have lost hope because they are no longer able to either set goals, or successfully plan to meet those goals, or both. Wampold (2001) conducted a large quantitative review of psychotherapeutic effects and found that 70% of positive effects were due to common factors such as hope. This study highlighted the importance of a therapist's ability to instill hope in their clients. Within the current study, this construct is exploratory because previous awe studies have not directly specified hope as an outcome of awe experiences. However, previous research has put a great deal of emphasis on positive emotions that follow awe experiences that it seems prudent to look specifically at hope, as a positive emotion critical in treating clients within the clinical setting (Anderson et al., 2018; Shiota et al., 2007; Stellar et al., 2015). Shiota et al.'s (2007) study recorded participants responses to awe experiences and statements such as, "I was unaware of my day-to-day concerns" are representative of an important factor of hope which involves the perception that barriers are removed from the person's current struggle (Wampold, 2001).

Stress. Perceived stress is the degree to which situations in one's life are appraised as stressful (Cohen, 1988). A 2014 meta-analysis of 59 previous studies on the effects of nature contact found that contact with nature was significantly linked to a reduction in stress (Hartig et al., 2014). The aforementioned rafting study conducted by Anderson et al. (2018) also found a reduction in stress after awe experiences. A more quantitative study was conducted on this outcome by Stellar et al. (2015). In this study, awe was linked to lower levels of proinflammatory cytokines. Proinflammatory cytokines are a response from the immune system brought on by stress. Therefore, this study sheds light on the actual physiological responses that humans have to stress and how awe experiences could play a role in reducing the stress response that is responsible for many physical and mental health issues.

Purpose

The purpose of the current study was to examine the effect of awe, induced by 360-degree nature videos, on participant's perceived level of well-being, hope, and stress. This study aimed to contribute to the literature of awe and nature's ability to induce the awe experience. Additionally, this study aimed to promote the use of 360-degree nature videos within the clinical setting to combat the accessibility limitations of using nature in a therapeutic setting. Originally this study intended to use VR environments, that had been validated to produce awe. However, the global COVID-19 pandemic prevented the use of VR in the research setting. The only safe alternative to create a similar study was to use 360-degree nature videos, in an attempt to induce at least some degree of awe.

Previous research has shown that experiencing awe can elicit positive mental health outcomes, such as increased life-satisfaction and well-being and decreased anxiety and stress. To experience awe, one must experience two constructs simultaneously: accommodation and vastness. Previous research has shown that various nature environments require both accommodation and vastness thus, they can elicit awe. Specifically, mountains, tall trees, water, and wildlife have been used in previous awe literature. Thus, it was predicted that 360-degree nature environments would result in higher levels of life-satisfaction in the water and mountain videos, compared to the neutral video. It was also predicted that 360-degree nature videos would result in higher levels of hope, compared to the neutral video. Lastly, it is predicted that 360-degree nature videos would result in lower levels of stress, compared to the neutral group.

Tested Hypotheses

1a. The mountain group and water group will each report significantly higher scores on self-reported life-satisfaction compared to the neutral group.

1b. There will be no significant difference in life-satisfaction between the mountain group and the water group.

2a. The mountain group and water group will report significantly higher scores of self-reported hope compared to the neutral group.

2b. There will be no significant difference in hope between the mountain group and the water group.

3a. The mountain group and water group will report significantly lower levels scores of self-reported stress compared to the neutral group.

3b. There will be no significant difference in stress between the mountain group and the water group.

Method

Participants

The sample consisted of undergraduate students, at least 18 years of age. A power analysis was conducted by G*Power (Faul, Erdfelder, Buchner, & Lang, 2009) which indicated a need for 252 participants to achieve 80% power for detecting a small-medium effect when employing the traditional .05 criterion of statistical significance. Participants were recruited from the Psychology 150 SONA recruitment research pool and receive research credit for participation.

Video Stimuli. The awe-inducing videos were 360-degree videos that allow the participant to change the angle of their view whereas, the neutral video did not offer this feature. The details of each video are described below.

Mountains. This 360-degree video was 3 minutes and 17 seconds long, it was shot with an Insta360-degree OneX and Insta360-degree Pro2. The 360- degree element allowed the viewer to change their angle while the video progresses to look around, down, and up, which adds an immersive quality. This video is of Mount Elbrus in Russia, the highest peak in Europe. Both vastness and need for accommodation were conveyed by the size of the mountain and the ability to moderately navigate this environment.

Water. This 360-degree video was 3 minutes and 31 seconds long, it was shot with an Insta360-degree OneX and Insta360-degree Pro2. The 360- degree element allowed the viewer to change their angle while the video progresses to look around, down, and up, which adds an immersive quality. This video is of Dietan Falls, Asia's largest transnational waterfall on the China/Vietnam border. Dietan Falls is the 4th largest waterfall along this national border and consists of two 30-meter high flows between China and Vietnam. Both vastness and need for accommodation were conveyed by the size of the mountains surrounding the waterfall and the immensity of the waterfall itself, as well as the ability to moderately navigate this environment.

Neutral. This video clip showed free range chickens being let out of their coop in the morning and wandering freely around a farm, scratching and feeding on the fresh grass and bugs. This video was chosen as the neutral video because it did not convey vastness or require the need for accommodation. This stimulus was adapted from previous research. Chirico (2017) conducted a preliminary study validated awe-inducing

stimuli and identified hens walking as a neutral stimulus thus, the current study choose to find the closest video to that research as possible.

Measures

Demographics

Participants completed a demographic questionnaire. The demographics included gender (male, female, non-binary), age, ethnicity, and race.

Well-Being

Participants completed the Psychological Well-Being Scale Short Form (PWB; Ryff, 1995). The PWB Short Form scale consists of 18 items 6 factors such as positive relation with others, autonomy, environmental mastery, personal growth, purpose in life and self-acceptance that measures and uses a seven-point Likert response format (Ryff, 1989). The statements, "Some people wander aimlessly through life, but I am not one of them" and "For me, life has been a continuous process of learning, changing, and growth" are representative of the types of statements on this scale. The seven points range from one (Strongly Disagree) to seven (Strongly Agree), with a neutral stance at four. Responses reflect the extent to which the participant feels the statement is accurate for themselves. This scale has demonstrated good internal reliability (α =.85; Ryff, 1989).

Hope

Participants completed the Adult State Hope Scale (ASHS; Snyder et al., 1996). The ASHS contains six items and uses an eight-point Likert response format. The statements, "If I should find myself in a jam, I could think of many ways to get out of it" and "I can think of many ways to reach my current goals" are representative of the types

of statements on this scale. The eight points range from one (Definitely False) to seven (Definitely True). Responses reflect the extent to which the participant feels the statement is accurate for themselves. The scale has demonstrated excellent internal reliability in this study (α =.92; Snyder et al, 1996).

Stress

Participants completed the Perceived Stress Scale (PSS; Cohen et al., 1983). The PSS contains ten items and uses a four-point Likert response format. The statements, "In the last month, how often have you felt that you were unable to control the important things in your life?" and "In the last month, how often have you found that you could not cope with all the things that you had to do?" are representative of the types of questions on this scale. The four points range from zero (Never) to four (Very Often). Responses reflect the extent to which the participant feels the statement is accurate for themselves. Internal consistency for the full 10-item scale is moderate ($\alpha = 0.70$)

Procedures

IRB approval was obtained through Western Carolina University on August 31, 2020. Western Carolina University participants logged into SONA and were directed to Qualtrics to complete this study. Once they clicked on this link an informed consent was provided. Participants then completed demographic questions. After participants agreed to the informed consent and competed demographics, Qualtrics randomly assigned each participant to an awe-inducing 360-degree video group (water or mountains) or a neutral group (hens walking). Participants then viewed their assigned video; participants in 360-degree video group were able to moderately navigate around the environments as the video progressed by looking up and around with touch screen or arrow keys. Instructions

for the 360-degree videos were as follows: “On the next page, you will view a video. Please turn your volume **off** and **maximize** your screen. Use your mouse or touchscreen to navigate around the environment. Watch the video in its entirety.” Instructions for the neutral video were as follows: “On the next page, you will view a video. Please turn your volume off and maximize your screen. Watch the video in its entirety.” Participants then completed the PWB, ASHS, and PSS. Finally, participants were thanked for their participation and the survey concluded. Western Carolina undergraduate students were awarded their half credit hour of participation.

Analyses

Mahalanobis (1936) distances were calculated to determine multivariate normality, linearity of relationships via scatterplots (for content validity; e.g., Cureton, 1951), multicollinearity, and Box's test of equality of covariance matrices. These analyses were completed prior to running a multivariate analysis of variance (MANOVA) to ensure all assumption criteria was met for the MANOVA analysis. A one-way between groups MANOVA was calculated to test hypotheses one, two, and three with well-being, hope, and stress being the three dependent variables. A one-way between subjects’ analysis of variance (ANOVA) was conducted to further compare the effect of nature videos on wellbeing, hope, and stress. To further investigate any possible significance between the awe-inducing videos and the neutral video, independent variable levels mountain and water videos (awe-inducing) were combined, and an independent samples t-test was conducted to compare the means of awe-inducing videos to the means of the hens walking video level (neutral).

Results

The entire participant pool was recruited via Sona from undergraduate Introductory Psychology students attending Western Carolina University. Data collection took place from October 14, 2020, to December 1, 2020. Participants ranged in age from 18 to 23 years, with an average of 18.62 years and mode of 18 (58.7%; see Table 1). Participants for the current study consisted of 103 males (34.6%), 170 females (57%), and four individuals who identified as other (1.3%; see Table 2). Four hundred and eleven participants completed the survey; however, 116 subjects were removed due to refusing consent (3) and completely missing data (these participants filled out demographics but did not watch any videos or fill out any surveys; 113), resulting in a total of 298 subjects. For participants with partial missing data (missing responses for one survey;180), the mice package in R was used to impute the data 20 times (van Buuren & Groothuis-Oudshoorn, 2011).

Table 1
Age Descriptives

	n	Min	Max	*M*
Age	298	18	23	18.62

Table 2
Gender Descriptives

Gender		*n*	%
	Female	170.0	57.0
	Male	103.0	34.6
	Other	4.0	1.3
Total		298.0	100.0

A one-way between groups MANOVA was performed to test hypotheses one (a and b), two (a and b), and three (a and b). Three dependent variables were used: well-being, hope, and stress. The independent variable was a video and consisted of three groups: mountain, water, neutral. Assumption testing was conducted for normality, linearity, univariate and multivariate outliers (Mahalanobis, 1936), homogeneity of variance-covariance matrices, and multicollinearity, with no notable violations.

There was as a statistically significant difference between video groups on the combined dependent variables of well-being, hope, and stress $F(6,586) = 2.5$, $p < .005$; Wilks' Lambda = .95 (Wilks, 1932); $\eta^2 = .025$, a small medium effect size (Cohen, 1966) (see Table 3). However, post hoc analyses using the Scheffe post hoc criterion for significance indicated no significance between groups (see Table 4). This discrepancy is most likely because the Wilks Lambda test works to maximize the group differences, when the groups are considered separately the differences are not pronounced.

Table 3
MANOVA

	Value	*F*	df_1	df_2	*Sig.*
Wilks Lambda	0.95	2.50[b]	6	586	0.02

Table 4
Scheffe Multiple Comparisons

Dependent Variable	*(I) Group*	*(J) Group*	*Mean Difference (I-J)*	*Std. error*	*Sig.*
PSS	Mountains	2.0	0.05	0.52	0.97
		3.0	- 0.05	0.51	0.97
	Water	1.0	- 0.05	0.52	0.97
		3.0	- 0.09	0.52	0.98
	Hens	1.0	0.05	0.51	1.0
		2.0	0.09	0.52	0.98
ASHS	Mountains	2.0	0.41	1.76	0.97
		3.0	- 2.12	1.72	0.46
	Water	1.0	- 0.41	1.76	0.97
		3.0	- 2.55	1.75	0.35
	Hens	1.0	2.14	1.72	0.46
		2.0	2.55	1.75	0.35
PSS	Mountains	2.0	- 1.72	1.05	0.26
		3.0	- 1.96	1.03	0.16
	Water	1.0	1.72	1.05	0.26
		3.0	- 0.24	1.04	0.97
	Hens	1.0	1.96	1.03	0.16
		2.0	0.24	1.04	0.97

A one-way between-subjects ANOVA was conducted to further investigate the significant difference between groups noted in the MANOVA. However, when the results for the dependent variables were considered separately, no significant difference was found in level of perceived well-being $F(2,295) = 1.258$, $p > 0.05$, state hope $F(2,295) = 2.142$, $p > .05$, or perceived stress $F(2,295) = .017$, $p > 0.05$ (see Table 5).

Table 5
ANOVA

		df	M^2	*f*	*Sig.*
PWB					
	Between Groups	2	189.48	1.26	0.27
	Within Groups	295	150.61		
	Total	297			
ASHS					
	Between Groups	2	114.91	2.14	0.12
	Within Groups	295	53.65		
	Total	297			
PSS					
	Between Groups	2	0.22	0.02	0.98
	Within Groups	295	13.22		
	Total	297			

Despite no significance for the ANOVA analysis, the researcher further investigated any possible significance between the awe-inducing videos and the neutral video by combining independent variable levels mountain and water videos (awe-inducing) and conducting an independent samples t-test to compare the means of awe-inducing videos to the means of the hens walking video level (neutral). For perceived well-being, there was no significant difference in awe-inducing videos (M = 46.08, SD = 12.11) and the neutral video (M = 48.42, SD = 12.51); conditions; t(296) = -1.57, p = .117. For state hope, there was no significant difference in the awe-inducing videos (M = 34.31, SD = 7.53) and the neutral video (M = 35.44, SD = 6.98); conditions; t(296) = -1.26, p = .207. For perceived stress, there was no significant in the awe-inducing videos (M = 23.24, SD = 3.77) and the neutral video (M = 23.31, SD 3.35); conditions; t(296) = -0.16, p = .873 (see Table 6 & 7).

Table 6
Group Statistics

	Group	*n*	*M*	*St. Deviation*	*Std. Error Mean*
PWB	Awe	194	46.08	12.11	0.87
	Neutral	104	48.42	12.51	1.23
ASHS	Awe	194	34.31	7.53	0.54
	Neutral	104	35.44	6.98	0.68
PSS	Awe	194	23.24	3.77	0.27
	Neutral	104	23.31	3.34	0.33

Table 7
t-test

		Levene's Test for quality of Variance		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		f	*Sig.*	*t*	*df*	*Sig. (2-tailed)*	*Mean Difference*	*Std. Error Difference*	*Lower*	*Upper*
PWB	Equal variance assumed	0.78	0.38	- 1.57	296.0	0.12	- 2.34	1.49	- 5.27	0.59
	Equal variance not assumed			- 1.56	204.84	0.12	- 2.34	1.5	- 5.31	0.62
ASHS	Equal variance assumed	1.58	0.21	- 1.27	296.0	0.21	- 1.13	0.89	- 2.88	0.63
	Equal variance not assumed			- 1.29	225.04	0.2	- 1.13	0.87	- 2.85	0.59
PSS	Equal variance assumed	0.78	0.39	- 0.16	296.0	0.87	- 0.07	0.44	- 0.94	0.8
	Equal variance not assumed			- 0.17	233.23	0.87	- 0.07	0.43	- 0.91	0.77

Discussion

The current research aimed to contribute to research on nature therapy and awe. However, no significant results were noted from the data collected. At first glance, this study is easy to dismiss for its' lack of significance and stark deviation from the original study. The aforementioned deviation from the original VR study, is quite likely a substantial reason for the non-significant results noted above. The original study was intended to be a highly controlled study in the laboratory setting with VR environments that had been validated to produce the experience of awe. Higher control would be achieved in the laboratory because of the consistent environment, technology, and training of researchers. The implications of these limitations will be discussed in the section below.

Instead of dismissing the study altogether based on lack of significance, these results could be beneficial in specifying certain aspects of nature or nature experiences that can produce the awe previously associated with positive mental health outcomes. Indeed, one of the main purposes of this study was to clarify some of the haziness around nature therapy. Specifically, what it is in nature or about the nature experience that produces positive mental health outcomes noted in previous research. Previous research notes that immersion is an important aspect of experiencing the awe that potentially leads to these positive outcomes. For example, previous studies have shown that pictures and videos of nature were effective a producing awe at low intensities (Gordon et al., 2017; Piff et al., 2015; Silvia et al., 2015). These studies were different than the current study however, because they were run in a laboratory setting where the technology and environment were heavily controlled; environmental control was a specific limitation to

the current study and will be discussed in more detail in the limitations section below. The lack of immersion in the current study may lend researchers to conclude that there is, indeed, a cutoff for immersiveness in producing awe. Perhaps, awe is contingent on a certain level of immersion/intensity. In previous qualitative studies, physically being in nature is often noted by a sense of presence in the moment (Powch, 2008). It would be negligent to dismiss this sense of presence as a nominal player in the induction of awe.

The non-significant results could be due to a lack of awe on any level because the videos chosen for this study were not validated to elicit the awe experience. If we speculate that the videos used in the study did not induce awe, that could lend to the possibility that awe is necessary to elicit the positive mental health outcomes noted in previous research. Simply, this research may suggest that without awe, people do not experience the positive mental health outcomes seen in previous research.

Whether the videos in the current study did not produce high enough intensities of awe or awe at all, the results still add to the research rigor around the topic. With more research, this study's results could suggest that awe, specifically, high intensities of awe, plays a significant role in the positive mental health outcomes noted in previous nature research and that lower levels are not reliably successful at producing these results. These results may also suggest that previous research noting positive mental health outcomes with pictures and videos of nature may be eliciting these outcomes through another medium besides awe.

Limitations

Due to methodological and procedural alternations, in response to the COVID-19 pandemic, there are several limitations to this study. The most notable limitations were

related to the lack of immersion that led to a poor content validity. Firstly, the lack of environmental control is due to the atmosphere in which the study was run and the fallibility of personal technology as a means of delivering the stimuli. Rather than the originally intended laboratory study, participants completed the study from their personal devices with the experimenter having no control over the environment. Any number of environmental stimuli could serve as a distraction in this circumstance. For example, they could have completed the survey in public on their personal device with no control of their environment. Participants who completed the survey in their living space could still have had any number of distractions that were not accounted for. Additionally, the utilization of personal devices for video viewing could have led to general problems running the video or navigating the angles in the 360-degree videos. It is important for these videos to have been viewed in a quiet space with no distractions to produce the desired experience of awe, without assurance of environmental control and technological ease we are left with a significant limitation.

Secondly, the use of videos, as well as the use of videos on personal devices, significantly limited the immersion needed to induce the intensities of awe the current research aimed to produce. Whereas the original study intended to use validated, awe-inducing, VR environments, this study attempted to induce awe with 360-degree videos. The hope was that the 360-degree element would add some sense of presence to the videos. In retrospect, it would have been prudent to add a measure of awe after each video as a manipulation check to see if even a low level of awe was achieved. However, since this was not done, there is no way for the current study to determine if participants actually experienced awe. Without the awe experience, the foundation of the study is

ultimately flawed. In addition to the chosen video's content not producing the experience of awe at all, there is the possibility that the videos were not immersive enough to produce awe at the intensity needed to produce positive mental health outcomes noted in previous research. As previously noted, participants used their personal devices to complete the survey. The mere size of the screen could have limited the immersiveness of the video. Participants were also asked to maximize their screen to view the video. However, if they did not follow this prompt, the video still played which would have limited the immersion as well. Lastly, the videos gave the option of changing the angle throughout the video in 360 degrees by using the arrow keys or touchpad. However, if they did not utilize this feature, the immersiveness would be impacted as well.

Thirdly, two of the questions in the PWB were removed due to a flawed survey design in Qualtrics. The answer choices to two of the 18 questions were blank and offered no choice. This brings into question the validity of the remaining PSS scores as accurate measures of perceived well-being.

Finally, there are general limitations that should be noted as well. As this was a participant pool of only Introductory Psychology students, the population is not generalizable to the general population. In addition, the use of multiple imputation assumes that data is missing at random and although that seems to be the case, it is never possible to completely rule out that some data was missing for a reason specific to the participant.

Future Directions

Future direction should be in direct response to the alterations required by the COVID-19 pandemic. Specifically, future research should utilize VR as a means of

inducing awe, as opposed to nature videos. The use of VR will aim to combat the lack of immersiveness noted in the limitations section above. Chirico et al. (2016) introduced VR (VR) as a possible alternative to two-dimensional pictures and videos, in an attempt to induce awe at stronger intensities. VR uses a combination of sensory stimuli to generate the feeling of presence that is missing from the previously used pictures and videos. Previous research like Felnhofer and colleagues' (2015) study utilizing VR has supported its use to elicit positive emotions. In this study, various virtual park environments were created and through manipulation of music, light, textures, and other components within the virtual environment, they were able to elicit expected emotional responses like joy, sadness, boredom, anger, and anxiety. In fact, DeKort et al. (2006), posit that presence, the feeling of being there, is stronger when the media delivering the stimulus is more immersive. Thus, using VR to induce awe may be the most satisfactory surrogate to actually being in nature. Chirico et al. (2016) note three key benefits to VR induction of awe: VR allows the participant to experience a sense of presence in the environment, can generate the complexity of the environments, and can be used to track participant responses (Chirico et al., 2016; Riva et al., 2016).

To research the theory that a more immersive environment would produce stronger intensities of awe, Chirico et al. (2017) compared induced awe intensity using both VR and two-dimensional stimuli. After a preliminary study identifying an awe-inducing stimulus (tall trees) and a neutral stimulus (hens wandering), researchers exposed each participant to four different conditions (tall trees 2D, tall trees VR, hens wandering 2D, hens wandering VR). After viewing each two-minute video, participant responses were measured with a self-report measure on the extent to which they

experienced, awe, presence, vastness, and need for accommodation. Specific to the current study, their findings supported the hypothesis that the awe-inducing VR environment produced significantly higher levels of awe than the two-dimensional awe-environment. Similarly, the awe-inducing VR environment produced a significantly higher sense of perceived vastness and need for accommodation (Chirico et al., 2017).

For the aforementioned reasons, VR should be utilized in future research. However, it is advised that the nature-based VR environments used should be validated as capable of inducing awe. Chirico et al. (2018) has already designed nature-based VR environments to create validated awe-inducing environments for future research. The three awe-inducing created environments were, a forest of tall trees with a hidden waterfall, high snowy mountains, and earth views from deep space. The neutral environment consisted of a park with a few trees and flowers with specific components to inhibit a sense of vastness or need for accommodation. Before viewing the environments, participants were asked to report feelings of awe, anger, sadness, disgust, fear, pride, and joy. Additionally, they were measured on general affect. After viewing the environments, the participants again reported on awe and the seven other distinct emotions, as well as presence, sense of vastness, and need for accommodation, and engagement. Each awe-inducing stimulus produced significantly higher levels of awe than the neutral stimulus, with mountains producing the highest levels, followed by forest, and then Earth. All conditions produced higher perceived vastness than the neutral environment with mountains eliciting the highest sense of vastness. Both presence and engagement were significantly higher in the awe-inducing stimuli compared to the neutral stimuli. These

results demonstrate promise in these created environments ecological validity (Chirico et al., 2018).

The use of these existing, nature-based, awe-inducing VR environments will address the other main limitation noted in this study which was a lack of control within the participants environment. The use of VR will require the participants to be run through a psychological laboratory that will control nearly all extraneous stimuli that could have affected the results of the current study. Simply, the use of awe-validated VR environments directly addresses the main limitations of the study which were a lack of immersion that led to a lack of content validity and a lack of control. Future research using these VR environments would be a substantial contribution to the field of mental health, were that research to find the significant positive mental health outcomes hypothesized in the current study.

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Appendices

1. Appendix of Measures

1.1 Demographics

1. What is your age, in years?

2. What is your sex?

   Male Female Other

3. What is your ethnic identification?

   Asian Black Hispanic Native American White Other

1.2 Psychological Wellbeing (PWB)

Instructions: Circle one response below each statement to indicate how much you agree or disagree.

1. "I like most parts of my personality."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

2. "When I look at the story of my life, I am pleased with how things have turned out so far."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

3. "Some people wander aimlessly through life, but I am not one of them."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

4. "The demands of everyday life often get me down."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

5. "In many ways I feel disappointed about my achievements in life."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

6. "Maintaining close relationships has been difficult and frustrating for me."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

7. "I live life one day at a time and don't really think about the future."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

8. "In general, I feel I am in charge of the situation in which I live."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

9. “I am good at managing the responsibilities of daily life.”

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

10. “I sometimes feel as if I've done all there is to do in life.”

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

11. “For me, life has been a continuous process of learning, changing, and growth.”

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

12. “I think it is important to have new experiences that challenge how I think about myself and the world.”

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

13. “People would describe me as a giving person, willing to share my time with others.”

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

14. “I gave up trying to make big improvements or changes in my life a long time ago”

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

15. “I tend to be influenced by people with strong opinions”

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

16. “I have not experienced many warm and trusting relationships with others.”

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

17. “I have confidence in my own opinions, even if they are different from the way most other people think.”

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

18. “I judge myself by what I think is important, not by the values of what others think is important.”

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree

1.3 Adult State Hope Scale (ASHS)

Read each item carefully. Using the scale shown below, please select the number that best describes *how you think about yourself right now* and put that number in the blank before each sentence. Please take a few moments to focus on yourself and what is going on in *your life at this moment*. Once you have this "here and now" set, go ahead and answer each item according to the following scale:

1	2	3	4	5	6	7	8
Definitely False	Mostly False	Somewhat False	Slightly False	Slightly True	Somewhat True	Mostly True	Definitely True

_____ 1. If I should find myself in a jam, I could think of many ways to get out of it

_____ 2. At the present time, I am energetically pursuing my goals

_____ 3. There are lots of ways around any problem that I am facing now

_____ 4. Right now, I see myself as being pretty successful

_____ 5. I can think of many ways to reach my current goals

_____ 6. At this time, I am meeting the goals that I have set for myself

Scoring information

Pathways subscale score: Add items 1, 3, and 5. Scores on this subscale can range from 3 to 24, with higher scores indicating higher levels of pathways thinking.

Agency subscale score: Add items 2, 4, and 6. Scores on this subscale can range from 3 to 24, with higher scores indicating higher levels of agency thinking.

Total hope score: Add the pathways and Agency subscales together. Scores can range from 6 to 48, with higher scores representing higher hope levels.

1.4 Perceived Stress Scale (PSS)

The questions in this scale ask you about your feelings and thoughts during the last month.

In each case, you will be asked to indicate by circling how often you felt or thought a certain way.

0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often

1. In the last month, how often have you been upset because of something that happened unexpectedly?	0 1 2 3 4
2. In the last month, how often have you felt that you were unable to control the important things in your life?	0 1 2 3 4
3. In the last month, how often have you felt nervous and "stressed"?	0 1 2 3 4
4. In the last month, how often have you felt confident about your ability to handle your personal problems?	0 1 2 3 4
5. In the last month, how often have you felt that things were going your way?	0 1 2 3 4
6. In the last month, how often have you found that you could not cope with all the things that you had to do?	0 1 2 3 4
7. In the last month, how often have you been able to control irritations in your life?	0 1 2 3 4
8. In the last month, how often have you felt that you were on top of things?	0 1 2 3 4
9. In the last month, how often have you been angered because of things that were outside of your control?	0 1 2 3 4
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	0 1 2 3 4