The Adaptive Cycle of Meaning Making:

Development and Preliminary Evaluation of a Self-Report Scale

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Abstract

Meaning in life has long been established as a core component of individual well-being, making it a topic of great importance within psychological research. Advancements in psychological studies of meaning in life are limited by the availability of appropriate measurement tools. To date, several measures of meaning in life have been developed. However, the existing measures fail to capture the full complexity of the processes involved in making meaning in life, particularly with regards to acknowledging the necessary destruction and reconstruction of meaning in life frameworks in order to develop increasingly complex systems of meaning in life. The current project details the development and preliminary evaluation of the Adaptive Cycle of Meaning Making (ACMM), a new self-report scale aimed at addressing this limitation in existing measures. Informed by the theoretical framework of the adaptive cycle, the ACMM posits a dynamic conceptualization of the growth, conservation, release, and reorganization phases of meaning-making.

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Perhaps the greatest existential questions throughout human existence have been regarding the meaning of life. Although there exists an important differentiation between meaning *of* life and meaning *in* life, both of these concepts have captured the interest of many great thinkers throughout history. Some researchers have suggested meaning *of* life comes from connecting with something larger than one's self, often a deity or divine force, whereas meaning *in* life is believed to arise primarily through nurturing interpersonal relationships (Glaw et al, 2017). Within the realm of understanding the individual, western psychology has largely focused its efforts on exploring meaning in life. Many theories of meaningfulness, and associated measures, have been proposed. However, there continues to be need for further study of this construct, particularly in relation to the processes involved in making meaning, in order to more accurately understand the dynamic nature of various phases of making meaning in life.

A review of existing literature regarding the theoretical and empirical study of meaning in life is presented to examine the definition of meaning in life and to situate it within current knowledge regarding its correlates, particularly its relationship with well-being. Beginning with an exploration of the theoretical understanding of meaning in life, the literature review then progresses to review various domains of empirical research including the relationship between meaning in life and religion, sources of meaning in life, the role of mindfulness, and changes in meaning in life across the lifespan. Finally, the literature review focuses on exploring the relationship between meaning in life and well-being. This portion of the literature review summarizes much of our current scientific understanding of meaning in life, while demonstrating

the importance of this construct within psychological research, particularly with regard to its role in well-being.

Given the importance of this construct, it is necessary to consider how it is measured. The way we measure a construct will have significant ramifications for the development of scientific understanding. The answers we get are dependent upon the questions we ask, and within western science, the questions we are able to ask are strongly influenced by the tools we have to measure constructs of interest. A review of many of the ways in which meaning in life has been measured throughout existing studies is also presented.

The literature review highlights a primary limitation in our current understanding of meaning in life, namely that its dynamic complexity is largely overlooked. Throughout much of the empirical research, meaning in life is discussed as being high or low in an individual in terms that imply a high degree of meaning in life is something that can be achieved and sustained. The current studies posit that this view of meaning in life is limited. Rather, the current studies suggest that creating meaning in life involves ongoing dynamic and complex cyclical processes. As such, the adaptive cycle drawn from complexity theory may be a useful theory to apply to the processes of making meaning in life. The current studies describe the development of a new measure, the Adaptive Cycle of Meaning Making (ACMM), and present preliminary analyses of its psychometric properties and temporal stability. The ACMM aims to address the existing gap in the literature regarding the conceptualization and measurement of meaning in life by providing a novel, dynamic view of the processes of meaning-making.

Theories and Definitions of Meaning

One of the most prominent early theorists in western psychology who focused on meaning in life was Viktor Frankl, who described finding meaning in life as the basic human

motivator (1966). In his seminal publication of *Man's Search for Meaning* (1963), Frankl quoted

Nietzsche stating: "he who has a *why* to live can bear almost any *how*" (italics in original, p.

104), succinctly capturing the importance of meaning in life for persevering and overcoming

life's adversity. Frankl's theory of logotherapy. described as meaning-centred therapy, states

there are three pathways to meaning in life: 1) through completing a task, 2) through

experiencing love, or 3) through rising above oneself when confronted with significant adversity

to "turn a personal tragedy into a triumph" (p. 146). This third pathway to meaning in life has

been reframed with the language of posttraumatic growth in recent decades, a topic that is

discussed in a subsequent section.

Meaning in life itself, however, is a highly abstract construct that continues to be difficult

to define. Meaning in life is conceived more broadly than the experience of posttraumatic

growth. Although this may be one pathway to building meaning in life, there are many other

possible sources and conceptualizations of meaning in life. As Baumeister (1991) noted, a large

part of the challenge of defining meaning in life arises from the fact that one must use semantic

meaning to define meaning. Meaning in life, having multiple facets, refers both to the

definitional understanding and to the subjective significance of life. As such, it can become

somewhat tautological to attempt to define meaning in life. Examining what is the 'meaning of

meaning' can become an infinite and circular process. After mentioning this caveat, however,

Baumeister (1991) puts forth his own definition of meaning in life stating that: "meaning is

shared mental representations of possible relationships among things, events, and relationships.

Thus, meaning *connects* things." (p.15).

Some theorists have equated meaning in life with purpose, defining it as having set goals

towards which they actively work and which provide a sense of organization to their lives

(Klinger, 1977). On the other hand, other researchers have focused on the explanatory elements of meaning in life, viewing it as a cognitive process of abstracting causal relationships (Bering, 2003). Still others have defined meaning in life in terms of a judgment of significance or value (Taubman-Ben-Ari, 2011). More recent understandings of meaning in life are more explicitly multidimensional, such as the perspective put forth by Wong (2015) in reference to Meaning Therapy, which posits meaning in life as a holistic construct that is comprised of spiritual, cognitive, and behavioural components.

There has been debate in recent literature regarding the affective versus cognitive nature of meaning in life. Park (2017) addresses this topic as one of several persisting tensions among researchers investigating meaning in life, advocating that emotions are more accurately conceived of as outcomes rather than components of meaning in life. Park's commentary posits meaning in life as a primarily cognitive experience that is distinct from emotions, despite being intricately related to emotional outcomes. Other researchers, however, do not agree with this separation. Leontiev (2017), for example, cautions against isolating cognitive from affective elements of meaning in life stating that neither alone can fully and accurately capture the complex and dynamic nature of meaning in life. Whether emotions are viewed as an intrinsic component of meaning in life or as an outcome of experiencing meaning in life, there is strong evidence to suggest emotions and meaning in life are strongly related. This topic is explored further in the subsequent section reviewing meaning in life and well-being.

Recently, meaning in life has been divided into two conceptual categories within the literature, one focusing on the default existence of meaning in daily life, while the other describes meaning in life as being actively and intentionally constructed. For example, Steger, Frazier, Oishi, and Kaler (2006) discuss the two core processes of searching for and perceiving

the presence of meaning in life and present evidence to support these two factors as assessed in their Meaning in Life Questionnaire. Presence of meaning evaluates the degree to which an individual perceives their life to be meaningful at that moment, whereas search for meaning assesses the degree of active engagement in attempting to find or create meaning in one's life.

The division of search for and presence of meaning in life can be paralleled to the construction and detection of meaning in life described by King and Hicks (2009). Construction of meaning in life is described as the intentional and effortful processes involved in attempting to answer questions relating to why an event took place or what its significance was. The authors note this form of meaning in life is often associated with the sense of having grown or gained insight from a stressful event. Conversely, the detection of meaning in life is described as a default process of applying one's existing meaning framework to life events. It is thought to be relatively automatic and at times quite subtle.

Leontiev (2017) describes similar separation in the ways in which meaning in life can be experienced. He also describes meaning in life as being construed or constructed, but rather than using the term detected, he has referred to meaning in life as being found. Additionally, Leontiev describes a third route for experiencing meaning in life: imposed meaning. Whereas both finding and constructing meaning in life are described as processes and experiences occurring within the individual, the third route of imposed meaning in life is described as a process in which meaning in life is imposed onto an individual's experience from external social or cultural contexts.

A recent conceptualization by Martela and Steger (2016) posits meaning in life as involving three elements: coherence, purpose, and significance. Coherence is described as the cognitive component of meaning in life and involves understanding and making sense of the world, partly through noticing patterns in interactions and events in the world. A lack of

coherence is said to lead to a sense of uncertainty, which is an uncomfortable experience that motivates individuals to seek out coherence. Purpose involves establishing goals in life that one can work towards. These goals help structure an individual's life by providing a framework around which behaviour can be organized; without them, individuals tend to lack motivation and feel directionless in life. Lastly, significance involves evaluating one's life in order to recognize its importance and inherent worth in accordance with one's values.

Martela and Steger (2016) discuss these three elements of meaning in life as being independent, yet influential on one another. They note that purpose enables significance to develop and similarly describe coherence as being a necessary but insufficient precursor to significance. Additionally, the theorists also describe influences between these components in the opposite direction. Specifically, they postulate that significance may increase an individual's motivation to pursue various goals, therefore increasing one's purpose. In a similar sense, purpose may foster coherence because of the structure imposed through having concrete goals towards which an individual is working.

The core components of meaning in life described by Martela and Steger (2016) are aligned with the structure of meaning in life as described by Park (2017). According to Park, global meaning in life has both content and judgment subcomponents. The content of meaning in life consists of an individual's goals and values, as well as their beliefs about the world and sense of identity. The content of meaning is then related to the judgments of meaning in life in that an individual evaluates their goals and values to judge their sense of purpose, whereas their judgments about their beliefs and identity inform their sense of comprehension and mattering. These elements of judgment delineated by Park present the same concepts in slightly modified vernacular as is described by Martela and Steger (2016).

A slightly older model of meaning in life, the Meaning Maintenance Model (MMM, Heine, Proulx, & Vohs, 2006), focuses on the processes involved in making and maintaining a sense of meaning in life rather than describing its component parts in depth. The MMM, however, outlines meaning in life to be the perception of predictable relationships among elements of the world. Accordingly, meaning in experiences is perceived when elements interact the way in which the observer anticipated. For example, if a friend listens in an empathetic, supportive, and validating way to a person's stressors, the relationship may reinforce the person's framework of meaning for understanding friendships. However, if the friend responded with criticism or disrespect, the person faces a challenge in which they may have to adjust their meaning framework as it pertains to this sort of interaction. Either they would have to alter their understanding of friendship to include at least occasional incidents of criticism or re-evaluate whether this individual is in fact a friend.

Observing an event that challenges one's existing sense of meaning in life is typically an aversive experience that motivates individuals to attempt to find a way to perceive meaning in life, returning to a state of understanding and predictability in the events of the world. The uncomfortable negative affect that results from a violation of one's expectations according to established cognitive representations of relationships motivates an individual do something to alleviate this discomfort.

The MMM describes five ways in which individuals can alleviate their distress by making or maintaining meaning in their lives: assimilation, accommodation, affirmation, assembly, and abstraction (Proulx & Inzlicht, 2012). Briefly, when a person experiences an unexpected event, they can assimilate the occurrence into existing understandings by reinterpreting the event so it fits in some capacity with their expectations. This allows the

individual to maintain their current meaning framework. The individual may instead adjust their

preexisting meaning framework slightly to allow them to incorporate the initially shocking event

through accommodative processes. Whereas with assimilation the event is fit into their existing

meaning framework, in accommodation, their meaning framework is adjusted to fit with the

event. The concept of fluid compensation in the MMM states that perceiving meaning in any

domain of life contributes to an overall sense of meaningfulness, and that heightened meaning in

one domain can compensate for reduced meaning in another domain. As such, the individual

may instead affirm another unrelated area of meaning in life, thereby alleviating the aversive

arousal caused by the unexpected event. The individual also has the option to abstract new

meaning from the event by noticing patterns and relationships in events to which he or she had

not previously attended. Discovering previously unnoticed patterns or similarities allows for a

new sense of predictability in the event, once these environmental patterns are brought into

conscious awareness. Lastly, the individual may assemble new meaning by creating an entirely

new framework through which the relationships between objects can be perceived and feel

familiar in order to overcome the aversive feelings caused by the violation of expectations

(Proulx & Inzlicht, 2012).

Empirical Study of Meaning in Life

Many groups of researchers have examined meaning in life through empirical studies.

One prominent topic of research is the relationship between meaning in life and religion.

Furthermore, notable areas of research have included sources of meaning in life, the relationship

between mindfulness and meaning in life, and changes in the experience of meaning in life

across the lifespan. Each of these areas of research is briefly reviewed below to provide a context

of the current state of empirical studies regarding the perception of meaning in life. Moreover,

this review provides some insights from previous empirical studies into the dynamic nature of

meaning in life with regards to how both factors that facilitate the development of meaning in

life and one's perception of meaning in life vary over the lifespan.

A comprehensive review of literature regarding meaning in life is beyond the scope of

this paper. An important area of research that is not explored in detail in the following review is

clinical research focusing on certain diagnostic categories. An extensive body of research exists

regarding meaning in life in contexts such as posttraumatic stress disorder, mood disorders,

substance use, anxiety, and personality disorders. Similarly, research exists regarding the effects

of clinical interventions and meaning in life. Areas of research such as these, that involve a focus

on clinical populations, are not the focus of the current review. Rather, the scope of the current

studies focuses on meaning in life within the general populations.

Meaning in Life and Religion

The relationship between meaning in life and religion has been explored by several

researchers. The current review presents a brief overview with a focus on western religions,

philosophies, and sciences. An expansive literature review of religion and meaning in life in

eastern as compared to western contexts is beyond the scope of the current studies. Religion is an

institution that many turn to for answers to life's existential questions or when facing adversity in

life and as such has been viewed in relation to well-being. Meaning in life has been examined as

a mediating factor in the relationship between religion and well-being. Religiosity has been

shown to have a significant relationship with life satisfaction, a common indicator of well-being.

However, there is evidence to suggest this relationship is heavily mediated by meaning in life.

Specifically, Steger and Frazier (2005) demonstrated through multiple regression analysis that

92.3% of the relationship between religiousness and well-being, as measured by life satisfaction,

was mediated by meaning in life as measured by the Presence subscale of the Meaning in Life Questionnaire (MLQ; Steger, Frazier, Oishi, & Kaler, 2006). Focusing on daily religious behaviour, rather than more general religiosity, the same researchers again found over 90% of the relationship between religiousness and well-being to be mediated by meaning in life.

To further examine the relationship between meaning in life and religiosity, Van Togneren, Hook and Davis (2013) explored potential meditational variables in explaining the relationship between defensive religion and meaning in life. The authors reference Beck's (2004) model of defensive versus existential religiousness in defining defensive religiousness as "dogmatic, simplistic, and exclusive" (Van Tongeren et al, 2013, p. 228). Participants in this study completed the MLQ as well as questionnaires to evaluate their degree of belief in immortality, as in how much they believe they will continue to live after death, and religious commitment or conviction. Results indicated that the relationship between defensive religiousness and meaning in life was fully mediated by both an individual's belief in immortality and their religious commitment. Furthermore, individuals who reported higher levels of defensive religiousness also tended to report higher levels of meaning in life.

In a qualitative study of twelve women residing in secular assisted-living facilities ranging from 70 to 94 years of age, Fletcher (2004) examined variation in both religious beliefs and the sense of being part of a religious community in one's ability to make meaning towards the end of life. Analyses across seven themes, including meaning in life, resulted in participants being grouped into one of three categories: believers, doubters, or belongers. Believers were found to endorse meaning in life as deriving from serving God, doubters described meaning in life as coming from leaving a legacy to their lives, and belongers perceived meaning in life as coming from being of service to other people. For believers, maintenance of religious beliefs was

a sufficient source of meaning in their lives, whereas belongers required the social interaction with a religious community in conjunction with religious beliefs, to perceive meaning in their lives. Doubters, on the other hand, did not perceive meaning in life as relating to either religious beliefs or involvement with a religious community (Fletcher, 2004). Insights from this research suggest that individuals relate differently to religious beliefs and community involvement in their relevance as sources of meaning in life. Despite all having self-identified with some form of religious denomination, not all participants related to their beliefs or community elements of religiosity in the same manner in terms of creating meaning in life.

A recent study posits 'need for meaning' as a novel construct of interest relating to meaning in life and religiosity. Abeyta and Routledge (2018) developed a brief 10-item need for meaning scale and found that it has modest correlations with existing measures of meaning, including the purpose in life test and presence subscale of the meaning in life questionnaire, while having a large correlation with search for meaning subscale of the meaning in life questionnaire. Additionally, the need for meaning was positively related to religious commitment, frequency of religious experiences, and stronger beliefs in God or supernatural religious phenomena. Authors interpreted these findings to suggest that need for meaning relates to religiosity, is a distinct construct, and with further research could add to the understanding of motivations for meaning in life (Abeyta & Routledge, 2018).

Another study examined the effects of threatening one's sense of meaning in life to determine if this would increase one's willingness to believe in miraculous stories, (Routledge, Roylance, & Abeyta, 2017). Participants were randomly assigned to either control or meaning threat groups; individuals in the meaning threat group read a philosophical essay detailing the inherent insignificance and meaninglessness of human life. Participants then read three

testimonials describing miraculous experiences (e.g., an encounter with a guardian angel) and

rated the degree to which they believed the stories. Results indicated that individuals who

experienced a threat to their sense of meaning in life were more likely to endorse believing

miraculous stories. This suggests that people may be motivated to believe in supernatural events

as a mechanism to cope with the distress of having their sense of meaning threatened.

Sources of Meaning

Although religion is often turned to as a framework for meaning in life, it is far from

being the only source of meaning in life. Delle Fave and colleagues (2013) conducted a study

with over 600 participants across seven western countries, specifically Australia, South Africa,

Italy, Spain, Portugal, Germany, and Croatia. Using a mixed methods approach, the authors

explored sources of meaning in life and reasons why these sources were identified as

meaningful. Participants were asked to provide three sources of meaning in their lives and two

reasons why each source was seen as meaningful. Results indicated that family and work were

the two most common sources of meaning in life. However, family was significantly more

endorsed, with 83.9% of participants listing family as one of their three sources of meaning

while only 44.3% listed work. Several other sources of meaning were reported by participants at

much lower frequencies, including health, spirituality, community, and education, among others

(Delle Fave et al., 2013).

A recent review indicated that interpersonal relationships, particularly those within a

family, are viewed as the most important source of meaning in life for individuals across diverse

cultures and ages (Glaw et al., 2017). These findings were based on a review of 24 empirical

studies conducted in various countries including Canada, South Africa, Finland, and Israel,

among others, with participant samples ranging from high school students to older adults.

Although all included studies found relationships to be significantly more important as a source of meaning in life than any other, a long list of moderate sources of meaning in life was provided. These included factors such as work, education, health, pets, nature, hobbies, culture, creative activities, and several others.

Interestingly, among the least important sources of meaning in life according to this review is participation in religious activities (Glaw et al., 2017). The authors do not speculate as to the reason why this was rated so low relative to other sources. However, it may be that the act of participating in religious activities is not particularly strongly associated with religious conviction or a meaningful investment in a religion as a framework of meaning in life. Individuals may not always be intrinsically motivated to participate in religious activities, but rather may do it because of familial traditions, social expectations, or other extrinsic factors. This may be seen as consistent with findings of Delle Fave and colleagues (2013) in which only 10.8% of participants listed spirituality as one of their three sources of meaning. Based on these results, it appears that although religion or spirituality may be an important source of meaning in life for some, this domain is not typically the largest source of meaning in life for most people.

Mindfulness and Meaning in Life

The influence of individual cognitive states on perceptions of meaning in life has been explored, particularly that of mindfulness. Garland, Hanley, and colleagues (2015) examined the effect of state mindfulness on cognitive reappraisal processes, which involve reinterpreting the meaning of events. Garland and colleagues posit that the increased cognitive flexibility resulting from a mindful state would promote reappraisals. Results indicated that the degree to which an individual attained a state of mindfulness through use of an audio-recorded mindfulness induction was predictive of an increase in reappraisal. Although researchers had examined

between group differences, comparing participants randomly assigned to a mindfulness condition to others, the group differences were insignificant, suggesting that the mindfulness group as a whole may not have achieved significant enough increases in state mindfulness to result in significant group differences on reappraisal. However, researchers suggest long-term mindfulness practices may be used to achieve sustained effects on reappraisals (Garland, Farb, et al., 2015).

Nakamura and Ho (2015) also discuss the relationship between mindfulness and cognitive reappraisal and perceptions of meaning in life. These researchers advocate for a more comprehensive conceptualization of mindfulness and reappraisal. Given the non-evaluative nature of mindfulness, relative to the inherently evaluative interpretation involved in reappraisals, these concepts are often held in opposition. However, Nakamura and Ho describe the need to integrate theories to recognize the dynamic interplay between the awareness derived through mindfulness and the evaluation involved in reappraisal, stating that mindfulness may not directly cause meaning in life to emerge, but may be considered a necessary yet insufficient condition to enable the perception of meaning in life.

In their description of the mindfulness-to-meaning theory, Garland, Farb, Goldin, and Fredrickson (2015) posit mindfulness as a tool to interrupt default cognitive schema to allow for a reinterpretation of events. They explain that a mindful state disrupts the automatic engagement in habitual events so that an individual's working memory capacity can intervene to reappraise the situation and allow for an intentional, rather than automatic, behavioural response and more flexible interpretation of meaning.

Meaning in Life Across the Lifespan

Research has suggested that perceptions and experiences of meaning in life vary across the lifespan. Steger Oishi, and Kashdan (2009) recruited more than 8,700 participants through an online study to complete measures of meaning in life, happiness, affect, life satisfaction, and depression. Meaning in life was measured using the Meaning in Life Questionnaire, which provides two subscale scores for presence of and search for meaning in life, with no global total score. Results from this study indicated that older adults generally report higher levels of presence of meaning in life relative to younger adults, with the exception that individuals in the 18-24 category reported higher levels of meaning in life than those aged 25-44.

Similarly, older adults generally indicated lower levels of search for meaning in life, again with the exception that those aged 25-44 reported higher levels of search for meaning in life than those aged 18-24. The correlation between search for and presence of meaning in life scores was negative for all age categories. These results indicate that, in general, younger people are reporting higher levels of searching for meaning in life and lower levels of presence of meaning in life, with this pattern inverting over the lifespan. Additionally, search for meaning in life was positively correlated with depression at each stage of life, with the strongest correlation seen among individuals 65 and older, suggesting that engaging in search for meaning in life may become more distressing as one ages.

A more recent study by Allan, Duffy, and Douglass (2015) explored search for and presence of meaning in life, again measured by the MLQ, while examining the possible moderating effect of work on the relationship between age and meaning in life. Their results indicated that age and search for meaning in life were negatively related in a linear fashion, but they did not find a significant relationship between age and presence of meaning in life. Having meaningful work was positively related to presence of meaning in life and negatively related to

search for meaning and the meaning of one's work significantly moderated the relationship

between presence of meaning and age (Allan et al., 2015). Given the amount of time and energy

most individuals spend at work throughout adulthood, it seems reasonable to expect the meaning

of this activity to influence one's overall sense of meaning in life.

Examining both theoretical conceptualizations of meaning in life and empirical evidence

regarding its relationship with religion, mindfulness, its sources, and changes across the lifespan

helps to further elucidate the scientific understanding of meaning and demonstrates that meaning

in life is a construct that varies significantly over time and across people. As discussed,

significant challenges exist in describing and understanding this complex topic. However, the

strong relationship between meaning in life and well-being justifies the effort it takes to examine

such an abstract construct. As such, a brief overview of the relationship between meaning in life

and well-being is presented.

Meaning in Life and Well-Being

Meaning in life has long been discussed in the literature as an important contributor or

component of well-being. Frankl (1963), for example, advocated for meaning in life as the

central component of well-being, noting that happiness is a by-product of meaning in life and

should not itself be the goal in life. Since Frankl's foundational work, a great deal of research

has continued to be published on the importance of meaning in life. For example, researchers

have noted that making meaning in life can be highly instrumental in coping with stressful events

(Park & Folkman, 1997) such as processing grief (Davis, Nolen-Hoeksema, & Larson, 1998) and

can facilitate problem solving while providing a sense of structure and stability to life

(Baumeister & Vohs, 2002).

In their integrative review, Glaw and colleagues (2017) discuss the centrality of existential concerns to psychopathologies, highlighting the importance of meaning in life in therapeutic endeavours. The fourth and final section of Irvin Yalom's book, *Existential Psychotherapy* (1980) focuses on the issue of meaninglessness that Yalom describes as being problematically neglected in mainstream approaches to therapy. After clearly stating that: "The human being seems to require meaning" (p. 422, 1980), Yalom attempts to synthesize existing theoretical and clinical knowledge regarding the importance of addressing crises of meaning in life and the existential distress that results from meaninglessness, all the while emphasizing the need for therapists to directly work with these concerns in the therapeutic process.

Adopting more of an empirical approach, Brassai, Piko and Steger (2011) report that meaning in life has been found to be a protective factor in adolescents. The authors discuss meaning in life as a perception of coherence, relating to elements of self-acceptance through self-understanding, environmental mastery derived through understanding one's surroundings, and having a sense of belonging and relating positively with the surrounding world. Operationally, meaning in life was measured using the Purpose and Connections subscale of the Brief Stress and Coping Inventory, which evaluates meaning in life with items that ask about an individual's perception of their life being worthwhile and being part of something greater than themselves. Over 2,000 Romanian high school students aged 15 to 19 years completed a series of self-report questionnaires. Researchers concluded meaning in life to be a protective factor against a number of health risk behaviours. Specifically, among male students, those who reported higher levels of meaning in life also reported lower levels of drug use and sedative use. Among female students, less meaning in life was associated with less exercise and poor diet control. Both males and females reported higher psychosomatic symptoms and lower quality of life with lower levels of

meaning in life. This study, therefore, presents evidence of the importance of meaning in life for both psychological and behavioural outcomes.

Similarly, Dulaney and colleagues (2018) found meaning in life moderated the relationship between exposure to stressful events and depression. Researchers collected data from 177 adolescents with an average age of just under 15 years old at two time points with seven months in between. Individuals scoring low in meaning in life showed a strong positive relationship between stress and depression across the two time points, whereas this relationship was not found in those high in meaning in life. This supports the idea that perceiving meaning in life can serve as a protective buffer against depression in the face of stressful events.

When separating the search for and presence of meaning in life, as is done in the MLQ, different patterns emerge with various elements of well-being. For example, Park, Park and Peterson (2010) had participants complete the MLQ, along with other self-report measures, and found the presence of meaning in life to be positively related to happiness, life satisfaction, and positive affect, while being negatively associated with negative affect and depression. In the same study, search for meaning in life demonstrated the opposite pattern of correlations as found with the presence of meaning in life. However, individuals who demonstrated high levels of both search for and presence of meaning in life simultaneously reported heightened levels of life satisfaction and happiness, with lower levels of depression. This suggests that the process of perceiving meaning in life is dynamic, and the relationship between meaning in life and well-being varies depending on where an individual is in this dynamic process.

The degree of perceived hostility in the world has also been investigated in terms of its effect on the relationship between meaning in life and well-being (Shrira, Palgi, Ben-Ezra, & Shmotkin, 2011). Participants completed the Hostile World Scenario, a self-report questionnaire

that assesses the degree of actual or potential threat perceived, while evaluating both positive and negative engagement. Positive engagement is described as an individual's ability to cope with adversity increasing as a result of having been exposed to the hostile scenario, whereas negative engagement involves an individual's coping skills decreasing. Positive engagement can be thought of similarly to posttraumatic growth in that the individual has experienced some degree of benefit from exposure to hardship. Researchers reported a significant interaction between participants' engagement, either positive or negative, and the relationship between meaning in life and well-being. Specifically, as positive engagement increased and negative engagement decreased, the relationship between meaning in life and subjective well-being weakened. Put differently, individuals who experience the benefit of improved coping as a result of exposure to perceived hostility appear less dependent on perceiving meaning in life in order to maintain a sense of well-being. However, individuals who do not experience this benefit of improved coping show a much stronger need to perceive meaning in order to experience well-being.

These results suggest that the more hostility an individual experiences, whether perceived or actual, the more strongly meaning in life becomes related to subjective well-being. Further elaboration on these findings would indicate that perceiving meaning in life is more important for individuals who perceive or experience more hostility in the world. To the extent that the world is viewed as hostile, meaning in life becomes increasingly important for overall well-being. However, with little or no hostility perceived, an individual's perception of meaning in life is less influential on their overall sense of well-being. Building on this, if an individual is exposed to high levels of adversity but does not perceive meaning in life, their subjective well-being is likely to suffer. However, the perception of meaning in life may be less important for

overall subjective well-being for individuals who are only exposed to very low levels of adversity.

Emotional experiences have also been found to influence perceptions of meaning in life. Abeyta and colleagues (2015) found that the degree to which an individual was able to clearly understand their emotional experiences was related to their overall experience of meaning in life. Researchers evaluated emotional clarity as a trait and found that those high in emotional clarity also reported higher levels of meaning in life. Additionally, the same research team found that individuals high in emotional clarity were also less affected by existential threat and maintained their sense of meaning in life despite the threat of a mortality salience activity, in which participants are reminded of their own mortality.

King and colleagues (2006) explored the influence of positive affect on ratings of meaning in life. In a study with over 500 undergraduate students, participants completed a series of self-report questionnaires relating to meaning in life, affect, and goal appraisal in terms of goal difficulty and value. Scores were analysed using multivariate analyses to attribute relative predictive power to both goal appraisal and positive affect in predicting meaning in life. Results indicated that positive affect related to higher meaning in life while negative affect predicted lower meaning in life. Regarding goal appraisal, higher difficulty predicted lower meaning in life, whereas goal value predicted high levels of meaning in life. Overall, however, affect was more strongly predictive of meaning in life than was goal appraisal, despite the theoretical relevance of the latter concept to meaning in life.

Additionally, the same researchers found daily positive affect to be highly predictive of daily ratings of meaning in life. Specifically, ratings of meaning in life were shown to increase when participants were first primed for positive emotional concepts, through 20 *ms* visual

display of words such as happy, or when positive mood was induced through reading a positive story. Overall, King and colleagues (2006) demonstrated in several ways that positive affect is significantly influential on individual perceptions of meaning in life.

Measures of Meaning in Life

Further insight into the construct of meaning in life can be derived through examining how it is commonly measured in psychology. Looking back over years of research, many different self-report measures of meaning in life have been developed. According to Steger (2006), the most frequently used measures of meaning in life at that time were the Purpose in Life Test (PIL; Crumbaugh & Maholick, 1964) and the Life Regard Index (LRI; Battista & Almond, 1973). The PIL is designed to rate an individual's experience of meaning in life and purpose and is closely related to Frankl's concept of noögenic neurosis or existential distress created by a lack of meaning in life. Early validation of this scale involved exploring its utility in discriminating between clinical and non-clinical populations (Crumbaugh, 1968). Originally developed to be a single-factor evaluation of meaning in life, the factor structure of the PIL has since been questioned (Haughan & Moksnes, 2013).

These meaning in life scales, however, are no longer regarded as positively as they were previously. Both the PIL and LRI have been criticized by various researchers because of the perception that these tests do not purely measure meaning in life but instead are confounded by items that measure other constructs, such as happiness, passion, or depression, that are highly correlated with meaning in life (Steger, 2007). Additionally, Steger notes the structural validity of the LRI in particular was not supported in recent explorations of its psychometric properties (2007).

More recently, the brief six-item Life Engagement Test (LET; Scheier et al., 2006) was developed. This self-report measure posits to evaluate purpose in life both by asking about perceived purpose directly and through questions regarding the degree to which individuals engage in valued behaviours. The scale is viewed as having reasonable psychometric properties, with items loading onto a single factor. Whereas the PIL is considered to be an attitudinal measure (Crumbaugh, 1968), measuring a more cognitive aspect of perceived meaning, the LET emphasizes a behavioural component to meaning in life.

Another more recently developed measure is the 23-item Meaningful Life Measure (MLM; Morgan & Farsides, 2009). Researchers factor analyzed participant responses on three common measures of meaning in life, the PIL and LRI, as well as the purpose subscale of the Psychological Well-Being Scale (Ryff, 1989). Results indicated five latent constructs underlying these measures, which were identified as the purposeful life, principled life, valued life, exciting life, and accomplished life. These five factors have been shown to load onto a single second-order factor, meaning that further factor analysis of the five subfactors reveals a single latent factor onto which all five first-order factors load significantly. This single second-order factor is interpreted as representing a singular construct of meaning in life. As such, its developers posit the MLM as a comprehensive, psychometrically valid self-report measure of meaning in life (Morgan & Farsides, 2009).

Despite the attempts to move towards a more complex and comprehensive evaluation of meaning in life in more recent measures, such as the MLM, the trend persists that meaning in life is viewed as a stagnant concept that individuals either perceive in life or not. A relatively recent and frequently used measure of meaning in life that steps beyond the evaluation of mere presence or absence of meaning is the Meaning in Life Questionnaire (MLQ; Steger, Frazier,

Oishi, & Kaler, 2006). This brief 10-item self-report scale of meaning in life contains two independent factors, Search and Presence, both of which have been reported to have adequate psychometric properties. The Presence subscale represents the subjective evaluation of the degree to which an individual views their life as meaningful, whereas the Search subscale represents an individual's active orientation towards and engagement in creating meaning in their life. The development and validation of the MLQ represents an improvement over previous measures of meaning in life because of its items are not viewed as being confounded with other elements of well-being; rather this scale focuses solely on meaning in life.

The MLQ is the first measure to explicitly separate the two factors of search for and presence of meaning in life. The identification of these two factors suggests there is an effortful component in the experience of meaning in life in which an individual searches for or creates meaning in their life. This alludes to the dynamic nature of the process of meaning making, in which experiences of meaning in life are expected to change significantly over time. Furthermore, with a reported one-month temporal stability of .70 for the Purpose scale and .73 for the Search scale (Steger et al., 2006), some change in scores on the MLQ over time may be expected, again suggesting a dynamic nature to the process of meaning-making.

The MLQ does not highlight all of the complex steps involved in the development of meaning in life. Rather, it discusses this construct in terms of whether or not an individual perceives meaning in life as present, and whether or not that individual is actively searching for meaning in life. However, the process of searching for meaning, as conceptualized by the MLQ is somewhat two-dimensional in that scores exist along a single continuum from high to low.

Much of modern western science has developed through the use of a reductionist framework, in which scientific endeavours attempt to examine the smallest components possible

of a given phenomenon to try to understand the whole (Streufert, 1997). As described by Wall

Kimmer (2013), the emphasis of reductionist models in Western science has been "to atomize

complexity into its smallest components" (p. 43). Although this theoretical methodology has led

to significant advances in the understanding of various phenomena, there are limitations to its

application. For example, a reductionist perspective that identifies a singular significant causal

factor that influences an observable result may enhance our understanding of these two factors.

However, in reality these factors do not exist in isolation, nor would it be possible to identify a

single causal factor that is entirely responsible for an observable outcome. Rather, myriad

proximal and distal factors interact dynamically over time to influence outcomes across all

domains of life. As such, frameworks that attempt to capture the dynamic nature and complexity

of reality have been developed. Although there is no unanimously accepted definition of

complexity or a complex system, the general consensus describes a complex system as one in

which multiple components or subsystems interact in reciprocal and nonlinear feedback loops

(Sanger & Giddings, 2012).

Within the realm of meaning-making, the perception of meaning in life can be understood

as the outcome of interactions within a complex system. For example, an individual's beliefs,

worldviews and values, as well as relationships, availability of resources, and present emotional

state of mind could all influence their experience of meaning in life. As such, changes in

experiences of meaning in life can arise from many complex causal influences. Given the

complexity of the construct of meaning in life, it is unlikely that the processes involved in

meaning-making would be fully captured within a linear reductionist framework. An alternative

to the linearity of a typical reductionist framework is to examine the processes of making

meaning in life through a more complex framework, such as that provided by the adaptive cycle (Gunderson & Holling, 2002).

The Adaptive Cycle

The adaptive cycle framework models change in complex systems (Angeler et al., 2015), and may be particularly relevant in conceptualizing the dynamic processes involved in making meaning in life. The adaptive cycle consists of four phases: growth, conservation, release, and reorganization (Gunderson & Holling, 2002). Briefly, growth is characterized by a period of relatively rapid development and expansion with a heightened degree of available resources. As the system moves into a state of conservation, an increasingly established structure defines the system. This results in increased efficiency with fewer redundancies. However, with the increasing rigidity in its structure, the system also becomes less resilient to change. As such, in the event of environmental perturbation, the system may collapse and move into a release phase during which the structure is no longer imposed, and resources and energy are released. Available resources are then recombined and reorganized into various potential structures in preparation for re-entering a novel state of growth, when one structure begins to take hold of the system (Angeler et al., 2015).

Fires in an ecosystem are often used to exemplify change across the phases of the adaptive cycle. For example, Fath, Dean, & Katzmir (2015) describe the analogy of a fire in a grassland, while Boyer (2020), Burkhard, Fath, and Müller (2011), and Hurst (2012) describe the analogy of a forest fire. In the growth phase, many different species of trees may be coexisting, including pine trees. Over time the large pine trees begin to take over and claim the majority of available resources. As the forest enters a phase of conservation, other plant species are unable to compete for resources against the dominant pine trees, which block out the sun below and

continue to expand their root systems. The pine trees, which are self-pruning, drop needles and lower branches, continuing to block out seedlings from competing plants. At the same time, the risk of forest fire begins to increase as highly flammable fallen branches accumulate below. As the forest becomes more homogenous, consisting almost entirely of a single species, it becomes increasingly rigid and vulnerable to adversity. Whereas certain species may be better able to survive various challenges, a homogenous system runs the risk of being entirely overthrown by a single adverse event. Eventually, a fire will ignite and move the forest system into a release phase, during which resources that had initially been consumed and held by pine trees will be released and made available to other species once again. As sun, water, and soil nutrients are redistributed in a reorganization phase, a variety of plant species will once again begin to grow in the wealth of newly available resources.

The growth and conservation phases of the cycle are referred to as the fore loop, whereas release and reorganization phases are considered the back loop (Hurst, 2012). The phases in the adaptive cycle also differ in the speed at which systems are expected to move through them. Specifically, the conservation phase is generally viewed as the only slow-moving phase in which systems tend to spend the majority of time. Release, reorganization, and growth are all typically described as relatively rapid processes (Gunderson & Holling, 2002). However, given the intrinsic complexity of systems conceptualized through the adaptive cycle, systems may differ in the speed at which they move through various phases. Generally, larger systems tend to move more slowly, whereas smaller systems can move more rapidly. Similarly, although the order of phases tends to proceed from growth, to conservation, to release, and finally reorganization before returning to growth, it is possible that a system may move through phases in a different order.

Concepts of the fore loop and back loop are similar to that of dialectics, in which two seemingly opposite factors or processes can coexist, and both be held up as true. A classic example of a dialectic is when an individual can both accept themselves in their current state and feel motivated to change aspects of themselves. Acceptance of the current state can be viewed as complementary to the seemingly opposite force of desiring change. Similarly, the fore loop process of preserving the status quo and investing in growing or maintaining the present state of a system can be seen as complementary, rather than in opposition, to the back loop processes of releasing the existing framework and reorganizing the component parts of a system to create a novel structure. In accordance with the framework of the adaptive cycle, every complex system must include a balance of both of these potentially dialectical forces to balance stability with change (Gunderson & Holling, 2002). A complex system cannot orient to only one of these; stability without change cannot exist as the only goal.

The adaptive cycle is typically represented visually with a horizontal 'figure eight' depicting the flow from one phase to the next in an infinite loop, see Figure 1. In the figure, two variables are represented with the *y* axis indicating the degree of potential in the system and the *x* axis indicating the degree of connectedness within the system. Gunderson and Holling (2002) describe systems as becoming increasingly connected as they move from growth into conservation and become more efficiently organized and less redundant. Connection increases as the relationships between elements of the system become more focused on inward relationships within the system rather than incorporating relationships with elements external to the system. Connection decreases as the system moves into the back loop phases of release and reorganization. The high degree of connectedness in the fore loop, particularly in a conservation

phase, reinforces the existing structure of the system while also leaving it increasingly vulnerable to collapse.

The high interconnectedness seen in conservation also increases the system's potential, which refers to the amount of available resources that have been incorporated into the existing structure of the system. The more resources accumulated into a system, the higher its potential. As such, potential is highest during a conservation phase when the maximum amount of resources has been recruited into the rigid, highly interconnected structure of the established system. When the system loses this structure and moves into a release phase, the potential of the system decreases significantly. However, potential increases again in a reorganization phase, during the focus of the system is no longer the preservation of stability, but rather the other dialectical goal of novelty. There is high potential for novelty in a system that is in reorganization because of the high degree of available resources that have been released from their former structure. Once a system begins to develop a new established structure when entering a growth phase, potential is once again somewhat reduced until the structure of the system becomes established enough that a high level of resources has been recruited into maintaining its framework.

Returning to the example of a forest, the forest system becomes increasingly connected and has higher potential as a dominant plant species creates an increasingly homogenous organization to the environment. The accumulation of resources by the dominant structure refers to the amount of nutrients that the dominant plant species would hold. This would include having taller trunks or broader leaves to claim the majority of available sunlight and having broad root networks to access water and nutrients in the soil. However, as the forest becomes increasingly homogenous with a plant species progressing deeper into a phase of conservation, it becomes

vulnerable to adversity that targets that species, such as a parasitic infestation or the above-described forest fire. The adversity could cause the release of the existing structure, reducing its connectedness and potential and releasing accumulated resources back into the environment.

Figure 1

The Adaptive Cycle
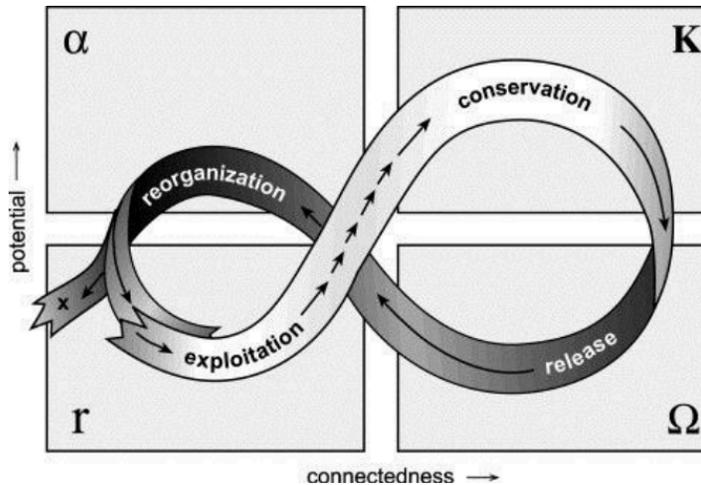
Note. The adaptive cycle as depicted by Holling (2001).

A third property of a system described in the framework of the adaptive cycle is that of resilience. Within the framework of the adaptive cycle, resilience is defined as: "the ability of the system to return to the original state after a disturbance" (Gunderson & Holling, 2002, p.202). A system's level of resilience is believed to ebb and flow over the phases of the adaptive cycle and is lowest when a system is most highly interconnected. When resources are less interconnected and a system may have more redundancies, it is seen as more resilient to changes in its environment. Therefore, a system is least resilient in a conservation phase, and most resilient in a reorganization phase, with its resilience gradually decreasing as it progresses through a growth phase. This would be reflected in a z axis extending outward on an imaginary third dimension toward the reader on the image depicted above. Figure 2 depicts three different rotations of the

adaptive cycle in three dimensions to provide a visual representation of the *z* axis illustrating

fluctuations in resilience throughout the cycle.

Figure 2

Rotations of the Adaptive Cycle
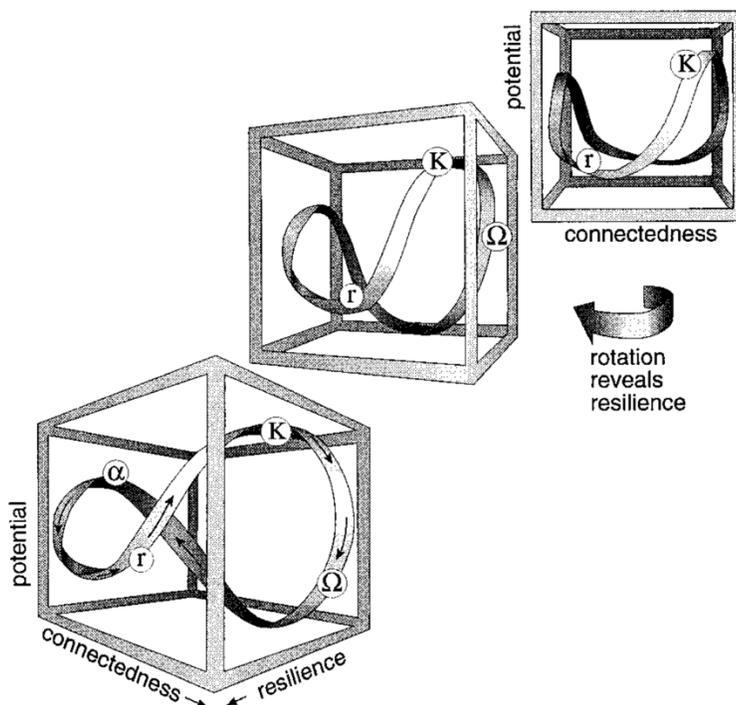
Note. Rotated depictions of the adaptive cycle (Holling, 2001).

The Adaptive Cycle and Meaning-Making

It is possible, and potentially beneficial, to apply the framework of the adaptive cycle to

the processes of making meaning in life. For example, an individual in a reorganization phase of

meaning-making may be considering multiple alternative frameworks of meaning in life. They

may explore various worldviews and belief structures to test the degree to which any given

meaning framework may align with their subjective beliefs and values. As they settle on a

particular meaning structure and begin to invest more resources into endorsing a specific

framework, they enter a growth phase, investing increasingly more of their resources into the

chosen framework. They may continue reduce redundancies and develop a more efficient, established, and rigidly designed sense of meaning in life, therefore entering a phase of conservation. However, if the individual experiences an event that challenges their sense of meaning in life, they may progress into a release phase. Accordingly, their rigid sense of meaning in life may collapse and the energy they had previously invested into endorsing that structure will be released. Their newly available resources will be reorganized in order to make them available for novel growth as the system moves towards another growth phase.

Meaning-making processes may also be considered in terms of the degree of connectedness and potential seen across the phases according to the framework of the adaptive cycle. As a person becomes more intensely committed to an existing framework of meaning in life, moving deeper into a phase of conservation, it is expected that an increasing amount of their energy, identity, and relationships will be congruent with their sense of meaning in life and will likely reinforce the existing structure of this system or framework. This represents increasing connectedness as more elements of an individual's sense of self, beliefs, values, interpersonal relationships, and overall energy expenditure becomes aligned with their existing sense of meaning in life, which in turn leads to increasing potential in the sense that this framework of meaning in life is highly instrumental in organizing their understanding of themself, their relationships, and their world. The highly connected sense of meaning in life has a high potential of defining their understanding of reality.

However, as connectedness of a system increases, its resilience decreases. As the individual encounters an adverse experience that challenges their existing framework of meaning in life, they may have to release some or all of their sense of meaning in life, leaving a conservation phase and quickly entering the release and subsequent reorganization phases. As

they release their meaning in life structure, the resources that had been invested in that structure

become freed and available to be reorganized. This would include cognitive resources such as

belief structures, elements of their sense of identity, and resources of time and energy that they

would have previously invested in relationships and activities congruent with their previous

meaning in life structure. During a release phase, there is a low degree of connectedness as there

is no dominant overarching structure to resources such as beliefs and behaviours.

       Conceptualizing meaning-making in terms of the adaptive cycle of change enables a

more comprehensive understanding of the dynamic nature and ongoing cycle of these processes.

Not only does this framework acknowledge that meaning in life is not always immediately

perceptible, but it also emphasizes the ongoing cyclical processes involved in perceiving

meaning in life. According to this model, meaning in life is not an end-state that is permanently

maintained. Rather, it is expected that various adverse life experiences will challenge one's sense

of meaning in life over time, prompting a release and reorganization of resources to enable a

novel, more complex framework to develop as the individual progresses through growth into a

renewed state of conservation. Within this conceptualization of meaning in life, adversity is not

necessarily an experience that should be avoided. The dialectical balance of stability and novelty

are both important factors in a complex system of meaning in life. The process of releasing and

reorganizing one's framework enables the individual to incorporate a broader range of events

into one's sense of meaning in life, therefore developing a more complex structure. A more

broadly based, complex framework may be more resilient than a simpler, more narrowly defined

framework of meaning in life. Just as a forest consisting of only one species of plant is less

resilient to adversity than a diverse system, a framework of meaning in life based on a narrow

range of experiences is likely to be less resilient than one that incorporates a broad range of events.

Second-Wave Positive Psychology

Recognizing the benefit of some adversity in life in forcing the release and reorganization of a meaning in life framework, therefore moving the system towards greater complexity and resilience, fits well with what is being referred to as second wave positive psychology. Positive psychology was developed as a reaction to the perception of mainstream psychology's focus on disorders and pathology to the exclusion of strengths and virtues (Seligman, 1998). However, positive psychology itself has begun to receive criticism for dichotomizing 'positive' and 'negative' experiences, ignoring both the inevitable existence and the benefits of 'negative' emotions and experiences (Wong, 2011). As the field develops, a more nuanced approach, referred to as second wave positive psychology, has begun to develop. This approach recognizes the dialectic nature of 'positive' and 'negative' phenomena, working towards integrating them and capturing the complexity of their interactions. Wong (2011) advocates for second wave positive psychology to study the paradoxical interactions between negative and positive experiences in order to move towards understanding the true complexities of life.

Similarly, Lomas and Ivtzan (2016) describe human flourishing as a dialectical phenomenon "involving a complex and dynamic interplay of positive and negative experiences" (p. 1753). These researchers discuss several examples where previously deemed 'negative' experiences are in fact beneficial or even necessary for 'positive' experiences. For example, Lomas and Ivtzan describe the helpful balance of optimism and pessimism in order to maintain realistic expectations and perceptions of the world, whereas in its original doctrine, positive psychology may have valued optimism while denigrating pessimism. However, having too much

optimism without any pessimism can be detrimental if expectations are consistently unmet

(Lomas & Ivtzan, 2016). Although previous tradition in psychology may have been to consider

such constructs as optimism and pessimism opposites on a unidimensional continuum, the

evolution of psychology has progressed such that more complex multidimensional

understandings of reality often prevail. As such, the movement toward second-wave positive

psychology pushes the science to step out of dichotomous and simplistic views of 'positive' and

'negative' or 'good' and 'bad' to instead look for complex dialectical syntheses of such

constructs.

Similarly, the dialectical balance of stability and novelty in frameworks for meaning in

life suggests that the goal of pursuing and maintaining a perpetually high level of meaning in life

may be impossible. Rather, stability and novelty must coexist through the ongoing creation and

destruction of frameworks of meaning in life. The uncomfortable experience of releasing one's

sense of meaning in life is a necessary component to future experiences of conserving a

framework of meaning in life. Eternal stability is not possible in complex systems. One must

continually fluctuate between novelty and stability in order to continue to define and redefine

one's sense of meaning in life.

Posttraumatic Growth

The literature regarding posttraumatic growth is a primary example of the dialectical

synthesis involved in second-wave positive psychology. Posttraumatic growth is described as

positive change following a traumatic event and is often conceptualized across five domains.

Individuals may experience growth in themselves, such as perceiving themselves to be more self-

assured or stronger, changes in interpersonal relationships, such as feeling closer to family or

friends, changes in life philosophy, including changing priorities or feeling a deeper appreciation

for life, spiritual changes, such as experiencing an increased sense of religiosity or spiritual

connection, and perceiving new possibilities, including discovering a new life direction or

interests (Tedeschi & Calhoun, 1996). It has been acknowledged that although posttraumatic

growth is discussed as a relatively recent term in psychology, the idea of growth through

suffering has persisted throughout centuries, including being found in many religious texts

(Tedeschi & Calhoun, 2004).

The Diagnostic and Statistical Manual of Mental Disorders, 5th edition (American

Psychiatric Association, 2013) defines posttraumatic stress disorder, which has become well

recognized by the general public as a possible outcome of exposure to trauma. However, fitting

with the dialectical understanding of phenomena in second wave positive psychology, the

experience of trauma can be more complex than previously discussed. Posttraumatic growth,

positive change resulting from grappling with adverse life events (Tedeschi & Calhoun, 2004),

represents the potential benefit, or proverbial silver lining, to exposure to trauma.

Just as individuals who experience posttraumatic growth are expected to develop

schemas for understanding the world that are more robust and resilient to future adversity

(Tedeschi & Calhoun, 2004), individuals who are forced to release a previously held framework

of meaning in life in order reorganize resources, such as beliefs, aspects of identity, or

interpersonal relationships, and move through a novel growth phase on the adaptive cycle of

change are likely to develop a more complex and resilient sense of meaning in life. Frankl speaks

to the relationship of suffering and meaning, stating that suffering ceases as soon as the

individual is able to find meaning within the suffering (1963). More recently, Vohs, Aaker, and

Catapano (2019) wrote about the importance of negative experiences in bolstering meaning in

life. Specifically, Vohs and colleagues (2019) suggest that the added effort required to

comprehend a negative experience can strengthen one's existing meaning in life frameworks or prompt engagement in meaning-making processes. Although uncomfortable in the moment, negative experiences might therefore be beneficial in motivating meaning-making endeavours or bolstering existing frameworks.

Another dialectical parallel can be found in the experience of anxiety relating to performance. Anxiety is typically perceived to be a negative experience that necessitates effort to minimize its influence. However, as a specific example of Yerkes-Dodson Law, previous research has demonstrated evidence for an optimal level of anxiety in test performance (Keeley, Zayac, & Correia, 2008). Specifically, these researchers found a curvilinear model to be the best predictor of the relationship between anxiety related to statistics and test performance in an undergraduate statistics course. These findings were interpreted to suggest that a moderate degree of anxiety may be beneficial for optimizing test performance and that attempting to reduce all students' anxiety may be detrimental for their overall performance.

Similarly, it is possible that there may be an optimal level of exposure to adversity to strengthen one's overall sense of meaning in life. If an individual experiences no adversity, they may become 'stuck' in a phase of conservation, investing in an overly simplified, narrowly defined and rigid meaning in life framework, which could leave them vulnerable to significant distress when they are inevitably exposed to adversity that pushes them to release this structure. However, if an individual is exposed to chronic and severe traumatic adversity, they may be so significantly influenced by these events that they may be unable to successfully reorganize resources to continue progressing through the phases of change in the adaptive cycle. As such, they may in a sense get 'stuck' in the back loop of the cycle. If, however, an individual is exposed to a moderate level of adversity over time, they may be more readily able to continue

progressing from one phase to another, developing an increasingly resilient meaning in life

framework with each subsequent lap of the adaptive cycle while avoiding becoming 'stuck' in

any particular phase. This is aligned with the definition of resilience that states that: "resilience is

the capacity to successfully navigate ALL stages of the complex adaptive cycle" (capitalization

in original; Fath et al., 2015).

Applying the adaptive cycle to the processes involved in making meaning in life may be

helpful in terms of understanding the dialectical synthesis of meaning in life and adversity. The

four phases of growth, conservation, release, and reorganization contribute to the same dynamic

and ongoing processes of developing increasingly complex meaning in life frameworks.

Therefore, progressing through each phase in turn contributes to the development of one unified

framework of meaning in life. The release and reorganization of a structure in the face of

adversity are not steps backwards or phases that should necessarily be avoided. Rather, they are

natural, expected components of the cycle and contribute in their own way over time to the

development of a more robust and resilient structure of meaning in life.

As with many scientific endeavours, applying the adaptive cycle to meaning-making

processes may be beneficial in terms of improving our shared understanding of this complex

phenomenon that is so central to human existence. However, the benefits of using this

framework to understand meaning-making processes extend beyond the scientific utility of

improving knowledge for its own sake.

In accordance with applying the adaptive cycle of change to the processes of meaning-

making, it may be possible to evaluate the phase in the cycle that an individual is in at a given

point in time. Viewing these processes in terms of the adaptive cycle may help generate both

self-compassion and understanding for the less acknowledged back loop phases of the cycle. If

these processes are acknowledged as a necessary component of the cycle as a whole, they may

be more readily tolerated despite the subjective discomfort that is likely to ensue during release

and reorganization phases. The anxiety, depression, and general distress that are commonly

associated with events that violate one's sense of meaning in life may be accepted, and therefore

less disruptive to an individual's overall functioning, if they are viewed within the context of an

ongoing cyclical and dynamic process.

Additionally, it is possible that certain individuals may have more difficulty than others

navigating a particular phase of the cycle. This could result in an individual getting 'stuck' at a

particular phase. Of note, 'stuck' may be a useful term to use for describing how an individual

may feel at certain times. However, in this context it is meant in an impermanent state. It could

also be thought of as feeling 'stalled' or 'bogged down'. For example, an individual may feel

'stuck' if they have inadequate resources available to invest in a new meaning system to progress

from reorganization into growth. Similarly, if they are in a state of deep conservation where they

are prevented from releasing any portion of their framework, they may feel 'stuck' because of

building pressure on them to maintain status quo, leaving no capacity for novelty in life. If it

were possible to understand where in the cycle the individual is 'stuck' it may be possible to

implement more tailored strategies to help the individual become 'unstuck' and resume

progression through phases of meaning-making. Remembering the definition of resilience used

by Fath and colleagues (2015) that resilience involves progressing through each of the phases of

the adaptive cycle in turn, supporting an individual's ability to navigate each phase can be seen

as a strategy for promoting resilience.

There are different risks associated with being stuck in different phases. An individual

'stuck' in conservation is highly vulnerable to adversity and the loss of meaning in life because

of the rigidity of their singular framework. Someone 'stuck' in a release phase does not perceive

meaning in life and is unable to begin even looking for frameworks because of the prolonged

experience of loss of their previous sense of meaning in life. A person who has become 'stuck' in

reorganization will not have a clear sense of meaning in life because they will perceive too many

competing frameworks. Similarly, an individual 'stuck' in growth will not perceive an

established or strong framework of meaning in life to guide their actions, but rather will be

perpetually working towards expanding their framework of meaning in life and building more

connections within said framework.

The full exploration of being 'stuck' in any given phase of the adaptive cycle, along with

proposed strategies for mitigating this risk, is beyond the scope of the current project. However,

this brief overview suggests there may be different risks and challenges associated with being

'stuck' in each phase. As such, there may be different strategies that may be more beneficial to

apply at certain points within the adaptive cycle of meaning making which may be explored in

future research. These individual-level strategies may parallel those described by Fath and

colleagues (2015) in reference to social organizations. In the event that empirical studies

demonstrate that individuals can in fact become 'stuck' in a particular phase of the cycle of

meaning-making, it is hoped that this research leads to future investigations to evaluate

techniques that may help people become 'unstuck' and continue to progress through the cycle in

an adaptive, effective, and resilient way.

The Current Project

The current project describes the development and preliminary psychometric evaluation

of a new scale, the Adaptive Cycle of Meaning Making (ACMM). The newly developed ACMM

was designed to assess where along the phases of the adaptive cycle an individual is at a

particular point in time in terms of making meaning in life. The ACMM aims to improve the

understanding of the processes involved in making meaning in life, particularly through

acknowledging the necessity of releasing and reorganizing one's sense of meaning in life in

order to move towards increasingly robust, complex, and adaptive structures for perceiving

meaning in life.

The current project consisted of three studies, each building on the previous. The first

study was qualitative in nature and involved gathering subjective perceptions of the processes

involved in overcoming an adverse life event and the effects of this experience on each

individual's perceptions of meaning in life. The qualitative data was analysed using a theoretical

thematic analysis to explore the potential application of the adaptive cycle as a framework for

understanding these processes. Results of the first study informed the item generation of the

ACMM. Specifically, participants' direct wording was used to help create the items of the

ACMM. The second study was a cross-sectional quantitative evaluation of psychometric

properties of the ACMM. The third study focused on the potential dynamic nature of the ACMM

and meaning-making processes it is posited to capture. It consisted of repeated administrations of

the ACMM using Ecological Momentary Assessment and a subsequent descriptive analysis of

changes in response patterns among participants over a period of approximately 9 weeks.

Study 1

Participants

A sample of six participants were interviewed regarding their personal experiences of a

time in their life when they had successfully overcome a challenging experience. Participants

ranged in age from 28 to 69 years, with an average of 50.8 years (SD=18.2 years) and included 5

females and 1 male. All 6 participants identified as Caucasian and had between 1 year of college

to partially completed doctoral level education. Participants were not asked about spiritual or

religious orientations; however, some chose to discuss aspects of religion in their description of

overcoming a stressor. Participants were referred to the researcher by individuals who were

peripheral to the project, such as other faculty members in the university who were not directly

involved in the project. A referral to participate was required in order to ensure individuals had

fully overcome the adversity of the challenging experience they would be discussing and had

clearly understood the interview was not intended to have any therapeutic elements.

Additionally, individuals needed to be sufficiently insightful and self-reflective to be able to

articulate their intrapersonal experiences effectively.

Procedure

Participants met with the researcher individually for a semi-structured interview, which

lasted between 45 and 90 minutes. After providing informed consent (Appendix A), participants

reported basic demographic information, then answered a number of questions regarding the

process of having overcome a challenging event in their life. In the event that an individual

reported numerous distinct and significantly stressful events, they were encouraged to discuss the

most stressful event that they believed they had successfully overcome. Participants were left to

determine for themselves what having 'successfully overcome' an event would entail. When

numerous stressful events were subjectively viewed as having a comparable degree of severity,

participants were encouraged to discuss the most recent event. No specific limitations on the

nature of the stressful event were set a priori to allow participants to freely select what they

personally viewed as the most significant recent stressor that they felt comfortable discussing.

Interviews were conducted in an open-ended manner so as to avoid leading participants' recounts

of their processes. In accordance with the semi-structured format, participants were asked a

standard set of prompting questions with additional questions as required to elicit elaborations on

aspects of their experiences. See Appendix B for interview questions. Once transcripts of the

interviews had been generated, participants were offered the opportunity to review their personal

transcript and revise any sections they believed did not accurately convey their intended

meaning; no participants offered any corrections or revisions. See Appendix C for the debriefing

form provided to participants upon completion of their interview.

Qualitative Analysis

Qualitative data was analysed using theoretical thematic analysis (Braun & Clarke,

2006). There was an a priori hypothesis that themes identified in the data would align with the

four phases of the adaptive cycle. Given this top-down influence on the interpretation of the data,

a theoretical thematic analysis was more appropriate than an inductive approach. Similarly, the

typical language regarding the 'emergence' of themes from the data is intentionally avoided

given the active role that the researcher had in interpreting the data. This is in accordance with

Braun and Clarke's (2006) caution regarding recognition of researcher bias and the unavoidable

influence that theoretical alliance can have on data interpretation. As such, rather than feigning

an objective 'emergence' of themes, the current study conducted theoretical thematic analysis in

recognition of the pre-existing influence of the hypothesis that data would align with the adaptive

cycle.

The analyses took on a predominantly essentialist focus, rather than constructionist, as

described by Braun and Clarke (2006). The essentialist view of thematic analysis focuses on

subjective experiences and personal interpretations of meaning, whereas constructionist views

attend more to interactions between individual and social interpretations of reality. The

interpretation of the explicit meaning of words used by a participant, known as semantic

interpretations, are viewed as more common in essentialist perspectives, whereas latent

interpretations that examine underlying or implied significance of data may be more common in

constructionist orientations (Braun & Clarke, 2006). That is to say, interpretations of implied or

underlying significance are more frequently used when examining an individual's data by

situating it within a social or cultural context. Alternatively, the examination of the explicitly

stated meaning of words used by a participant is more compatible with a focus on that

individual's subjective experiences of reality. The current study emphasized semantic

interpretations to align with the predominantly essentialist perspective used to interpret

participants' data.

Theoretical thematic analysis was conducted in accordance with the six-step guide

provided by Braun and Clarke (2006). Joffe (2012) suggests the use of software such as NVivo

to facilitate qualitative analyses, particularly for large-scale studies. However, given the very

small sample size of this study, the in-depth familiarity with the data generated through manual

transcription, coding, and interpretation rather than computer-based was both manageable and

appropriate. Interviews were audio-recorded, transcribed, and reviewed by participants. In

accordance with Van Manen (2014), transcripts were first read to capture wholistic impressions

by considering each transcript in its entirety to gain a sense of the overall experience described

by the participant. On a second more selective reading, sections of the transcripts were coded and

highlighted in accordance with their alignment with each of the four phases of the adaptive

cycle: growth, conservation, release, and reorganization. Lastly, in the detailed reading each

individual sentence within the transcript and its potential affiliation with one of the four

identified codes representing the phases of the adaptive cycle was considered. This multi-stepped

approach ensured a thorough analysis of the available data.

Results

Each of the six participants interviewed for this study described their uniquely personal experiences of overcoming an adverse event in their life. Pseudonyms were created for each participant to protect their confidentiality. Adverse experiences covered a range of topics including the death of a loved one, divorce, infidelity, relocating geographically, and starting a new career. Each participant described their unique processes of coping with a stressful life event to the point at which they felt they had successfully overcome the adversity.

Each of the accounts provided by the six participants can be interpreted in terms of the four phases of the adaptive cycle. In general, each participant described experiencing a stressful event that disrupted the perceived stability, predictability, and routine nature of their daily lives (release). They then described actively struggling to manage the initial aftermath of the event, including ongoing emotional and cognitive effects of the stressor, such as denial (reorganization). After a period of conscious effort to re-establish a functional life, including periods of trial-and-error, new or renewed patterns began to take root and provide a sense of improvement relative to the initial situation (growth). Over time, these new and renewed patterns became fully established for the individuals, providing them again with a sense of consistency, stability, and routine in life (conservation). A more detailed review of how each of the four phases was represented in participants' interviews is presented below.

Release

Many participants described their lives as having been relatively stable and constant prior to the stressful event. As such, the experience of the stressor appeared to move individuals from a state of conservation into a state of release. Participants described this experience in terms of a sense of shock, disbelief, and surrealness. One person expressed:

"It threw me into a tailspin" (Marie).

Many participants expressed a sense of life falling apart, using language like

"crumbling…unravelling…just out of control" (Charlotte),

or "fractures…breaks" (Darlene).

Along with this sense of shock and disruption to life, several participants described

notable emotional effects of the stressful event. For example, one participant said:

"The first day, I was sad and confused and, you know, kind of, it was a negative day…At

first, there was sad and confused and scared." (Paul)

while another participant noted:

"This fear set in…reality sort of like hits you, right?" (Isabelle)

Other participants described broad ranging effects of the stressor, noting that it altered their

experience of life as a whole during that period of time. For example, one person said:

"Things that seemed important before, really, were insignificant." (Beth)

whereas another participant stated:

"It was like the world had ended." (Marie)

Importantly, one participant (Isabelle) chose to describe a stressful life event that she had

initiated. As such, she did not describe feeling shocked, which was common among other

participants. However, despite her anticipation of the situation and control over its occurrence,

she did discuss feelings of fear, disbelief, and stress as the event transpired. Releases that are

unexpected appear to create a more intense subjective experience. However, even anticipated

releases show some similar elements regarding negative affect and confusion as the individual

adjusts to a new reality.

Reorganization

Whereas the release phase was denoted by expressions of shock, loss of control, disbelief, and fear, the reorganization phase was described by participants as involving conscious effort and attempts to rebuild a life for themselves. One participant stated:

"It does take effort, it really does. It takes effort of pushing yourself to organize your life

to make sure that you are interacting with friends and family" (Beth).

while another participant said:

"We really invested a lot of time and energy trying to right the ship" (Darlene)

As a description of how effortful this process of reorganization can be, one person said:

"It's just like wading through mud." (Marie)

A degree of intentionality or conscious decision making was conveyed by some participants. For example, one person said:

"we chose to fight [the illness]" (Beth)

Similarly, another participant noted:

"I was trying to hang on to this for as long as I could" (Darlene)

Conveying a similar sentiment. One participant described her resistance to the event, wanting to resolve the issue before others became aware. Specifically, she commented:

"I was isolating myself. I was shutting down. I wasn't telling people…right away we go

into that mode 'what can we do? We're going to fix this.'" (Charlotte)

The expressions from some participants in this phase conveyed sentiments of distress while they actively struggled against the reality of their stressful event. Some exerted futile efforts to maintain aspects of comfort and familiarity from the routines of their life prior to the stressful event. However, others did not attempt to deny the stressful event, but rather tried to expedite the transitional process. For example, Marie stated:

"I was very reckless after that um, I was very reckless, and I think I was forcing, forcing

it to come to a head."

All participants described a transitional period that deviated from the routines of their

typical lifestyles. As if shifting away from cruise controlled auto-pilot, participants consistently

spoke about exerting effort and consciously attempting to make changes. Several participants

discussed seeking support, either formally or from friends and family to help them navigate the

ongoing difficulties that arose from their stressful life events.

Retrospective accounts of some benefits arising from the reorganization process were

described by some participants. The forced reset in their lives created by having to release a

previous state provided an opportunity for some positive experiences akin to discovering a

proverbial silver lining. For example, Isabelle spoke with a positive tone as she described:

"It was like a different mindset…so it was a lot more flexible…everything was just so

new."

Similarly, Charlotte stated:

"It forced me to relax and to stop."

Although Isabelle described positive outcomes of this phase most explicitly, she had also chosen

to intentionally embark upon changing as aspect of her life. She had the benefit of anticipating

the various elements of change more than other participants. As such, it is expected that her

overall experiences may be less distressing and include more positive affect. However,

Charlotte's note of a silver lining was derived from an event that was entirely unexpected and

resulted in significant distress. Therefore, even in situations in which the change causes

significant hardship without warning, silver linings may be perceived.

Growth

After a period of time of struggling to find a new pathway forward, participants reached a point where things began to improve. They described discovering a newfound sense of self and confidence, as well as increased positive affect including happiness, peace, and excitement. For example, Paul stated:

> "this change has uh reinvigorated this ambition that I…was a bit dormant and impeded by this intrinsic fear that I seem to have, that I had."

With a similar tone of exuberance, Marie noted:

> "I suddenly came alive in a way that I didn't even know existed."

Along the same lines of a renewed sense of life, Beth described struggling to sort through myriad practical challenges resulting from her stressful life event. After muddying her way through this, she stated simply:

> "And then you have to start living again…one day at a time."

Many participants described a common experience of becoming reengaged in life after finding a way through the hardships of their stressful events. Some described it as a transformative experience, like Darlene, who referred to an "evolution of sense of self." Others noted a significant shift in affect and perceived stress, like Paul, who described that:

> "a huge weight was lifted from my shoulders."

Similarly, Isabelle explained that she found "some peace or some, a feeling of like, calm".

Charlotte, who had previously described closing off during the peak of stress resulting from her adverse life experience, commented that:

> "then you start to open up, you start to talk to your friends and your community and the close relationships that you have."

Overall, participants described moving into a phase in which they felt freer, content, and reinvigorated with a sense of joy from their newfound life direction.

Conservation

Many participants described their experiences of what was identified as a conservation phase both before and after their stressful event. This phase consisted of participants views of a baseline, routine sense of normality in their everyday lives. Prior to the onset of their stressful life event, participants spoke about feeling comfortable, stable, and having a sense of predictability. For example, Paul noted:

"I was very comfortable … and um and I really did feel very safe and secure [there] because I had a lot to bring."

Similarly, Darlene spoke about life "running its natural course" and described a sense of comfort in the perceived stability commenting that "you think it's going to last forever." Other participants spoke about a meaning framework, or particular belief about life that they maintained prior to their challenging life experience, such as Marie, who said:

"Before that I thought, I thought once you got married, ha pretty naively, you were committed, and you could fix anything."

Some participants also noted that being in this phase was less cognitively and emotionally taxing. For example, Isabelle stated:

"I feel comfortable… just like I don't have to think about it as much… it doesn't take as much mental like cognitive energy."

Similarly, Paul described feeling drawn to this sense of predictable routine in his life, stating "I crave stability". Darlene also described an affinity for the perception of consistency in life, stating:

> "I always have this beautiful constant that is like a really nice grounding and positive
>
> piece for which I'm very grateful."

Participants frequently described their experiences in this phase as a return to status quo, or the

development of a new and enduring sense of normality. This integrated both the cognitive

aspects of consistency, predictability, stability, and routine, as well as the emotional elements of

calm, tranquil contentedness.

Rigidity Trap

Although conservation phases are typically affiliated with positive affect, there are times

in which the stability and consistency of this phase become more extreme, resulting in a negative

sense of being stuck in a monotonous and unfulfilling routine. In the adaptive cycle, this is

known as deep conservation or the rigidity trap. At times, an individual or system fails to release

patterns that have become unhelpful and instead becomes stuck in the rigidity of these

established processes. This can be evidenced in a few participants' descriptions of their lives

prior to the release of the stressful life event that they described. For example, Isabelle said:

> "I felt very stuck… like I'd used up all the opportunities that I could… I didn't feel like
>
> there was much room to grow, like um whether that was like I don't know, career,
>
> lifestyle, dating someone, meeting new people… like I'd reached like a cap."

Paul, who had described feeling stuck in life, despite recognizing the need for change. He noted:

> "[I] felt that I needed to move up in the world in that sense, but my fear was overcoming-
>
> was impeding me from continuing on."

He noted the strong appeal he felt towards maintaining the status quo rather than taking the risk

of disrupting what was familiar, saying:

> "I had security and I could have stayed there and been satisfied and avoid that fear."

Fear of uncertainty is a very common human experience. As such, resisting change in an attempt to preserve the perception of safety in what is familiar is a frequent occurrence. However, inevitably change will come and both individuals and systems will have to release previous frameworks, reorganize their understandings, and work towards growing new systems.

Meaning in Life Across the Four Phases

Meaning in life, as previously discussed, can be understood as a combination of coherence, purpose, and significance (Martela & Steger, 2016). With this in mind, changes in meaning in life aligned with the four phases of the adaptive cycle can be seen in participants' descriptions of overcoming a stressful life event.

Coherence

Coherence involves having a sense of understanding in the world. The subjective perception of life making sense is the experience of coherence. Many participants described their sense of coherence being lost or disrupted by the stressful event. This manifested in expressions of confusion, shock, and disbelief, as well as emotional experiences of fear. For example, Beth expressed:

"[The event] was not, any, anywhere on the horizon of anyone's thought…it was a shock, it was a real shock."

Marie expressed a similar feeling of disbelief, stating:

"That really set me back. That was, that was not expected."

Throughout the struggle to overcome their challenging life events, part of the process involved participants working to develop a new sense of understanding, or coherence, in the world. Charlotte commented directly about part of her shift in coherence, stating:

"I finally came to the understanding that not everything's going to fall apart if, if, because

of [the stressful event]."

The shift in coherence throughout the phases of the adaptive cycle was most clearly visible in

participants who had selected to describe the process of overcoming an unexpected stressful life

event. Isabelle, who spoke about a self-imposed challenging life event, did still express a degree

of having to re-establish a sense of coherence, stating:

"that was like pretty stressful at first too and like understanding like how – I think that

was a whole thing like understanding how public transportation worked um and like the

timing of things, where things are..."

Therefore, it appears as though stressful events that are unexpected have a more significant

effect on one's sense of coherence, but even anticipated stressors can create a change in one's

sense of coherence.

Purpose

Purpose can be thought of as the meaningful roles and goals that guide an individual's

behaviour on a daily basis. This facet of meaning in life was also significantly affected by

participants' challenging life events. Participants' purposes can be viewed as progressing through

the phases of the adaptive cycle as a component of overcoming the adversity. Darlene explicitly

highlighted her view of her purpose during the conservation phase she was in prior to

experiencing the adverse life event. She stated:

"My purpose when I was married was very much so like, to be the best wife ever."

For many participants, the experience of their stressful life event pulled them away from their

pre-existing purposes and motivated them to develop new purposes to help them cope with the

challenging event. An interim purpose for many participants became to engage in complex

decision-making processes regarding how to best respond to the stressful event; however, for some participants, the onset of the stressful event resulted in a general loss of purpose or direction in life.

As they actively worked to overcome the event, they may have tried multiple new activities in the hopes that one would take root and grow into a new sense of purpose, which can be seen as an element of reorganization. Similarly, they may have had to actively work to establish a new role in life, such as becoming single, widowed, or unemployed. Their previous roles, being employed or in a relationship, would have involved certain tasks and responsibilities that would have helped guide their behaviour throughout the day. The loss of these roles, therefore, also would have resulted in a loss of these goal-directed behaviours, creating a need for new roles and goals to be established. Marie spoke about having created a new sense of purpose as part of overcoming her stressful life event by stating:

> "I had a life that I felt, that I managed, I made a life, I made a life for my daughter and she's grown and successful and I'm still the glue that holds my family together."

By the time they felt as though they had successfully overcome their challenging life event, participants described feeling like they had once again established a sense of purpose in life, with meaningful roles and goals that provided structure for their behaviour. This came in the form of new friendships, hobbies, and employment.

Significance

Significance as a component of meaning in life describes the sense of intrinsic worth, importance, and value of oneself and one's life. This is the component of meaning in life that is frequently referenced in more existential perspectives. Fluctuations in participants' perceptions of significance were apparent, particularly in individuals who described unexpected and

devastating stressful life events. A pattern can be seen in participants' descriptions of

overcoming their events in terms of their perceptions of significance in life. Initially following

the onset of the adverse life experience, several participants described losing their sense of

significance in life. Beth very clearly spoke of this, saying:

> "I think initially after I would say the meaning of life meant nothing."

With a similar tone of despair immediately following the stressful life event, Marie stated:

> "Before I sorted through thinking things out um, it was like the world had ended. Yea, it
> was like the world had ended."

These expressions illustrate the intensity of distress experienced by participants as a result of

their adverse life events. The events had altered their perceptions of worth in life as a whole and

their process of overcoming this event involved recreating the perception of value or significance

in their life. For example, Charlotte initially described her reaction to the stressful life event as

follows:

> "It was devastating. It was heart-breaking, um it was sad, it was like my whole world was
> crumbling."

However, she explained that throughout her process of overcoming this adverse event, she came

to a new view of life, saying:

> "I sort of just, you know, if things are meant to happen, there's a reason for it and there's
> always a gift in that struggle, and I try and look for the gift in that struggle. Um, so I
> would say it was in the last year that I've come to realize that."

Marie described a similar process of initially feeling like her life had fallen into disarray, saying:

> "I didn't know which end was up, I wasn't, I was going to lose my mind."

However, in describing how she had managed to overcome this adversity, she stated towards the end of her interview:

> "Sometimes you look back and you think 'how did it ever fall into place as well as it did?'"

This comment reflected the significance that she attributes to the events of her life, as they all interdependently 'fall into place'. A tone of awe was present as she reflected on her life as a whole. When participants spoke of having successfully overcome their stressful life event, recreating the perception of value, worth, importance, and significance in themselves and their life was described as part of this process.

Development of the ACMM

Sufficient elements of each of the four phases of the adaptive cycle were seen in each of the transcripts, as reviewed by both the researcher and supervisor of the project. Additionally, the core components of meaning in life can be seen as progressing through these four phases of the adaptive cycle throughout participants' processes of overcoming their stressful life events. As such, these interviews were viewed as providing support for the development of the new self-report questionnaire, the ACMM. Results from this qualitative study, though based on a small somewhat homogenous sample, suggest that perceptions of meaning in life do progress through the four phases of the adaptive cycle as an individual experiences stressful life events and engages in processes to overcome adverse experiences.

In order to develop the ACMM, quotes reflecting each of the four phases of the adaptive cycle were compiled across all six transcripts and reviewed for key terms that represent the core concepts of each phase. Potential items for the ACMM were generated from this list of key terms representing each of the four phases, as drawn from participants' quotes. This initial

brainstormed list of items was reviewed by the project's supervisor and refined to include between 9 and 12 items per adaptive cycle phase. Potential items were reviewed in consultation with three other graduate researchers who are familiar with complexity theory, and the adaptive cycle in particular. The items that were viewed as best representing the core components of each phase of the adaptive cycle were then revised for optimal wording. The five most preferred items for each phase of the cycle, according to the project supervisor, main researcher, and team of graduate research consultants, were kept. Given that some evidence of the rigidity trap was present in participants' interviews, one additional item was added to evaluate this concept as a component of the conservation phase. The preliminary version of the ACMM can be found in Appendix D.

Study 2

Following the creation of the preliminary version of the ACMM resulting from Study 1, initial psychometric evaluation of the new scale was conducted in Study 2, with a particular focus on exploring convergent and discriminant validity, as well as factor structure. It was hypothesized that scores in the back loop phases of release and reorganization would be more positively correlated with stress scores, whereas growth and conservation scores were expected to correlate negatively with stress scores. Conservation scores, as well as growth scores to a lesser degree, were expected to be positively correlated with Presence scores on the Meaning in Life Questionnaire (MLQ), while release and reorganization scores were expected to be positively related to Search scores on the MLQ. Conservation scores were expected to be most strongly related to overall well-being, as measured by the Flourishing Scale, as well as to positive emotional experiences, with growth scores showing slightly weaker but still positive correlations with these measures. Negative emotional experiences are expected to be most

related to release and reorganization scores. See Table 1 below for a summary of expected

directions of correlations between scale scores.

Table 1

Expected Directions of Correlations Between Scales

	MLQ – Presence	MLQ – Search	Flourishing	Stress	SPANE – Positive	SPANE – Negative
Fore loop	Positive	Negative	Positive	Negative	Positive	Negative
Back loop	Negative	Positive	Negative	Positive	Negative	Positive

Measures of self-esteem (Rosenberg Self-Esteem Scale) and optimism (Life Orientation

Test – Revised) were included in this study to examine potential discriminant validity. Although

both self-esteem and optimism are likely related to overall well-being, including life satisfaction

and affect, these constructs were expected to be theoretically distinct from the processes involved

in meaning-making, as the ACMM is posited to measure. Regardless of one's degree of self-

esteem or optimism, it was expected that all individuals would experience the cyclical processes

involved in making meaning in life. As such, it was not expected that these constructs would

show particular patterns of relationships with the four phases of the ACMM. It is possible that if

an individual's sense of self-worth is affected in the dismantling of a previously held framework

of meaning in life, there may be a decrease in self-esteem evident in the back loop phases.

Similarly, if optimism is notably affected by situational changes, it may fluctuate throughout the

phases of the adaptive cycle, decreasing in the back loop phases.

Methods

Participants

Participants, aged 18 years or older, were recruited through social media advertising to complete a series of online questionnaires, including the newly developed ACMM. Using social media as the advertising platform allowed participants to be recruited internationally. As a token of appreciation for their participation, participants were given the option of being entered into a draw for a $20 Chapters gift card. The desired sample size was based on the number of items in the newly created ACMM, which has 21 items. The study aimed to recruit a minimum ratio of 10 participants for each proposed item on the ACMM, as recommended by Morgado and colleagues (2017). As such, the current study sought a minimum of 210 participants. To account for expected attrition and incomplete responding, a total of 269 were recruited.

Procedure

Participants were provided with a link to an online survey platform where, after completing an informed consent form (see Appendix E), they were prompted to complete a series of self-report questionnaires, including the ACMM, Meaning in Life Questionnaire, Flourishing Scale, Riverside Life Satisfaction Scale, Scale of Positive and Negative Experiences, Perceived Stress Scale, Rosenberg Self-Esteem Scale, and Life Orientation Test – Revised. See Appendices D, and F through L for all questionnaires. Following their participation, all individuals in the study were provided with a debriefing form (see Appendix M). These measures are described in more detail below. Psychometric properties of the ACMM were examined, including evaluations of convergent validity, internal consistency and factor structure. According to Streiner and Norman (2003), a Cronbach's alpha of .8 or greater should be expected for internal consistency. In line with the framework of the adaptive cycle, the ACMM was expected to have items loading onto either two or four factors; the two-factor model was expected to represent the fore loop (growth and conservation) and back loop (release and

reorganization), whereas the four-factor model was expected to have a factor for each phase of the cycle. Exploratory factor analysis was used to examine the factor structure of the ACMM. Additional analyses were conducted using partial confirmatory factor analysis, discussed below, to determine whether there was satisfactory empirical evidence to warrant conducting confirmatory factor analysis.

With regards to convergent validity, correlations were examined between the ACMM and measures of meaning in life, well-being, and stress. The ACMM does not generate an overall total score, but rather specific subscale scores according to each phase of the adaptive cycle. This is comparable to the subscale scores of Presence and Search for meaning measured by the Meaning in Life Questionnaire (MLQ; Steger et al., 2006), which also does not generate a total score of meaning in life. As such, convergent validity was explored with reference to specific subscale phase scores of the ACMM. Discriminant validity was examined through correlational analyses comparing the ACMM and the Rosenberg Self-Esteem Scale (Rosenberg, 1965), and the Life Orientation Test-Revised (LOT-R; Schreier, Carver, & Bridges, 1994), which evaluates dispositional optimism and pessimism.

Measures

Adaptive Cycle of Meaning Making

The ACMM was developed based on results of Study 1. The self-report scale consists of 21 items relating to each of the four phases of the adaptive cycle: growth, conservation, release, and reorganization. There are five items designed to measure each of the four phases, with one additional item designed to capture the concept of the rigidity trap, or deep conservation. Only a single item targeting the rigidity trap was included because this is not viewed as one of the four core phases of the adaptive cycle and is therefore somewhat peripheral to the focus of the scale at

this time. Items are rated on a seven-point likert scale indicating the degree to which an

individual agrees with each statement. Individuals are asked to respond to each item based on

their current, present-moment perspective of their life. The items for each phase are summed to

generate a phase score.

An individual's overall profile of scores may be interpreted by looking at the relative

magnitude of each of their four phase scores. The scores are expected to provide insight into the

relative positioning of an individual at a given point in time within the adaptive cycle relative to

their perception of meaning in life. Importantly, scores on the ACMM are not meant to be

interpreted in isolation. For example, an individual score on a particular subscale would not be

deemed high or low without considering its relative elevation in the context of the individual's

scores on other subscales. Rather, the phase score that is highest among an individual's scores

would identify the primary phase that they appear to be in along the adaptive cycle with regards

to meaning making. The four phases of the adaptive cycle are often viewed as continuous rather

than discrete. Therefore, in the event that an individual has two phase scores that are tied as the

highest among an individual's profile, they would be viewed as being in transition between these

two phases.

Meaning in Life Questionnaire

The Meaning in Life Questionnaire (MLQ, Steger, Frazier, Oishi & Kaler, 2006) is a ten-

item self-report scale with items rated on a seven-point likert scale ranging from 1=absolutely

untrue to 7=absolutely true. Sample items include "I have a good sense of what makes my life

meaningful" and "I am seeking a purpose or mission in my life", which load onto Presence and

Search subscales respectively. Half of the items load onto the Search subscale, while the other

half load onto the Presence subscale, which have been empirically shown to be two independent

factors. Only one item, on the Presence subscale, is reverse coded for scoring purposes. The

questionnaire evaluates perceptions of meaning in life in general rather than focusing on a

particular domain or source of meaning in life. Steger and colleagues (2006) report internal

consistencies for Presence and Search subscales to be .86 and .87 respectively, and one-month

test-retest reliability of .70 for Presence and .73 for Search. See Appendix F for the full MLQ.

Flourishing Scale

The Flourishing Scale (FS; Diener et al., 2010) is an eight-item self-report scale that

requires individuals to rate the degree to which they agree with each statement on a seven-point

likert scale ranging from 1=strongly disagree to 7=strongly agree. A total score is generated by

summing an individual's scores across all items. Sample items include "I am optimistic about my

future" and "I actively contribute to the happiness and well-being of others". The FS is reported

to have an internal consistency of .87 and factor analysis has supported the interpretation of all

items primarily loading onto a single factor. See Appendix G for the full FS.

Riverside Life Satisfaction Scale

The Riverside Life Satisfaction Scale (RLSS; Margolis, Schwitzgebel, Ozer, &

Lyubomirsky, 2018) is a self-report scale consisting of six items rated on a seven-point scale

ranging from 1=strongly disagree to 7=strongly agree. The RLSS is posited to be an

improvement over the previous Satisfaction With Life Scale (Diener, Emmons, Larsen, &

Griffin, 1985) because of its indirect evaluation of life satisfaction, for example with items such

as "I want to change the path my life is on". Half of the items are indirect, whereas the other half

ask directly about satisfaction, such as "I am content with my life." Having indirect items is

believed to allow for a broader conceptualization of life satisfaction while also mitigating

possible issues of acquiescent responding. See Appendix H for the full RLSS.

Scale of Positive and Negative Experiences

The Scale of Positive and Negative Experiences (SPANE, Diener et al., 2010) consists of 12 feelings such as "good", "bad", "angry" or "contented", each of which are rated on a scale ranging from 1=very rarely or never to 5=very often or always to indicate the frequency with which an individual has experienced each feeling over the past four weeks. Half of the items load onto the Positive subscale, while the other half load onto the Negative subscale. Scores are generated by summing the responses for each subscale. Additionally, a Balance subscale can be calculated by subtracting the Negative score from the Positive to indicate the relative frequency of positive and negative emotions experienced by an individual; however, the Balance subscale was not used in the current study. The internal consistencies of the Negative, Positive, and Balance subscales are .81, .87, and .89 respectively. See Appendix I for the full SPANE.

Perceived Stress Scale

The Perceived Stress Scale (PSS; Cohen, Kamarck & Mermelstein, 1983) is a 14-item self-report scale with items rated on a five-point likert-type scale ranging from 0=never to 4=very often to indicate the frequency with which an individual has perceived a range of stress-related experiences over the past month. Items include statements such as "In the last month, how often have you felt that things were going your way?" and "In the last month, how often have you found that you could not cope with all the things you had to do?". Half of the items are reverse scored and scores on all items are summed to generate a total score. The internal consistency for the PSS has been reported to range from .84 to .86 (Cohen et al., 1983). Given that the purpose of this study is to explore the psychometric validity of the newly developed ACMM, which focuses exclusively on present-moment experiences, the timeframe of each item on the PSS was reduced to one week. Specifically, each item was reworded to state "In the last

week…" rather than referring to a one-month timeframe. See Appendix J for the full PSS,

including the temporal modification.

Life Orientation Test – Revised

The Life Orientation Test – Revised is a measure of dispositional optimism that is viewed

as relatively stable over time; test-retest reliability over a period of 28 months was found to be

.79 (LOT-R; Scheier et al., 1994). The LOT-R is a ten-item self-report questionnaire consisting

of four filler items and six items that contribute to an individual's scores, three of which are

reverse coded (Scheier, Carter, & Bridges, 1994). Participants are asked to rate each of the ten

statements to indicate their degree of agreement ranging from 0=strongly disagree to 4=strongly

agree. Sample scored items on the LOT-R include statements such as "In uncertain times, I

usually expect the best" or "If something can go wrong for me, it will", which is a reverse scored

item. An example of a filler item is "It's easy for me to relax." The authors note that scores on

the LOT-R are described as being relatively stable across time, with test-retest correlations

varying between .56 and .79 at intervals ranging from 4 to 28 months. Additionally, the LOT-R

is said to have adequate internal consistency, although one report of Cronbach's alpha was .78,

which is lower than what is seen for some other tests (Scheier et al., 1994). See Appendix K for

the full LOT-R.

Rosenberg Self-Esteem Scale

The Rosenberg Self-Esteem Scale (RSES) is a ten-item self-report scale evaluating an

individual's positive or negative attitudes toward themself, also known as their self-esteem.

Items are rated on a four-point scale ranging from 1=strongly disagree to 4=strongly agree.

Every other item is reverse coded to control for acquiescent response style and all scores are

summed to generate a total rating of self-esteem. Sample items include "On the whole, I am

satisfied with myself" and the reverse scored item such as "I feel I do not have much to be proud of". The RSES was developed with the explicit intention of being face valid, brief, and simple to administer (Rosenberg, 1965). The single factor structure of the RSES has been confirmed by other researchers (Bagley, Bolitho, & Bertrand, 1997). This study also shows satisfactory temporal stability in the RSES with a test-retest correlation of .61 over a 7-month follow up and Cronbach's alphas showing internal consistencies ranging from .85 to .90 (Bagley et al., 1997). See Appendix L for the full RSES.

Results

Demographic Description

A total of 269 participants were recruited for this study. The sample consisted of 188 (69.9%) female-identified participants, 75 (27.9%) male-identified participants, and 6 (1.5%) individuals who identified outside of the male/female binary gender system or did not disclose a gender identity. One participant was removed from study for having reported being 16 years old when inclusion requirements were to be 18 years or older. Five participants did not disclose their age. The ages of the remaining 263 participants ranged from 18 to 81, with an average age of 36.6 years (SD=16.4 years). Of the 268 participants, 9 (3.4%) did not disclose their ethnicity, 200 (74.6%) identified as White, Caucasian, European, or Canadian. Additionally, 59 (22%) identified with another ethnicity, of which the majority (33, 12.3%) identified as being Asian. The remaining 26 participants (9.7%) reported a mix of ethnicities, including being bi- or multi-racial, African, First Nations, Métis, or Hispanic. Three (1.1%) participants did not disclose their highest level of education, while 29 (10.8%) reported high school as their highest level of education, 173 (64.6%) reported completing at least some post-secondary education, 55 (20.5%) reported having a master's degree, and 8 (3%) reported having a doctoral degree.

Internal Consistency

A Cronbach's alpha was calculated for each of the four phase scores of the ACMM to examine their internal consistency. The alpha score was .76 for both the growth and conservation scales, .81 for the release scale, and .67 for the reorganization scale. To investigate the inclusion of the item that is aiming to capture the concept of the rigidity trap, a Cronbach's alpha was also calculated for the conservation scale with the inclusion of the rigidity trap item; this score was .35. The very low internal consistency of the conservation scale when the rigidity trap item is included indicated that this concept should not be included in an overall evaluation of a conservation phase.

For both the growth and conservation scales, the Cronbach's alpha would not increase with the removal of any of the items currently included. However, both the release and reorganization scales would have higher internal consistency if one item were deleted. Specifically, the internal consistency for the release scale would increase from .81 to .82 if the item "My life feels unpredictable" were removed. The internal consistency of the reorganization scale would increase from .67 to .73 with the removal of the item "I am open to new possibilities". The change in internal consistency is quite negligible for the release scale; however, the change for the reorganization scale is more significant and removing this item should be considered in future iterations of the ACMM.

Only the release scale currently demonstrated an internal consistency above .80, which is the threshold noted by Streiner and Norman (2003) of what is considered to be good internal consistency. As such, the results of this study suggest that adding or modifying items, particularly for growth, conservation, and reorganization scales, should be considered in the future in an attempt to increase the scales' internal consistencies.

To verify the internal consistency of all the other scales used in the current study with this particular sample, Cronbach's alpha scores were also calculated for each of these scales. All scales demonstrated appropriately high degrees of internal consistency. See Table 2 below for a summary of internal consistency scores.

Table 2

Summary of Internal Consistency by Scale

	MLQ Presence	MLQ Search	FS	RLSS	SPANE positive	SPANE negative	PSS	LOT-R	RSES
Cronbach's Alpha	.91	.91	.90	.86	.92	.86	.86	.81	.92

Convergent and Discriminant Validity

The validity of the newly developed ACMM was examined using 2-tailed Pearson's correlations to explore both convergent and discriminant validity. To maximize the available data, missing cases were deleted pairwise. A summary of correlations among all scales can be found below in Table 3. Many highly significant correlations were found, largely in accordance with the above-stated hypotheses. Growth and conservation scales were significantly positively correlated, $r= .256, p<.001$, creating the fore loop of the adaptive cycle. Similarly, the two back loop scales, release and reorganization, were significantly positively correlated, $r= .471, p<.001$. Interestingly, growth and reorganization were also positively correlated, $r= .386, p<.001$. Theoretically, individuals would most often transition from reorganization into a growth phase as they progress along the adaptive cycle. Because of this continuity, some positive associations are not unexpected; however, further examination of the distinguishing features that differentiate the back loop phase of reorganization from the fore loop phase of growth may be warranted in future iterations of the ACMM. As expected, conservation was negatively related to both release, $r= -$

.583, $p<.001$, and reorganization, $r= -.261$, $p<.001$. Additionally, growth and release scores were negatively correlated, $r= -.206$, $p<.01$.

The four new ACMM scales were also significantly correlated with many other scales in predicted patterns. The Meaning in Life Questionnaire (MLQ; Steger et al., 2006) consists of two scales measuring the presence of and search for meaning in life respectively. Presence of meaning in life was strongly positively correlated with conservation, $r= .475$, $p<.001$, and growth, $r= .391$, $p<.001$. Contrarily, release had a significant negative correlation with presence of meaning in life, $r= -.566$, $p<.001$, while there was no significant correlation between reorganization and presence of meaning in life, $r= -.061$, $p=.371$. These results suggest that one's perception of meaning in life gradually increases from the back loop to the fore loop as predicted by the application of the adaptive cycle framework to the process of making meaning in life.

An inverted pattern of significance was found with regards to the search for meaning in life as measured by the MLQ (Steger et al., 2006). The search for meaning in life was strongly positively correlated with the release, $r= .456$, $p<.001$, and reorganization, $r= .376$, $p<.001$, phases. Growth was not significantly related to search for meaning in life ($r= .003$); however, conservation showed a significant negative correlation, $r= -.347$, $p<.001$. These results suggest that individuals engage more actively in the search for meaning in life during the back loop phases, while disengaging from this process during conservation.

The measures of well-being included in this study demonstrated the expected pattern of correlations with the four ACMM scales. The Flourishing Scale, a measure of overall well-being, (FS; Diener et al., 2010) was strongly related to the conservation phase, $r= .494$, $p<.001$, as well as growth, $r= .354$, $p<.001$, and was negatively related to release, $r= -.547$, $p<.001$. There was no significant relationship between the FS and reorganization, $r= -.042$.

Table 3

Pearson's Correlations Between Scale Totals

Scale	ACMM Growth	ACMM Conservation	ACMM Release	ACMM Reorganization
ACMM Growth	-			
ACMM Conservation	.256**	-		
ACMM Release	-.206**	-.583**	-	
ACMM Reorganization	.386**	-.261**	.471**	-
MLQ Presence	.391**	.475**	-.566**	-.061
MLQ Search	.003	-.347**	.456**	.376**
FS	.354**	.462**	-.547**	-.042
RLSS	.319**	.494**	-.678**	-.247**
SPANE Neg	-.156*	-.395**	.585**	.289**
SPANE Pos	.374**	.449**	-.538**	-.166*
PSS	-.225**	-.481**	.700**	.339**
RSES	.259**	.336**	-.497**	-.005
LOT-R	.256**	.443**	-.614**	-.122

Note: * significant at the *p*<.05 level (2-tailed), ** significant at the *p*<.01 level (2-tailed).

A similar pattern can be seen with the Scale of Positive and Negative Experiences (SPANE; Diener et al., 2010), in which conservation was strongly related with positive affect, *r*= .449, *p*<.001, and negatively related to negative affect, *r*= -.395, *p*<.001, while release was negatively related to positive affect, *r*= -.538, *p*<.001, and positively related to negative affect, *r*= .585, *p*<.001. Growth and reorganization phases also showed significant correlations with affect. Specifically, growth was seen to be positively related to positive affect, *r*=.374, *p*<.001, and negatively related to negative affect, *r*= -.156, *p*=.024. On the other hand, reorganization was negatively related to positive affect, *r*= -.166, *p*=.015, and positively related to negative affect, *r*= .289, *p*<.001.

As predicted, the opposite pattern of correlations can be found with the Perceived Stress Scale (PSS; Cohen, Kamarck & Mermelstein, 1983), relative to those scales measuring aspects of well-being. The PSS was strongly related to the release, *r*= .700, *p*<.001, and reorganization,

r= .399, *p*<.001, phases. Both conservation, *r*= -.481, *p*<.001, and growth, *r*= -.225, *p*=.001, were

negatively related to the PSS. This suggests that the back loop phases are more subjectively

stressful than the fore loop phases, as predicted.

The Life Orientation Test – Revised (Scheier, Carter, & Bridges, 1994) and Rosenberg

Self-Esteem Scale (Rosenberg, 1965) were included as preliminary examinations of possible

discriminant validity. Although there was some thought that these measures might vary across

the four phases of the ACMM, they were primarily believed to be distinct constructs that should

evaluate dispositional characteristics, therefore exhibiting a high degree of temporal stability.

However, both of these measures were in fact found to fluctuate in a discernable pattern across

the four phases of the adaptive cycle in a manner that is quite consistent with measures of well-

being. Specifically, both measures were significantly positively related with both fore loop

phases. Additionally, they were both significantly negatively related with the release phase; no

significant relationships were found between either of these measures and the reorganization

phase. Further research examining potential discriminant validity with other constructs should be

considered in the future.

Factor Structure

Several steps of analyses were conducted to explore the factor structure of the newly

developed ACMM, including both exploratory and partial confirmatory analyses with various

factor structures. Given the preliminary nature of the current studies and the still early stage of

development of the ACMM, partial confirmatory factor analysis was conducted following

exploratory analyses to determine whether there is a sufficient empirical basis for recommending

confirmatory factor analyses be conducted at this time.

Exploratory Analyses

Initial exploratory factor analysis was conducted using a maximum likelihood extraction method. Despite the popularity of principal component analysis, the aim of these analyses was to examine the structure of underlying factors. As such, a method that would explore underlying latent variables that may account for shared variance in the items of the ACMM was selected. Principal component analysis, on the other hand, functions as a method of data reduction that does not differentiate between shared and unique variance and does not provide an estimate of latent variables accounting for variance (Preacher & MacCallum, 2003). Maximum likelihood extraction has been recommended by other researchers (Costello & Osborne, 2005), particularly when data is relatively normally distributed. Data in the current study is not perfectly normally distributed; however, visual examinations of histograms demonstrate relative acceptability of the normality of the distributions. As such, maximum likelihood extraction was selected.

Although orthogonal rotations are frequently used (Preacher & MacCallum, 2003), the current study opted to use a direct oblimin rotation, which allows for both orthogonal and oblique rotations to be considered in the generation of solutions; in this rotation method, the rotation that provides the simplest solution for the data is the one that is maintained. As such, if allowing the factors to correlate provides a simpler solution for the data, then an oblique rotation will be implemented. The flexibility of permitting an oblique rotation with this method was important for the current study since the underlying latent variables, or factors, are expected to correlate. With the hypothesis that four factors would be found representing each of the four phases of the adaptive cycle, it is expected that there will be correlations, particularly within the fore loop and back loop respectively.

Four-Factor Solution. Using the maximum likelihood extraction with a direct oblimin rotation, the number of factors to retain was determined both by considering factors with

eigenvalues greater than one, and through a visual examination of the scree plot (Preacher &

MacCallum, 2003). Four factors were found to have eigenvalues greater than one. With the

examination of the scree plot, arguments could be made for both two-factor and four-factor

solutions. See Figure 3 below of the scree plot. Although the drop between factor 3 and 4 could

represent an initial leveling off of the plot and perhaps the beginning of the scree, the drop

between factor 4 and 5 is again more substantial than other factors and arguably could represent

the last significant drop before the commencement of the true scree. Given the combination of

the visual examination and guideline of retaining factors with eigenvalues greater than one, an

initial solution was explored retaining four factors.

When four factors were retained, the overall model accounted for 48.73% of the variance

among the 20 items. The first two factors accounted for 26.62% and 15.32% of the variance

respectively, with the third and fourth factors accounting for notably smaller portions of variance

(3.94% and 2.85% respectively). The four factors were found to correlate, with factors 1 and 3

being correlated, along with factors 2 and 4. As such, the solution was generated using an

oblique rotation in its solution, as permitted with a direct oblimin rotation. See Table 4 below for

a summary of factor correlations. As recommended by Preacher and MacCallum (2003), all

factor loadings for all items are reported in Table 5 below. Items in this table are ordered

according to the simplicity of their factor loadings, with items that load strongly onto a single

factor and have weak loading on the other three listed first.

Several factors consist of a mix of items that load both positively and negatively onto the

latent variable being assessed. Factor one, captures a sense of loss, including of one's sense of

direction, purposelessness, feeling out of control and uncomfortable, falling apart, and lacking a

sense of rejuvenation or invigoration. Factor two, on the other hand, captures experiencing a

sense of rejuvenation or a weight being lifted off one's shoulders, having a new understanding

and focus in life, as well as reorganizing and trying different solutions. Factor three comprises of

a sense of predictability and consistency, established routines, and a sense of feeling settled in

life. Factor three also incorporates the view that one is not currently trying to make sense of a

difficult experience. Factor four had three items that negatively loaded onto it, representing not

being in a time of transition or personal growth, and not being open to new possibilities.

Figure 3

Scree Plot of Factor Solution Using Maximum Likelihood Extraction
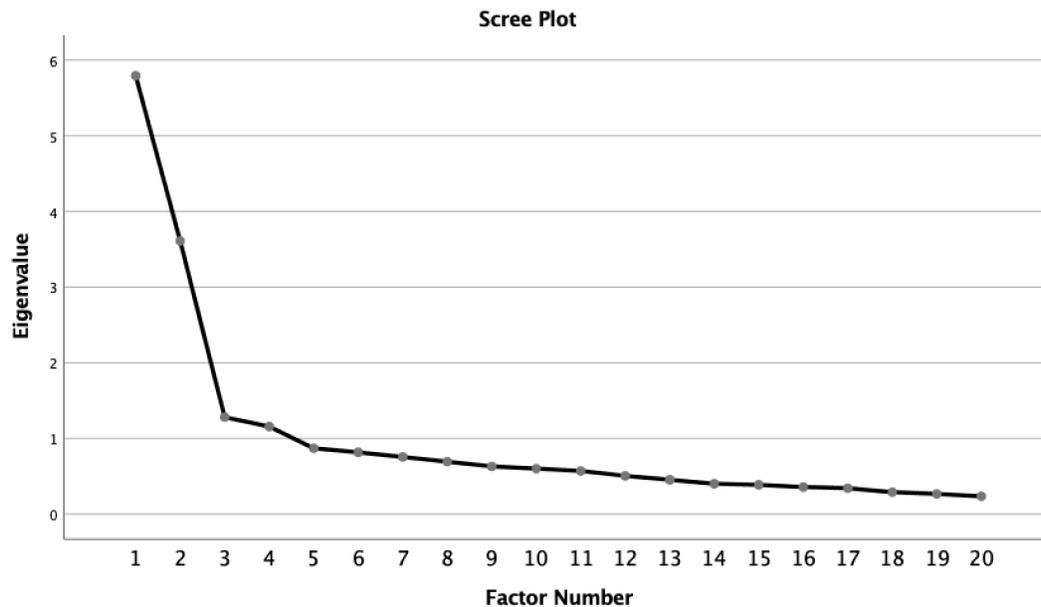
Table 4

Summary of Correlations Between Factors in a Four-Factor Solution

Factor	1	2	3	4
1	.			
2	-.163	.		
3	-.504	-.072	.	
4	-.025	-.337	.179	.

Table 5

Pattern Matrix Summary of Factor Loadings For Each Item in a Four-Factor Solution

ACMM Items	Factors			
	1	2	3	4
I feel like I'm falling apart (Re)	.834	.073	-.019	.050
I have lost my direction in life (Re)	.760	-.031	-.001	.039
My life has a clear purpose (C)	-.639	.279	-.061	.129
My life feels out of control (Re)	.606	.156	-.296	.159
I feel comfortable in my life (C)	-.574	.196	.239	.021
I feel reinvigorated and/or rejuvenated (G)	-.529	.478	-.091	-.007
I am losing something important to me (Re)	.405	.040	-.345	-.056
I have a new sense of understanding in my life (G)	-.024	.752	.073	.044
I have a new focus in my life (G)	-.061	.567	.069	-.090
A weight has been lifted off my shoulders (G)	-.084	.531	.039	-.145
I am reorganizing my life (Ro)	.079	.365	-.135	-.345
I am trying lots of different solutions after a challenge in my life (Ro)	.312	.360	-.231	-.145
My life feels unpredictable (Re)	.016	.167	-.682	.035
There is a lot of consistency in my life (C)	-.052	.078	.672	.116
I have some established routines in my life (C)	.095	.113	.639	-.077
My life feels very settled (C)	-.213	.323	.481	.291
I am trying to make sense of a difficult experience (Ro)	.323	.297	-.414	-.063
I am in a time of transition (Ro)	.281	.224	-.056	-.565
I am in a period of personal growth (G)	-.122	.355	-.017	-.402
I am open to new possibilities (Ro)	-.290	-.006	.043	-.384

Note: Abbreviations in parentheses indicate which scale the item was designed to target (G = Growth, C = Conservation, Re = Release, Ro = Reorganization)

A review of the description of these four factors is somewhat aligned with the phases of the adaptive cycle as it could be related to the processes of meaning-making. Specifically, factor one appears to capture the essence of the release phase. Factor two represents growth, albeit blurred with some components of reorganization. Factor three comprises of elements of the

conservation phase. The fourth factor is less clearly associated with a distinct phase of the adaptive cycle. Rather, it appears to capture not being in a state of reorganization, again blended with some aspects of growth.

Two-Factor Solution. Since the visual examination of the scree plot suggested there could be arguments for either a two- or four-factor solution, a two-factor solution was also examined. Theoretically, it is expected that a two-factor solution would separately capture elements of the fore loop and back loop of the adaptive cycle with the two latent variables. With a two-factor solution, factor one accounted for 26.4% of the variance, whereas factor two accounted for an additional 14.98% of variance, resulting in a total of 41.38% of variance accounted for. See Table 6 below for a summary of the factor loadings of all items in a two-factor model.

In this model, factor one appears to capture an uncomfortable sense of falling apart, feeling lost, out of control, directionless, purposeless, and, viewing life as inconsistent, lacking routines, unpredictable, and unsettled. It also includes trying to make sense of a difficult experience and trying different solutions after a challenge. Factor one appears to relate primarily to a release phase, or lack of conservation. Factor two, on the other hand, represents having a newfound sense of understanding and focus, feeling the rejuvenation of a weight being lifted, reorganizing one's life, in a period of personal growth, with an openness towards new possibilities. Factor two appears to relate primarily to growth, with some elements of conservation and reorganization blended into the factor.

These two factors capture a difference between positive and negative experiences, with factor one generally representing uncomfortable, negative experiences and factor two

Table 6

Pattern Matrix Summary of Factor Loadings for Each Item in a Two-Factor Solution

ACMM Items	Factor 1	Factor 2
My life feels out of control (Re)	.737	-.053
I feel like I'm falling apart (Re)	.726	-.206
I feel comfortable in my life (C)	-.697	.288
I am losing something important to me (Re)	.680	-.006
I am trying to make sense of a difficult experience (Ro)	.677	.284
I have lost my direction in life (Re)	.659	-.284
There is a lot of consistency in my life (C)	-.625	-.075
My life feels very settled (C)	-.618	.108
My life feels unpredictable (Re)	.580	.215
I am trying lots of different solutions after a challenge in my life (Ro)	.532	.361
My life has a clear purpose (C)	-.519	.399
I am in a time of transition (Ro)	.441	.429
I have some established routines in my life (C)	-.405	.015
I have a new sense of understanding in my life (G)	-.032	.633
I feel reinvigorated and/or rejuvenated (G)	-.361	.623
I have a new focus in my life (G)	-.038	.598
I am in a period of personal growth (G)	.047	.596
A weight has been lifted off my shoulders (G)	-.019	.585
I am reorganizing my life (Ro)	.298	.545
I am open to new possibilities (Ro)	-.169	.320

Note: Abbreviations in parentheses indicate which scale the item was designed to target (G = Growth, C = Conservation, Re = Release, Ro = Reorganization)

representing positive experiences. However, there is again a degree of blurring between the

factors in that elements of reorganization, a back loop phase, are present in both factors in this

model. Similar to the four-factor model, there is also notable mixing between positive and

negative loadings of items on latent variable factors. Neither positive nor negative factor

loadings are intrinsically problematic; however, they do indicate a lack of clarity between the a

priori hypotheses of what phase each item would measure and the actual results of factor

extraction. In particular, several items that were expected to load positively onto a factor

representing a conservation phase appear to load negatively onto a factor representing a release

phase. Although this is largely congruent with the framework of the adaptive cycle, in that

conservation and release are opposite positions in the cycle, it poses a challenge to the practical

application of this scale in terms of its scoring and interpretation. An individual's response to

items initially designed to evaluate conservation could either be positive scored to represent the

conservation phase, or reverse-scored and included in a measure of a release phase. Similar

challenges apply to both four- and two-factor models.

Subscale Factor Structure. As an additional consideration, items from each phase scale

of the ACMM were entered separately into an exploratory factor analysis with maximum

likelihood extraction and direct oblimin rotations selected. Three of the four scales resulted in a

single-factor solution, namely growth, conservation, and release. However, when the

reorganization items were analysed, a two-factor solution was produced based on the retention of

factors with eigenvalues greater than one.

A closer examination of the reorganization scale showed factor one to have an eigenvalue

of 2.222 and account for 34.5% of variance. Factor two had an eigenvalue of 1.055 and

accounted for an additional 8.5% of variance. A visual examination of the scree plot for the

reorganization items suggests that arguments could be made for either a one- or two-factor

solution given that the drop between factors one and two is substantially steeper than the drop

between factors two and three. See Figure 4 below of the scree plot. The pattern matrix of

reorganization items revealed one item in particular that did not appear to load well onto either

factors in a two-factor solution: "I am open to new possibilities". This same item also

demonstrated weak factor loadings in a four-factor solution. Similarly, the removal of this same

item was shown to increase the internal consistency of the reorganization subscale, as discussed

above. See Table 7 below for a full summary of factor loadings.

Figure 4

Scree Plot From a Factor Analysis of Reorganization Items
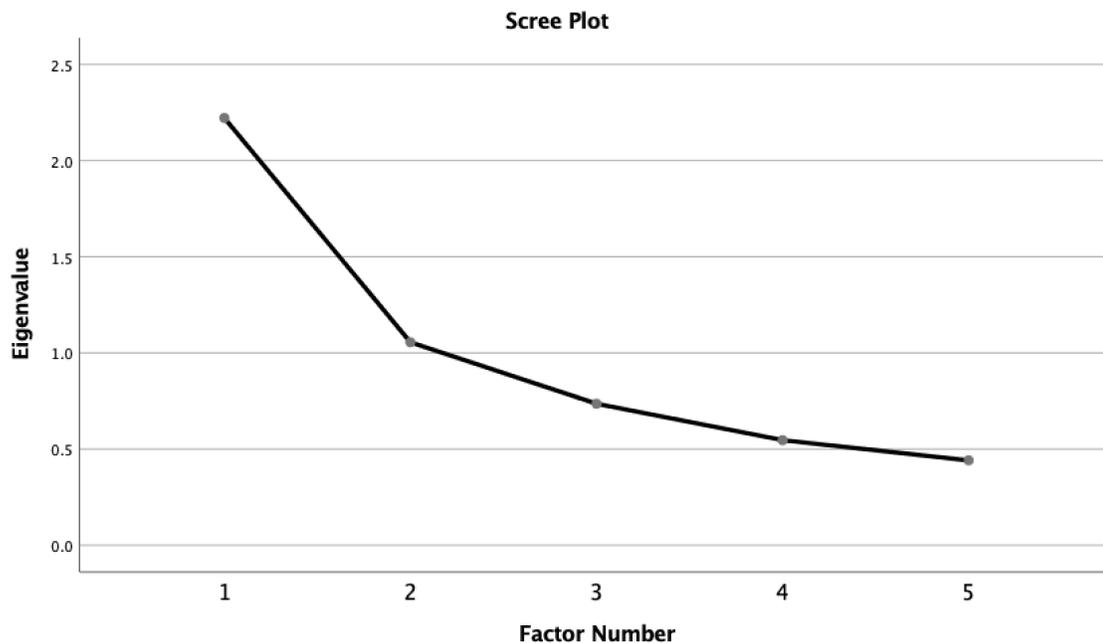
Table 7

Pattern Matrix Summary of Factor Loadings for Reorganization Items in a Two-Factor Solution

Reorganization items	Factor 1	Factor 2
I am trying to make sense of a difficult experience	.860	-.160
I am trying lots of different solutions after a challenge in my life	.672	.052
I am in a time of transition	.438	.366
I am reorganizing my life	.315	.558
I am open to new possibilities	-.055	.270

The majority of the reorganization items appear to load onto a single factor, with only "I am reorganizing my life" loading notably onto a second factor. To further explore this issue, a forced single-factor solution was examined for the reorganization items. A single-factor model accounted for 32.7% of variance among reorganization items, with all items demonstrating a factor loading of at least .51, except for "I am open to new possibilities", which only had a factor loading of .072. See Table 8 below for a summary of all factor loadings.

Table 8

Factor Matrix Summary for Reorganization Items in a Single-Factor Solution

Reorganization item	Factor 1
I am trying lots of different solutions after a challenge in my life	.731
I am trying to make sense of a difficult experience	.695
I am in a time of transition	.591
I am reorganizing my life	.515
I am open to new possibilities	.072

An exploratory analysis of growth items resulted in the retention of a single-factor solution accounting for 39.7% of variance with all items showing substantial loadings on one factor. See Table 9 below for a summary of all factor loadings. Only a single-factor solution emerged from both the Kaiser rule of retaining factors with eigenvalues greater than one, and a visual examination of the scree plot. As such, there is relative confidence in the one-factor model for growth items.

Table 9

Factor Matrix Summary for Growth Items in a Single-Factor Solution

Growth item	Factor 1
I have a new focus in my life	.654
A weight has been lifted off my shoulders	.587
I have a new sense of understanding in my life	.705
I am in a period of personal growth	.535
I feel reinvigorated and/or rejuvenated	.654

Conservation items similarly resulted in a one-factor model based on both an examination of the scree plot and the Kaiser rule, with one factor accounting for 41.0% of variance. See Table 10 below for a summary of factor loadings of conservation items.

Table 10

Factor Matrix Summary for Conservation Items in a Single-Factor Solution

Conservation item	Factor 1
My life feels very settled	.728
I have some established routines in my life	.504
I feel comfortable in my life	.717
There is a lot of consistency in my life	.675
My life has a clear purpose	.544

Analysis of release items demonstrated a relatively strong single-factor solution with an eigenvalue of 2.896 that accounted for 48.3% of variance. All items demonstrated reasonably strong factor loadings, with some variance between them. The item "My life feels unpredictable" had a somewhat smaller factor loading than the other release items. See Table 11 below for a summary of all release item factor loadings.

Table 11

Factor Matrix Summary for Release Items in a Single-Factor Solution

Release item	Factor 1
I feel like I'm falling apart	.821
My life feels out of control	.782
I am losing something important to me	.616
My life feels unpredictable	.464
I have lost my direction in life	.731

Analyses of single factor solutions for each of the four phases of the adaptive cycle suggest that within each subscale, items generally appear to be measuring a similar single underlying latent variable. This suggests that items in each subscale are predominantly relating to the same underlying construct, which would be interpreted as the core essence of each phase of the adaptive cycle. Importantly, there was some variance within the subscales in terms of the strength of factor loadings for the items. This is highly informative for further revisions to

ACMM items, which may seek to remove or revise items that demonstrate weaker factor

loadings in a single-factor model. This is particularly relevant to the one reorganization item ("I

am open to new possibilities") that demonstrated a very small factor loading, suggesting it does

not effectively relate to the same underlying latent variable.

Partial Confirmatory Analyses

The results of the exploratory factor analyses are somewhat aligned with the expected

factor structure of the ACMM. It has been put forth in the literature that prior to conducting

confirmatory factor analysis to confirm a model structure, partial confirmatory factor analysis

can be used as a way to increase empirical support for the recommendation of confirmatory

factor analysis by way of evaluating the likelihood that a confirmatory analysis will, in fact,

confirm the model structure (Gignac, 2009). The process and formulae for calculating various fit

indexes for a partial confirmatory factor analysis are described by Gignac (2009). An example of

the application of partial confirmatory factor analysis as described by Gignac (2009) can be seen

in the recent scale development publication by Gordon (2018).

In order to complete the calculations necessary for partial confirmatory factor analysis,

maximum likelihood extraction must be used. By calculating the partial confirmatory fit indexes

and evaluating their degree of significance, the likelihood of a confirmatory factor analysis being

significant can be evaluated. Specifically, if the fit indexes of a partial confirmatory analysis are

highly significant, there is strong empirical evidence to justify the use of confirmatory factor

analysis with the data. However, if the fit indexes are not highly significant it is empirical

evidence to suggest that a confirmatory factor analysis model is not likely to provide an

appropriate degree of fit for the data and is therefore not a worthwhile endeavour since a

confirmatory factor analysis is a more restricted analysis than a partial confirmatory factor

analysis (Gignac, 2009).

Using the goodness-of-fit chi-square from the maximum likelihood exploratory factor

analysis as the implied model, and the KMO and Bartlett's test of sphericity chi-square as a null

model, several fit indexes were calculated as a partial confirmatory factor analysis of the four-

factor model described above. The normed fit index (NFI), Tucker-Lewis Index (TLI), and

Comparative Fit Index (CFI) are all considered to demonstrate acceptable fit if they are greater

than .950. The four-factor model in the current study resulted in an NFI of .886, TLI of .915, and

CFI of .813. Additionally, the root mean square error of approximation (RMSEA), which

demonstrates acceptable fit if it is less than .08, was calculated to be .050 for the four-factor

model. Three of the four fit indexes therefore suggest that the four-factor model is unlikely to

demonstrate acceptable fit in a confirmatory factor analysis.

A partial confirmatory factor analysis was also conducted on the two-factor model

described above using the same process. The fit indexes for a two-factor solution were an NFI of

.811, TLI of .854, CFI of .762, and RMSEA of .067. Once again three of the four fit indexes

suggest that the two-factor model is unlikely to demonstrate an acceptable level of fit in a

confirmatory factor analysis. Overall, the partial confirmatory fit indexes were stronger in the

four-factor model than in the two-factor model.

Additionally, partial confirmatory factor analyses were conducted on four single-factor

models with items that were a priori designed to load onto a particular factor forced into a model

with a single-factor solution. The single factor for growth items resulted in the strongest fit

indexes of the four single-factor solutions conducted. For growth, NFI was calculated to be .979,

TLI was 1.00, and CFI was .959. RMSEA was not possible to calculate because the implied

model degrees of freedom were greater than the implied model chi-square, $x^2(5) = 4.74$, resulting in a negative ratio, for which the square root cannot be calculated. Conservation fit indexes all indicated insufficient fit for a single-factor model, NFI = .905, TLI = .844, CFI = .813, RMSEA = .124. Fit indexes for the single-factor model representing release items was similarly weak, NFI = .898, TLI = .817, CFI = .796, RMSEA = .163, as were fit indexes for reorganization items, NFI = .893, TLI = .830, CFI = .787, RMSEA = .107.

The results of the partial confirmatory factor analyses for four-, two-, and single-factor models were largely below the threshold of acceptable fit. These results therefore suggest a lack of empirical evidence for proceeding to a full confirmatory factor analysis at this time. Rather, items should be reviewed, and the four subscales should be examined for potential revisions that would simplify and strengthen the pattern of factor loadings prior to recommending confirmatory factor analyses be conducted.

Discussion

Overall, the results of this study indicate that future research refining the ACMM is warranted. The four phase scales varied in their degree of internal consistency, with reorganization showing the weakest Cronbach's alpha. One item in particular ("I am open to new possibilities.") is seen to be somewhat problematic for this scale. Release showed the strongest internal consistency, and the only scale to surpass the threshold of .80 as a desired measure on Cronbach's alpha. As such, it may be worthwhile for future research to consider adding more items to the scales to increase their internal consistency. Furthermore, the existing items may be reviewed for modifications that may improve the overall internal consistency for each scale, particularly reorganization.

Despite the slightly lower than desired internal consistency observed in the four scales, the pattern of correlations seen across the scales of the ACMM and various other measures of perceived stress and well-being was as predicted. Fore loop scales of growth and conservation demonstrated positive correlations with measures of well-being and negative correlations with measures of stress. The opposite pattern of correlations was observed for the back loop scales of release and reorganization. The relationships between each of the four scales and the measures of well-being and stress provided a degree of convergent validity to support the utility of the ACMM. Furthermore, the correlations observed between each of the four scales on the ACMM and the two scales of the MLQ supported the hypotheses. These results suggest that there may be an interpretable relationship between the ACMM scores and an existing, validated, and frequently used measure of meaning in life. Therefore, these correlational results provide some evidence supporting that the ACMM may be measuring what it has been designed to measure in an interpretable way.

The LOT-R and Rosenberg Self-Esteem Scale were included as measures of divergent validity based on the hypotheses that self-esteem and optimism are rather stable traits that are not expected to vary across phases of the adaptive cycle of meaning-making. Conversely, however, a significant pattern of correlations was observed between these two scales and phase scores on the ACMM. Specifically, both optimism and self-esteem were seen to correlate positively with fore loop phases and negatively with the release phase. One interpretation of these results is that optimism and self-esteem may fluctuate more than expected for 'dispositional' traits, and may be influenced by such factors as where in the process of making meaning in life a person is at a given point in time. If optimism and self-esteem are more stable, as is expected for dispositional traits, an alternative interpretation may be that the phases described in the ACMM may be more

stable than expected. The temporal stability of the ACMM is an important issue. The ACMM is

based on the premise that scores are expected to change over time in accordance with the

proposed dynamic nature of engaging in meaning-making processes. Change over time in scores

on the ACMM is explored in Study 3.

The factor structure of the ACMM, however, is an area in which further improvement

may be possible. Both exploratory and partial confirmatory factor analyses provided evidence for

either four-factor or two-factor models. However, the four-factor model appeared to fit

somewhat better with the data, accounting for more overall variance within the scores and

demonstrating slightly stronger fit indexes from the partial confirmatory analyses compared to

the two-factor model. These results suggest that the four phases of the adaptive cycle might each

be effectively represented in the factor structure of the ACMM. However, results also indicate

that further refinement of the items is warranted to try and simplify the factor structure and

clarify the pattern of factor loadings seen across the items.

One way that the factor model might strengthened is by considering removing the same

reorganization item ("I am open to new possibilities") that was discussed above. This item did

not load well onto any factor. Furthermore, the mixing of positively and negatively loaded items

onto a given factor is challenging for determining how best to score and interpret results on the

ACMM. For example, it brings into question whether a particular item, such as a conservation

item, might best be interpreted by reverse-scoring it and including it within the release scale.

Lastly, further distinction between reorganization and growth may improve the clarity of the

factor structure of the ACMM. In the two-factor model, for example, there appears to be some

blending of reorganization and growth items onto the same factor. This is unexpected within the

framework of the adaptive cycle given that reorganization is on the back loop, whereas growth is

in the fore loop. Although the two phases are adjacent in the adaptive cycle, they represent

distinct processes. The results of the current factor analyses suggest that this division may not be

established clearly enough in the ACMM items as they are currently written. Moreover,

reorganization items tended to show more noticeable cross-loading onto multiple factors in a

given model, again suggesting that further revision to the reorganization items may improve the

psychometric properties of the ACMM.

Another factor to consider when interpreting the data from this study is the overall

generalizability of the ACMM as a scale. Scale items were generated from the wording of

participants in Study 1. All of the Study 1 participants and the majority of Study 2 participants

identified as Caucasian and reported high levels of formal education. The average age of

participants in Study 1 was 50.8 years (SD=18.2 years), whereas the average age of participants

in Study 2 was 36.6 years (SD=16.4 years). It is possible that the language used by the somewhat

older participants in Study 1 would not resonate in the same way with younger participants.

However, the significant age range present in both studies helps to mitigate this potential effect.

Limitations

There are several important limitations to this study. Of note, the first item of the SPANE

("positive") was unintentionally omitted from data collection. As such, scores for the item were

calculated using multiple imputation for participants. Perhaps most significant limitation is the

issue of limited generalizability. Despite engaging in widespread recruitment through social

media, the participant sample for this study was predominantly Caucasian, female, and highly

educated. This is not unlike many studies in psychology. However, it raises the issue that the

results of this study may not apply to other populations, particularly individuals who identify as

male, of an ethnicity other than Caucasian, and who may not be as highly educated. Future

research should endeavour to recruit diverse participants to verify the generalizability of results.

The generalizability of results may also be compromised through selective attrition and selective

enrollment. Individuals with different views of meaning in life, may have either chosen not to

enroll in the study to begin with, or may have dropped out partway through, preventing their

experiences from being represented in the data.

Given the cross-sectional design of this study, it is not possible to comment on the

temporal stability or potential pattern of change in ACMM scores over time. The supposed

dynamic nature of the processes of making meaning in life is fundamental to the development

and utility of the ACMM. As such, a third study was conducted to evaluate whether scores on the

ACMM change over time.

Study 3

Building upon Study 2, which used a cross-sectional design to explore the psychometric

properties of the newly developed ACMM, study 3 focused on exploring the potential dynamic

nature of the ACMM using ecological momentary assessment. The primary aim of this study

was to examine whether there were any changes in participants' ACMM scores over time.

Secondary goals of this study were to examine what time interval of sampling might be most

effective for capturing changes in ACMM scores, and to offer supplemental exploratory analyses

regarding several options for how ACMM scores may be interpreted. Some consideration was

also given to whether changes in ACMM scores followed the order of the phases described in the

framework of the adaptive cycle.

Methods

Participants

Undergraduate psychology students at a mid-sized Canadian university were recruited to participate in an online study using a mobile phone application. The protocol for this study involved a significant commitment from participants, which led researchers to anticipate high degrees of attrition and incomplete data. In total, 98 individuals downloaded the required application on their cell phone to initiate participation. However, only 76 of them proceeded to review the information letter and complete the consent to participate process and fewer than 30 completed all self-report scales involved in the first time-block of participation for this time series study. See Appendix N for the consent form and Appendix R for the debriefing form. Since the focus of this study was to examine potential changes in participants' scores on the ACMM over multiple time points, only data from individuals who completed a significant majority of the prompts were maintained for analysis. A total of 12 participants completed the ACMM a minimum of 19 out of the 26 prompted occasions (more than 70%), 6 of whom identified appropriate moderate stressors for the study; see the Measures section below for an explanation of what was considered an appropriate moderate stressor. Demographic group differences were not the focus of the current exploratory study, and thus demographic information was not collected.

Procedure

The current study used ecological momentary assessment (EMA) with a variable schedule of non-random time sampling to assess for potential changes in participants' scores over time on the ACMM with regards to an identified current moderate stressor (see Appendix O). First, participants were asked to download the Expimetrics app, since renamed ExpiWell, on their iOS or Android device. All data entry was conducted through this app. Participants were given information about the predetermined schedule for data collection to minimize attrition and

non-responding and reduce the risk of unpredictability exacerbating the burden on participants.

Each participant was sent their first electronic prompt to submit data at 9:00am the morning after

they had registered to participate. The data collection schedule allowed participants to submit

their data entries with a 30-minute window for the first data entry, and 20-minute window for all

subsequent entries. The first entry was permitted extra time due to the number of additional

questionnaires involved in the first data entry.

During their first data entry, participants were invited to complete a series of self-report

questionnaires examining their subjective accounts of personal well-being and stress levels at

that point in time; these scales are described further in the following section. Participants were

provided with information regarding available supports in the event that their participation

elicited distress (see Appendix Q). As a part of their initial data entry, participants were asked to

complete the ACMM. Completion of the ACMM was subsequently repeated over the course of

approximately 9 weeks, with each participant being prompted to complete the ACMM 26 times.

At each scheduled data entry, participants were sent an automatic notification prompting them to

submit their responses. The data entry schedule involved participants completing the ACMM

every two hours for the first two days between 9 am and 9 pm, once a day for a week, once a

week for three weeks, then every two weeks for four weeks. During the final data entry,

participants were again asked to complete the same self-report questionnaires evaluating their

overall sense of well-being and stress as they had done during their initial data entry.

In exchange for their participation, individuals were rewarded with bonus points that

could be allocated towards eligible undergraduate psychology courses. Participants were

awarded one bonus point if they completed a minimum of 50% of the ACMM prompts (13/26)

and were awarded two bonus points if they completed 85% of the ACMM prompts (22/26).

Measures

At the first and last data entries of the current study, participants were asked to complete

the Meaning in Life Questionnaire (MLQ), Scale of Positive and Negative Experiences

(SPANE), Riverside Life Satisfaction Scale (RLSS), and Perceived Stress Scale (PSS) in

addition to the Adaptive Cycle of Meaning Making (ACMM). All of these measures were used

in Study 2 and a review of these measures can be found above in the methods section of Study 2.

This study involved one additional component that was not a part of Study 2: a brief

description of a current moderate life stressor (see Appendix N). During their initial data entry,

participants were asked to briefly describe a current moderate life stressor that they were

experiencing. A moderate stressor was operationalized for participants to be an event that would

be rated at approximately 3-5 out of 10 on a subjective scale of stress, with 0 being not at all

stressful and 10 being the most stressful event imaginable. They were provided with examples of

potential moderate life stressors, including starting a new job or school program, experiencing a

challenge in an important relationship or friendship, questioning their career path, or moving to a

new city. Additionally, in the last time interval of participation they were asked to report on the

current status of their same moderate life stressor, including whether it had improved,

deteriorated, or remained unchanged.

As in Study 2, the PSS was again modified to reflect a shorter time frame; see Appendix

P for the modified wording used in this study. Participants were asked to think about the

moderately stressful life event that they had described at the beginning of their participation and

answer how often they had felt or thought a certain way with reference to this event. Similarly,

the ACMM instructions included a reminder for participants to reflect on their current moderate

life stressor and respond according to how they felt in that specific moment. These instructions

were repeated throughout the duration of the protocol.

Results

In order to meaningfully examine change in scores across various time intervals, analyses

focused on participants who had completed more than 70% of the protocol. Twelve participants

completed the ACMM a minimum of 19 out of the 26 (73%) prompted occasions. This cut off

was determined by balancing the priorities of maintaining an adequate, albeit small, sample size,

while aiming for minimal rates of non-responding. It is possible that individuals who completed

a higher proportion of data entries may have been demonstrating more engagement in the study's

protocol overall, which may improve the validity of their data. Six of these participants were

removed for having selected moderate life stressors that appeared inappropriate for the scope of

the current project. The participants who were removed on the basis of an inappropriate

moderate stressor had chosen to refer to events such as a specific assignment, presentation, or

midterm exam, and historical stressors such as having started high school, or having chosen in

the past to study internationally. It is unclear at this time what specific factors may have

contributed to the high degree of attrition and missing data seen in this study.

The six participants who completed at least 19 out of the 26 prompted ACMM surveys

and who referred to appropriate moderate life stressors were included in analyses. The moderate

life stressors that were deemed appropriate for inclusion were starting at a new school,

considering changing one's major, applying to graduate school, moving to a new city, and trying

to find a job. Among these six participants, there were 21 missing data points (13.5%), resulting

from times that participants did not complete the ACMM as prompted. Of note, item 21 that

attempted to capture the concept of the rigidity trap was not included in any analyses from this study due to its poor psychometric performance described in the results of Study 2.

Visual Analysis

The primary aim of this study was to examine whether scores on the ACMM changed over time. As a preliminary overview of results, line graphs were created to visualize the potential change in phase scores over time for each of the six participants. A vertical line in each participant's graph indicates their nearest data entry relative to the declaration of the provincial state of emergency in Ontario due to the COVID-19 pandemic on March 17, 2020, which is discussed in more detail in a subsequent section.

Some variation in scores for each of the four phases can be seen in the graphs of all six participants, suggesting that the ACMM is at least somewhat sensitive to change over time. Since scores were entered on a seven-point likert scale with five items loading onto each of the four phases, phase scores could range from 5 to 35. Across the 6 participants, a wide range of scores were reported over time for each of the four phases. Growth scores ranged from 7 to 29, conservation scores from 7 to 32, release scores from 5 to 33, and lastly reorganization scores ranged from 12 to 33. Across all six participants, the mean growth score was 18.96 (*SD* 4.74), the mean conservation score was 23.81 (*SD* 5.81), the mean release score was 14.39 (*SD* 8.19), and the mean reorganization score was 22.29 (*SD* 4.81).

Analysis of Standard Deviations

In order to evaluate the magnitude of change among phase scores from one time period to the next, the standard deviation for scores in each of the four phases for each participant was calculated. This resulted in each of the six participants having four standard deviations

Figure 5

Changes in Four Phase Scores Over Time for Participant 16 – Starting University
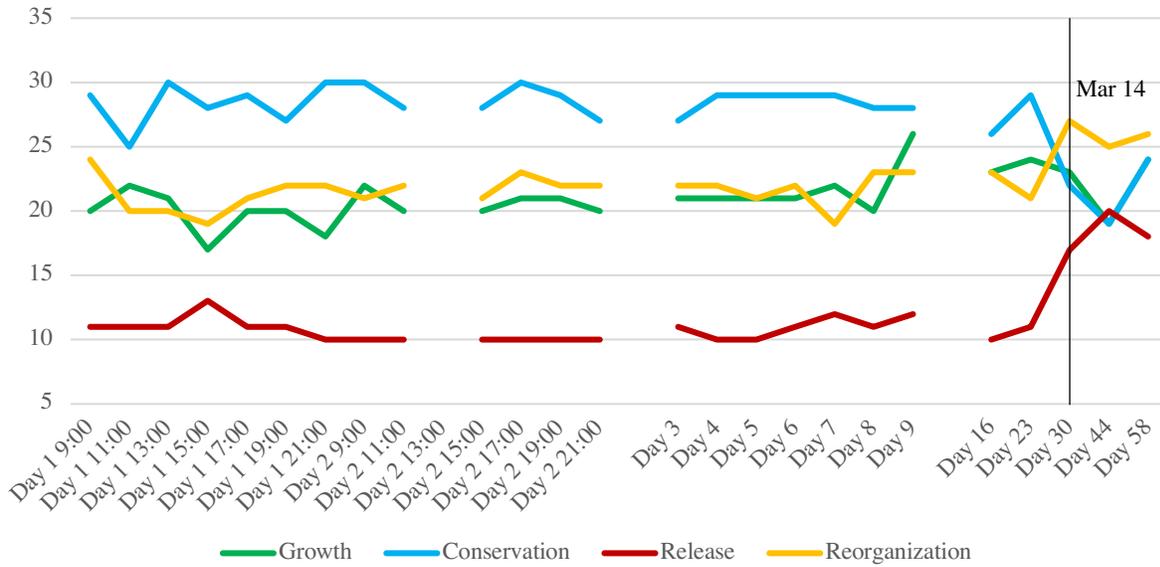
Note. The vertical line indicates the closest datapoint to the declaration of the COVID-19 state of emergency in Ontario.

Figure 6

Changes in Four Phase Scores Over Time for Participant 39 – Changing Major
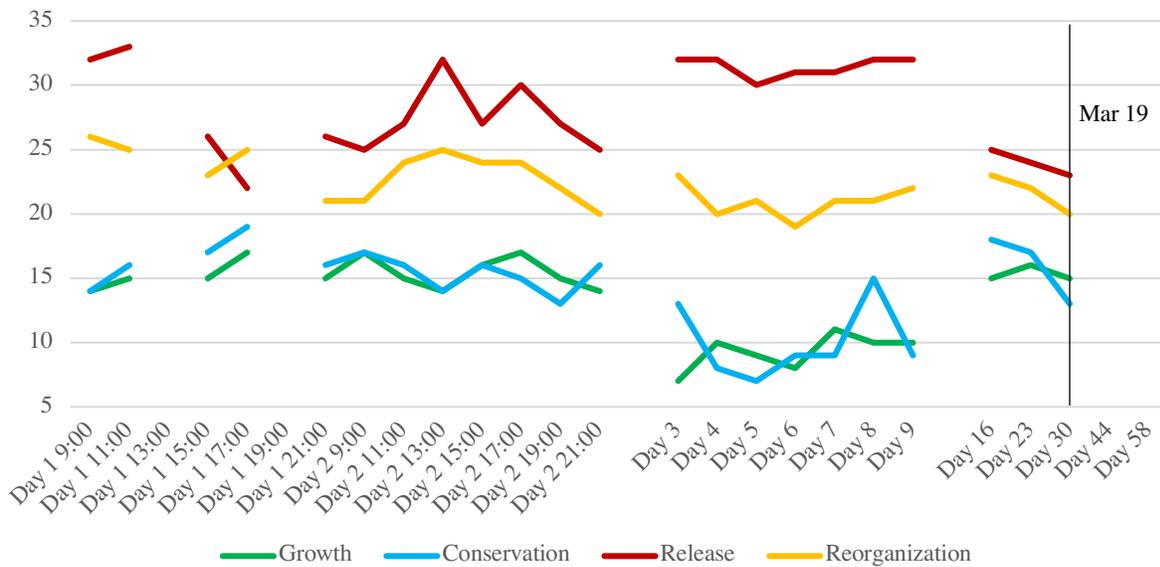
Note. The vertical line indicates the closest datapoint to the declaration of the COVID-19 state of emergency in Ontario.

Figure 7

Changes in Four Phase Scores Over Time for Participant 40 – Grad School Application
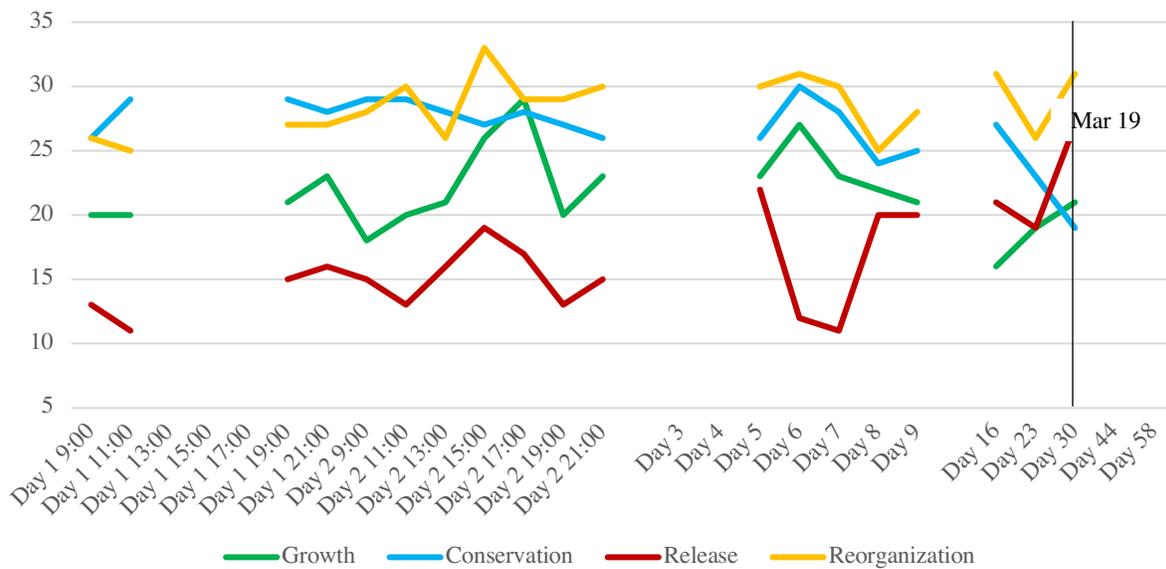
Note. The vertical line indicates the closest datapoint to the declaration of the COVID-19 state of emergency in Ontario.

Figure 8

Changes in Four Phase Scores Over Time for Participant 48 – Finding a Job After School
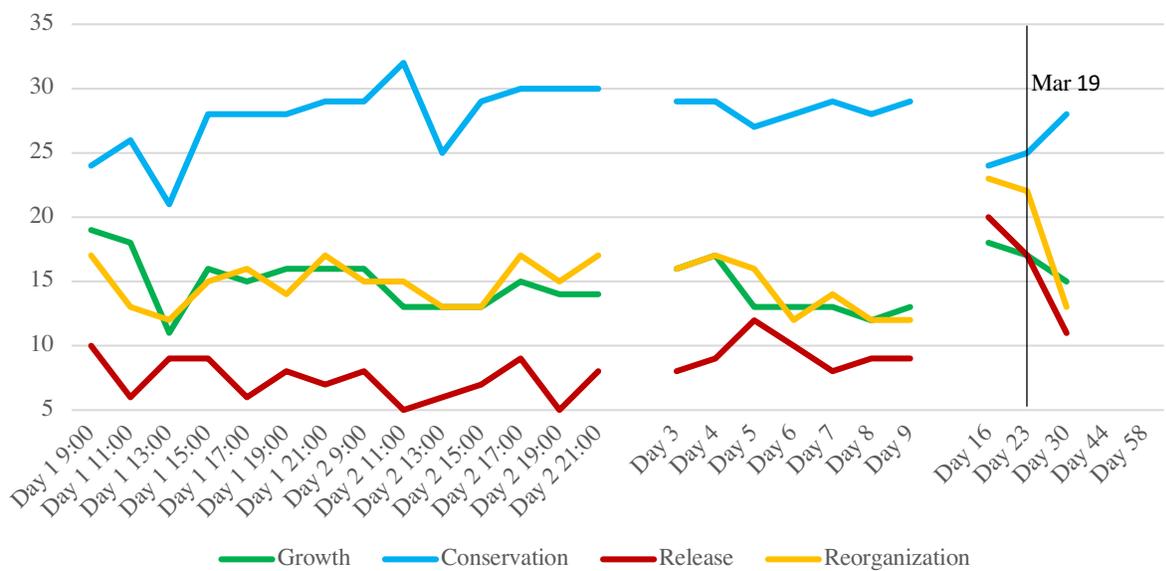
Note. The vertical line indicates the closest datapoint to the declaration of the COVID-19 state of emergency in Ontario.

Figure 9

Changes in Four Phase Scores Over Time for Participant 54 – New School
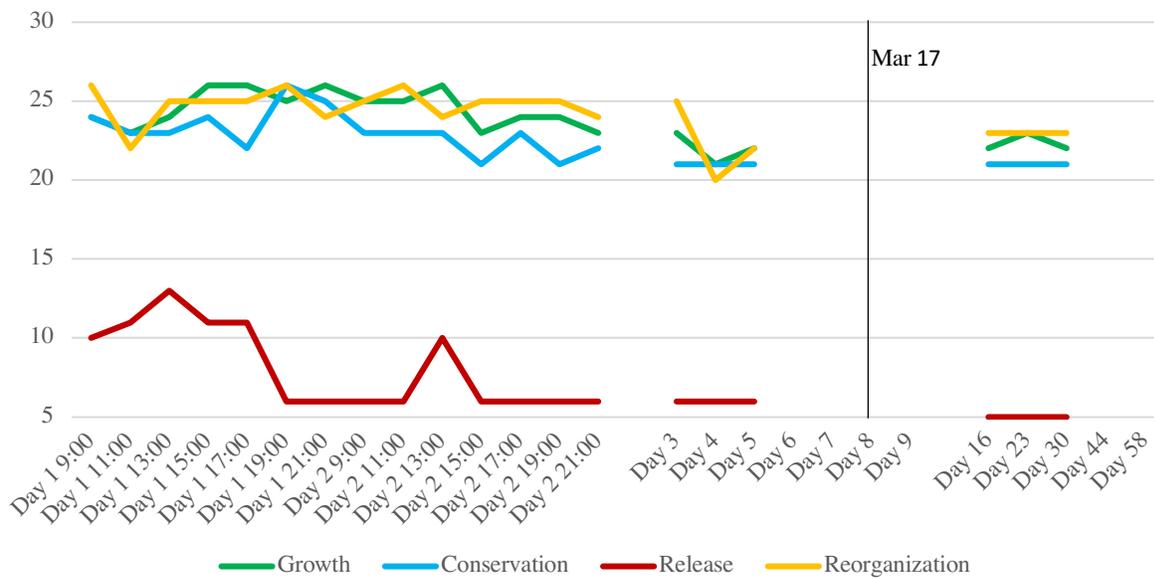
 Note. The vertical line indicates the closest datapoint to the declaration of the COVID-19 state of emergency in Ontario.

Figure 10

Changes in Four Phase Scores Over Time for Participant 59 – New School Next Year
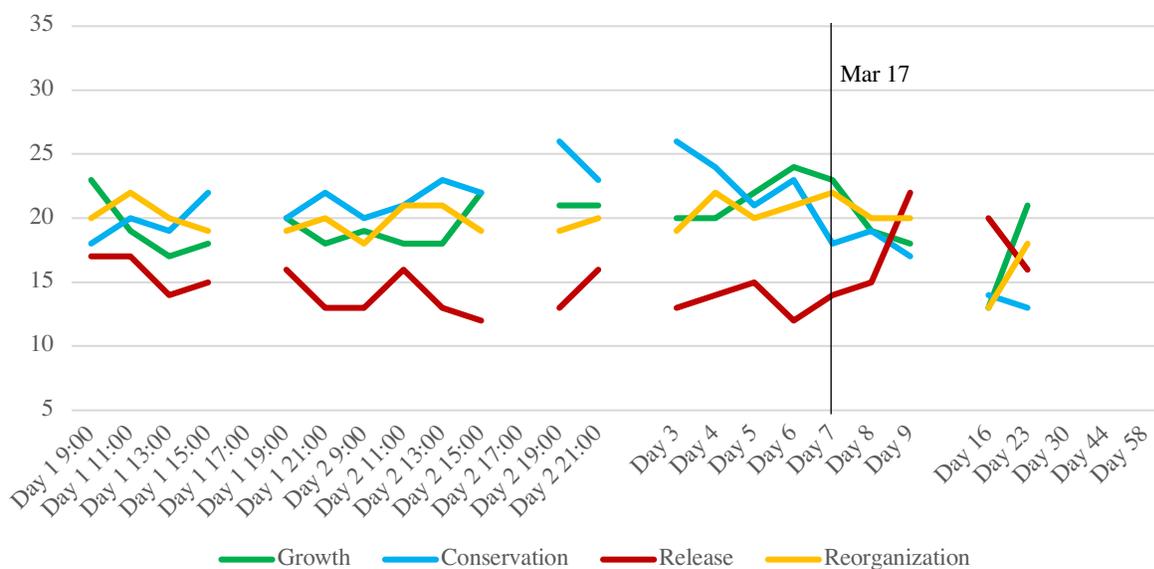
Note. The vertical line indicates the closest datapoint to the declaration of the COVID-19 state of emergency in Ontario.

calculated, one for each of the phases represented in the ACMM. The standard deviations were used to evaluate the magnitude of difference scores between each pair of adjacent time periods. Over the 26 possible data entries, 25 difference scores were examined. First, any difference score representing a change that was greater than one standard deviation was noted. Moreover, any difference score that was greater than two standard deviations was also noted. For these analyses, the direction of change was not considered pertinent.

Overall, with six participants responding on four phases over 26 time periods resulting in 25 difference scores, a total of 600 difference scores could have been calculated. However, 124 data points were missing due to non-responding across participants. Of the remaining 476 difference scores that were examined, 136 (28.6%) were greater than one standard deviation. Moreover, 38 (8%) were greater than two standard deviations.

Recalling the structure of the scheduled data entries, participants were first requested to complete the ACMM every 2 hours, followed by daily, then weekly, and finally biweekly data entries. In addition to evaluating the magnitude of difference scores, an examination was conducted to determine which time interval captured the greatest proportion of large difference scores.

A total of 256 difference scores were captured in the 2-hour interval entries. Of these, 67 (26.2%) were greater than one standard deviation, while 13 (5%) were greater than two standard deviations. Among the 144 difference scores from data entered daily, 35 (24.3%) were greater than one standard deviation and 8 (6%) were greater than two standard deviations. Weekly data entries resulted in 68 difference scores, with 28 (41.2%) of them greater than one standard deviation and 15 (22%) greater than two standard deviations. Only one participant completed

biweekly data entries, making it challenging to comment on the potential magnitude of change

that could be captured in this time interval. However, of the 8 difference scores that were

calculated from biweekly data, 6 (75%) were greater than one standard deviation; however, only

2 (25%) were greater than two standard deviations. See Table 12 below for a summary of the

proportions of difference scores that are greater than one and two standard deviations for each

timeframe.

Table 12

Proportion of Responses Greater Than 1 and 2 Standard Deviations by Sampling Timeframe

	2-hour interval	daily	weekly	biweekly
>1 *SD*	26.2%	24.3%	41.2%	75%
> 2 *SD*	5%	6%	22%	25%

Exploratory Analyses

In addition to asking whether scores appear to be dynamic over time, a question

addressed in the previous section, it is beneficial to consider the possible interpretations of scores

on the ACMM. Much work remains to be done regarding the interpretation of the ACMM to

determine the most effective way this data may be analysed. At this time, some exploratory

analyses are presented below to offer possible insights into ways in which ACMM data may be

interpreted in the future.

Dominant Phase Analysis

To further examine patterns of change in participants scores over time, dominant phase

scores for each of the 26 time periods were identified. An individual's dominant phase score was

simply identified as the highest phase score of the four at a given point in time. As there are not

yet any norms by which scores could be identified as high versus moderate versus low, initial

analyses were conducted using the simplest method of identifying a dominant phase for each

participant at each time period. This allowed researchers to examine trends in how individuals'

dominant phase fluctuated over time.

Throughout all time periods, conservation was the most common dominant phase among

participants. See Figure 11 below summarizing the proportion of time that each of the four

phases was dominant among participants over time. In the event that two or more phases scored

equally high, they were both considered to be equally dominant phases for that time period.

There were ties between two or three phases on 13 occasions among the six participants.

Including incidents where two or more scales were tied as the highest scores,

conservation was most frequently identified as the dominant phase among participants over time,

with 68 incidents representing 46% of sampled data. Reorganization was the next most common,

Figure 11

Proportion of Time as Dominant Phase
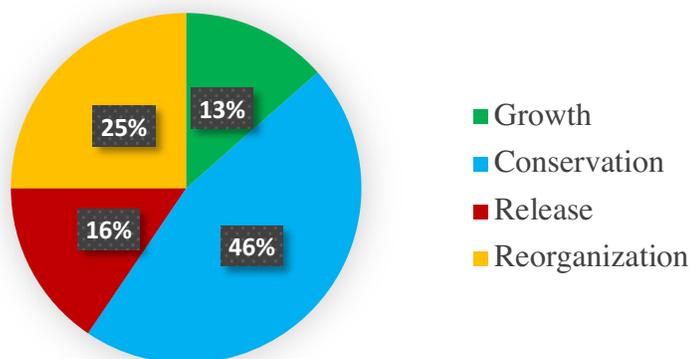
 Note. Pie chart depicting the proportion of time each phase was considered dominant over time
across all participants.

with 37 incidents of being identified as the dominant phase, equating to 25% of sampled data.

Growth and release phases were less frequently found to be the dominant phase, with 20 and 23

incidents respectively, representing 13% for growth and 16% for release phases.

Excluding incidents of ties, the numbers change slightly while the overall pattern remains largely unchanged. There were a total of 122 incidents in which one phase was identified as the dominant phase without any ties. Conservation was identified as the dominant phase score 61 times (50%), and reorganization was the dominant phase 29 times (23.8%). Growth was identified as the dominant phase 9 times (7.4%). Unlike the other three phases, Release was never found to be tied with another phase as the dominant phase. As such, excluding ties Release was still identified as the dominant phase 23 times (18.9%).

Pattern of Change in Dominant Phases. Importantly, there was some fluctuation in participants' dominant phases over time. By examining the change between the 26 time periods, 25 difference points were reviewed. Across the six participants, there were a total of 35 incidents in which participants' dominant phase changed between two time periods. Therefore, 23.3% of difference points examined demonstrated a change in dominant phase. However, this also indicates that 76.7% of the time individual's dominant phase score does not change from one time period to the next.

The theoretical basis of the ACMM relies heavily on the premise of the adaptive cycle. In this framework, there is a predominant pattern of change from one phase to the next, in which growth is typically followed by a period of conservation, which is sustained until a perturbation forces the system into a phase of release, followed by reorganization, prior to re-entering a growth phase (Gunderson & Hollings, 2002). This pattern of phases generally following one another in a predictable order is much more of a guideline than rule as there are many examples of situations in which systems may reverse their order or pass through phases so quickly that they are nearly undetectable. The only exception noted is that a system cannot pass directly from a release phase into a phase of conservation (Gunderson & Hollings, 2002). For example, a

system that experiences a novel environmental perturbation or challenge upon entering a growth phase may return to a reorganization phase, or perhaps experience another release phase rather than progressing into a conservation phase as may have otherwise been expected. As a more specific example, a person who was rebuilding their sense of meaning in life following the loss of a loved one may have entered a growth phase whereby their new framework of meaning in life was becoming increasingly established. This individual may have to once again release or reorganize this framework, rather than moving into a conservation phase, if they are subsequently faced with a job loss that challenges their framework of meaning in life.

Of the 21 times in which there was some sort of change regarding dominant phase between time periods, there were 7 times (33.3%) that the change followed the typical order of phases as described in the framework of the adaptive cycle when including situations involving ties. See Table 13 below for a summary of changes in dominant phases over time. The majority (5 out of 7; 71.4%) of the changes in the typical direction involved two phases becoming tied as the dominant phase. Data was missing for an additional 11 time periods.

Table 13

Summary of Changes in Dominant Phase Over Time

Phase (number of times dominant)	Followed by typical phase (no tie)	Followed by typical phase (ties only)	Followed by atypical phase (including ties)	No change	Any change	Followed by missing data
Growth (9)	0	1	5	2	6	1
Conservation (61)	0	0	5	52	5	4
Release (23)	1	0	1	19	2	2
Reorganization (29)	1	4	3	16	8	4
TOTAL (122)	2	5	14	89	21	11

Growth was stable on 2 occasions (11.1%) and was only followed by the typical phase on one occasion in which conservation and reorganization became tied as the dominant phases. Aligned with the adaptive cycle framework, conservation had the highest degree of stability, with 52 (85.2%) incidents of no change. Of the 5 times there was a change from conservation, none of them were in the typical direction. Release had a surprisingly high degree of stability, with 19 incidents (82.6%) of no change. There was only 1 incident (4.3%) in which release was followed by reorganization. Consistent with the framework of the adaptive cycle (Gunderson & Hollings, 2002), there were no incidents in which release was followed by conservation. All but two dominant release phases were reported by one participant, with four out of the six participants never entering a fully dominant release phase. Reorganization was followed by growth once, with an additional four incidents where growth tied with another phase was the subsequent dominant phase. On 16 occasions (55%), reorganization remained unchanged as the dominant phase in the next time period.

There was notable variance among the four phases with regards to the proportion of change that followed the typical pattern according to the adaptive cycle. When growth was the dominant phase, 1 out of 6 (16.7%) of change followed the usual pattern of conservation following growth. However, 0 out of the 5 (0%) changes from conservation followed the common pattern of release following conservation. For release, 1 out or 2 (50%) changes followed the typical pattern of reorganization coming after release. Lastly, for reorganization, 5 out of the 8 (62.5%) of the changes were in line with the usual pattern of growth following reorganization. These data include incidents in which the expected dominant phase was tied with another phase at the second time interval.

Rising Score Analysis

In this exploratory stage of scale development, a second way of interpreting scores was examined: rising scores. The rising score was defined as the phase score that showed the greatest increase between two time periods. If all four phase scores decreased between two time periods, the rising score was identified as the phase score that showed the smallest decrease. Each rising score was calculated by subtracting initial phase scores from the phase scores of the subsequent time period to generate difference scores. Over the 26 time periods sampled, 25 difference scores could be calculated per participant. Of the possible 150 difference calculations that could arise from the 6 participants over 25 periods, 31 (20.7%) difference points were missing. There were also 29 incidents of tied rising scores, where two or more phase scores were tied for having the largest increase during a given difference period. Of these, 21 were two-way ties, and 8 were three-way ties; there were no four-way ties.

Growth was identified as the rising score on 19 occasions excluding ties, and an additional 17 times in ties. Conservation was the most common rising score, identified 26 times excluding ties and another 14 times in ties. Release was the rising score 22 times, plus another 17 times in ties. Lastly, reorganization was the rising score 22 times, with an additional 18 times identified in ties. A visual representation of the proportion of times each phase was identified as the rising score can be seen in Figure 12 below. The frequency with which each of the four phases was identified as the rising score is quite evenly distributed among the four phases.

As with the dominant phase analyses described above, the pattern of change among the rising scores was examined to determine the proportions of changes that followed the order described by the framework of the adaptive cycle. See Table 14 below for a summary of the pattern of change in rising scores over time. Growth was identified as the rising score 19 times excluding ties. Of these, 2 were followed by conservation rising scores and an additional 2 were

Figure 12

Proportion of Rising Scores by Phase According to Phases, Including Ties
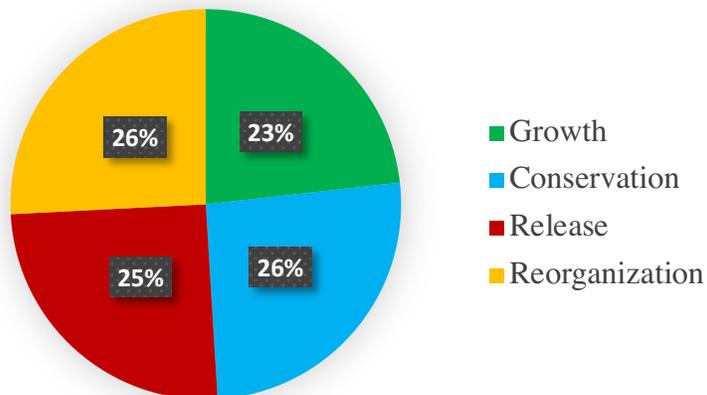
Note. Pie chart depicts the proportion of rising scores within each phase, including ties, across all participants.

followed by conservation tied with another phase as the rising score. Twelve times a growth

rising score was followed by an unexpected rising score (i.e., a phase other than conservation),

twice it was followed by missing data, and once it was followed by another growth rising phase.

As such, 4 out of the 16 times (25%) there was change in the growth rising phase from one

difference score to the next, it followed the expected order.

Conservation was the identified rising score 26 times. Of these, 5 were followed by rising

scores of release, the expected next phase, with an additional 3 occurrences of release tied with

another phase. Twelve times it was followed by other rising score phases, four times by missing

data, and twice with another conservation rising score. Of the 20 times a change in rising score

occurred between two time periods, 8 (40%) followed the expected order of release following

conservation.

Release was the identified rising score on 22 occasions, excluding ties. It was followed

by a reorganization rising score, aligned with the theory of the adaptive cycle, on 6 occasions.

There were another two occasions in which reorganization, tied with another phase, was the

subsequent rising score following release. There were again twelve occasions of an unexpected phase following the release rising score, one incident of a release rising score being followed by missing data, and once it was followed by another release phase. Of the 20 times there was a change in rising score, 8 (40%) followed the expected order of reorganization following release.

Table 14

Summary of Changes in Rising Score Over Time

	Times rising (no ties)	Followed by expected (no ties)	Followed by tie including expected	Unexpected (including unexpected ties)	Followed by missing data	No change	Any change
Growth	19	2	2	12	2	1	16
Conservation	26	5	3	12	4	2	20
Release	22	6	2	12	1	1	20
Reorganization	22	6	0	11	3	1	17
Total	89	19	7	47	10	5	73

Lastly, reorganization was identified as the rising score 22 times. On 6 occasions it was followed by a growth rising score, as expected, with no incidents of growth being tied with another phase as the subsequent rising score. There were 11 times that the reorganization rising score was followed by a rising score of another phase, 3 times it was followed by missing data, and once where there was no change and reorganization as a rising score was followed by another reorganization rising score. On one occasion following a reorganization rising score, one participant's scores did not change at all between two time periods across any of the four phases. As such, no rising score of any description was identified for that difference period. Of the 17 times there was a change in rising scores, 6 (35.3%) were followed by a growth phase as expected according to the adaptive cycle theory.

In total, there were 73 occasions in which there was a change in rising score between two time periods. Of these, a total of 19 followed the expected order of phases, with an additional 7 following the expected order when ties between two or more phases were included. There were 47 occasions in which the subsequent rising score did not follow the expected order of the phases, 10 times when a rising score was followed by missing data, and 5 occasions in which the same rising score repeated over two time periods. Overall, of the 73 occasions in which there was a change in rising score, 26 (35.6%) followed the expected order of phases.

Holistic Responding (COVID-19 Consideration)

Given the stability of dominant phases seen in the above-described analyses, it is possible that individuals were responding more holistically than anticipated regarding their perceptions of meaning in life. Half of the participants, 3 out of the 6 (50%), were in a conservation phase, with another 1 out of the 6 having conservation and reorganization tied as their dominant phase, at time 1. It is unexpected for participants to be in a conservation state at the first sampled time when focusing their responses on the moderate stressor they had described. It is possible that the moderate stressors were not significant enough to pull some individuals out of a state of conservation, or that items were not properly attuned or accurately interpreted with regards to participants' true states. Similarly, it is possible that the scale cannot detect this subtle degree of change, or that change across phases of the adaptive cycle did not happen as a result of the chosen moderate stressors. This seems unlikely, given the variability in participants' scores seen over time. Another possibility is that participants were answering with a broader focus on their perceptions of their lives overall, rather than focusing narrowly on the domain of their moderate stressor over time.

Data collection for this study spanned between February and May 2020, with all six participants included in the analyses having submitted their final responses by mid-April 2020. During this time, a unique global climate developed regarding the spread of coronavirus-19 (COVID-19), resulting in a state of emergency being declared in many nations, including many Canadian provinces. The state of emergency in Ontario, the province in which this study was conducted, was declared on March 17, 2020. The magnitude and severity of the COVID-19 pandemic made it likely that participants' stress levels and perceptions of well-being, including their subjective perception of meaning in life, were affected by the ongoing pandemic. If participants responses on the ACMM were reflective of a more holistic pattern of responding, rather than focusing narrowly on the domain of their moderate stressors, there may be a notable shift in responses surrounding the declaration of a state of emergency in Ontario.

To examine differences over time in ACMM scores relative to the COVID-19 pandemic and resulting state of emergency, data entries were categorized into three time periods. Responses submitted before March 17 were considered pre-emergency entries, those submitted between March 17 and March 21 were labeled peak emergency entries, and those submitted after March 21 were identified as post-emergency entries. Of note, the COVID-19 pandemic persisted much beyond the termination of data collection for this study. As such, the name 'post-emergency' is not indicative of the end of the state of emergency or the pandemic, but rather identifies the period after what has been identified as 'peak' in the few days following the provincial declaration of the state of emergency. In line with the framework of the adaptive cycle, individuals are expected to keep moving through the various phases to some degree despite the ongoing nature of the pandemic. The concept of 'new normal' was widely used in reference to the COVID-19 pandemic in its early months, which is a concept that resonates with

the framework of the adaptive cycle. Although the pandemic continues, individuals may move

out of a release phase into reorganization, growth, or even a state of conservation with regards to

this 'new normal'. Therefore, it is worthwhile to examine possible changes in ACMM scores

over a relatively short period with regards to the impact of the declaration of the state of

emergency. That being said, the selection of a 5-day window being considered 'peak emergency'

is somewhat arbitrary as there is not yet sufficient data to inform expected rates of change across

phases in meaning in life following this sort of adverse life experience. Based on the results of

Study 2, it is believed that change can be captured within days or a week.

Of the full dataset collected for this study, only 10 participants completed entries in each

of the three established time periods relative to the declaration of the state of emergency in

Ontario (before March 17, between March 17 and 21, and after March 21). A repeated measures

analysis of variance (ANOVA) was conducted using data from these 10 participants. In

situations in which an individual had multiple entries within one of the three identified

timeframes, only their first entry within that timeframe was maintained for analysis.

Although a visual analysis of the data (see Figure 13 below) suggests there is some change in

scores relative to the identified timeframes, the repeated measures ANOVA did not reveal a

significant interaction between ACMM phase scores and time, $F (6,54) = .88$, $p = .52$. A

summary of the mean scores and standard deviations for each phase in each time period is

presented below in Table 15.

A simple examination of mean scores for each of the four phases in each of the three time

periods identified was conducted using all data entered by all participants. This data cannot be

analysed using more eloquent statistical methods such as repeated ANOVA because there are

participants who are only in one or two time periods, while others are in all three, some

Figure 13

ACMM Scores Over Three Identified Time Periods Relevant to the COVID-19 Pandemic
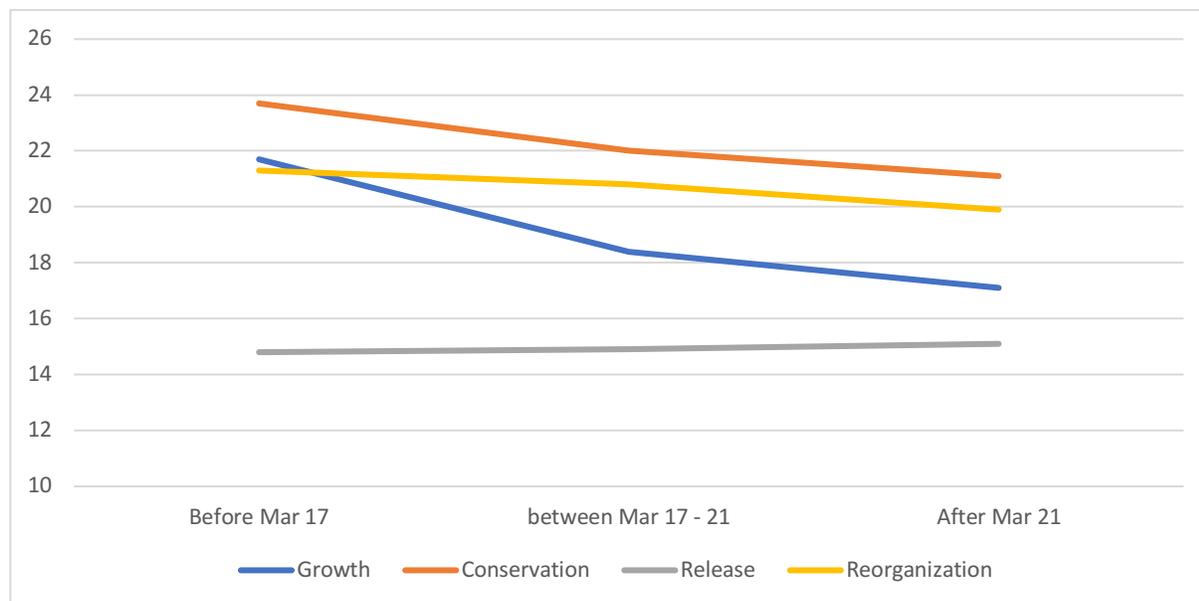
Table 15

Summary of Phase Scores Across Relevant COVID-19 Time Periods for n = 10

	Growth	Conservation	Release	Reorganization
Before March 17	21.70 (4.47)	23.70 (5.91)	14.80 (7.74)	21.30 (3.83)
Between March 17 – 21	18.40 (5.17)	22.00 (6.65)	14.90 (6.49)	20.80 (4.26)
After March 21	17.10 (5.22)	21.10 (9.09)	15.10 (8.50)	19.90 (7.19)

Note: mean scores presented with standard deviations in parentheses.

participants who only entered data once, and others who entered data upwards of twenty times.

There is also an inconsistent number of data points in each of the three time periods. For all of

these reasons, more refined statistical analyses could not be conducted. However, mean scores

for each phase across each of the three time periods for the whole dataset is presented below in

Table 16.

This data appears to be inconclusive regarding whether participants were responding in

more of a holistic way than intended. It remains a possibility that rather than focusing on the

domain specific moderate stressor that they had identified, participants may have been

Table 16

Mean Phase Scores Over Time for the Entire Available Dataset

	Growth	Conservation	Release	Reorganization
Before March 17 (N = 506)	20.39 (4.81)	23.61 (6.43)	15.19 (7.32)	21.47 (4.99)
Between March 17 – 21 (N = 134)	20.95 (5.11)	22.01 (6.94)	16.49 (7.79)	23.68 (5.00)
After March 21 (N = 199)	19.49 (5.29)	21.54 (5.24)	15.68 (7.04)	22.86 (5.88)

Note: mean scores presented with standard deviations in parentheses.

responding based on a more general perspective of their current life situation. It is possible that if more participants had completed data entries in each of the three time periods, providing greater statistical power for these analyses, there may have been a significant interaction between ACMM phase scores and time over the three identified time periods. Specifically, a visual analysis of the data suggests that there is a subtle increase in release scores coinciding with a decrease in conservation and growth scores, as well as a subtle decrease in reorganization.

The scope of perceptions regarding meaning in life that can be captured by the ACMM is an important consideration for determining the utility of interpreting ACMM scores in the future. It is possible that the ACMM may be able to detect changes in subjective experience with regard to meaning in life that are caused by large-scale events such as the COVID-19 pandemic. Future research is required to determine whether the ACMM is best used as an evaluation of an individual's momentary perception of holistic meaning in life, or whether it can be used to target domain-specific perceptions of meaning in life; perhaps both could be true by tailoring instructions for participants. Results from the current study suggest that scores on the ACMM do fluctuate in ways that may allow for interpretation of scores to help conceptualize where an individual is currently situated with regards to the processes of making meaning in life.

Discussion

All four phase scores were seen to fluctuate to some degree in all six participants. Each individual's graph of phase scores demonstrates a unique pattern of fluctuation in scores over time. This suggests the scale is sensitive to individual variation in perceptions of meaning making over time. There is not one scale that is consistently highest or lowest among all participants. Rather, the magnitude of phase scores appears to vary notably among all participants. In fact, many changes in scores over time were identified as being greater than one if not two standard deviations, suggesting that these changes in scores over time may be meaningful to interpret as reflecting changes in subjective experience with regard to meaning in life.

Results from this study suggest that weekly sampling may be ideal. It appears that weekly data sampling captures a significant proportion of large changes in difference scores, while minimizing the response burden on participants. Although biweekly sampling also captured a high proportion of large changes in differences scores, very few participants submitted biweekly data entries. Interestingly, the notable proportion of large changes captured by data entered every two hours suggests that these scores are highly dynamic in nature and do fluctuate over the course of one day.

Visual examination of line graphs of participants' scores over time reveals that growth and reorganization scores tend to follow similar patterns of change over time. Furthermore, although they are distinguishable at times, scores on these two phases show notable overlap in four of the six participants' graphs. This suggests that further review of the items on these scales and the theoretical division between them may be required. These results are consistent with conclusions drawn from Study 2, which also highlight the need for items on the reorganization

scale to be revised, particularly to ensure reorganization is sufficiently distinct from growth on the ACMM.

The high degree of stability of release being identified as a dominant phase is an unexpected result. However, it is important to note the context in which this result occurred. Specifically, the vast majority of incidents (21 out of 23) in which release was identified as the dominant phase occurred in one participant's data. As such, the stability of release as a dominant phase was only viewed to such a high degree within one participant's data.

Much more variation was seen among rising scores than dominant phases. This is unsurprising since individual scores can fluctuate significantly while the same dominant phase is maintained. Furthermore, each of the four phases were identified as the rising score at somewhat equal rates, whereas conservation was identified as the dominant phase much more often (46%) than the other three phases. This suggests that participants were overall in phases of conservation more consistently than other phases, but still demonstrated notable fluctuation in scores across all four phases of the adaptive cycle. Due to the exploratory nature of these analyses, it is as of yet unclear whether dominant phase, rising score, or some other metric for interpreting data from the ACMM is most meaningful or beneficial to understanding the individual's experience.

Throughout these exploratory analyses regarding potential interpretations of ACMM data, it is important to keep in mind that the primary focus of the measure is to capture the dynamic nature of the processes of making meaning in life over time. As such, the fluctuations seen in participants' scores over time is a crucial component in suggesting that future examination and refinement of this measure is warranted. Again, the order of the phases in the framework of the adaptive cycle is described primarily as a guideline rather than a rule. As such, the order of change in phases, although interesting to examine, is overall less important than the

evidence that scores were in fact demonstrated to vary over time. At this stage in the

development of the ACMM, it is more important to see that scores do change over time, rather

than focusing on the details of how they change over time (i.e., the order of phases over time).

Limitations

Importantly, there was significant attrition and missing data in this study. It is not clear at

this time what specific factors may have contributed to the high proportion of attrition and

missing data. Previous research using ecological momentary assessment (EMA) has reported

much lower attrition rates, such as Ruscio and colleagues (2016), who reported 27% of

participants dropped out of their two-week EMA study. Researchers intentionally over-recruited

due to the expectation that many participants would not complete the entire protocol over the

course of approximately nine weeks. The compensation (a maximum of two bonus points

towards an eligible undergraduate course) may have been inadequate relative to the burden of

participation in this rather lengthy protocol. Other recently published EMA studies have offered

monetary compensations in the range of 40 EUR in a six-day protocol (Forkmann et al., 2018),

or as high as $215 for a fifteen-day protocol (Ruscio et al., 2016). The fact that so many

individuals dropped out early or had large amounts of missing data suggests a likely possibility

of a selection bias. Specifically, individuals who chose to complete most of the protocol may be

different in a meaningful way from those who did not sign up at all or did not follow through

with the majority of the study's protocol. As such, the generalizability of results may be limited.

Similarly, the fact that only undergraduate students were recruited to participate in Study 3 limits

the generalizability of results.

The current study resulted in a small sample size relative to other EMA studies, with

twelve individuals completing more than 70% of the protocol, and only six of these individuals

selecting an appropriate moderate stressor. Other recently published EMA studies have had

relatively small sample sizes as low as 27 (van der Akker, Havermans, & Jansen, 2017) and 35

(Schmitter-Edgecombe, Sumida, & Cook, 2020). However, these samples are still notably larger

than the six individuals who were included in analyses of the current study. The threshold of

more than 70% completion of the protocol as adequate is slightly more lenient, but similar to that

set in other recent EMA studies. For example, Gershon and colleagues (2019) deemed 80% or

greater as adequate completion.

      Of the twelve individuals who completed a large proportion of the protocol, half were

removed from the study for having selected an inappropriate moderate stressor. This raises

concern that the wording of the instructions or prompts may not have been interpreted as

intended by participants. Consulting with even a small sample of participants about their

understanding of the protocol may have helped to mitigate this concern.

      There appears to have been insufficient statistical power to evaluate the potential effect

on ACMM scores of the declaration of the state of emergency in Ontario due to the COVID-19

pandemic. The analyses that were possible with the current sample, however, did not result in a

significant interaction between ACMM phase scores and the three identified periods of time

relevant to the COVID-19 state of emergency. The analyses were significantly limited due to

missing data and participant attrition. Examining the utility of the ACMM with regard to various

scopes of meaning in life, whether they are more holistic or relatively domain-specific, is an area

for future research.

      Another point to consider regarding the interpretation of these results is that the concept

of a rising score is limited by a ceiling effect within a scale. If a participant were scoring at the

top of the scale for a particular phase, it would not be possible for that score to increase any

further and therefore could not be identified as the rising score for that time period. However, in

the current sample of six participants, no phase score was ever reported to be at the top of the

scale at any time point. None the less, the possibility of a ceiling effect should be considered in

future studies. To mitigate this point, future research could also consider exploring the

interpretation of a descending score, defined as the score which shows the greatest decrease

between two time periods.

Although participants were asked to complete a series of self-report scales assessing

stress and well-being at the first and last scheduled data entries, there was not enough data to

evaluate possible associations between changes in time on scales of the ACMM and measures of

well-being. Only one of the six participants completed the measures of stress and well-being at

the final entry. Participants were not asked to complete the measures of well-being and stress

throughout the protocol to minimize their burden of participation. However, future studies should

consider integrating such measurements throughout a time series study in order to verify whether

changes in dominant phase or rising score are in fact associated with changes in self-reported

stress and well-being. Furthermore, a mixed methodology could incorporate asking participants

to describe any changes they notice regarding their perceptions of meaning in life that may

coincide with changes in their scores on the ACMM.

General Discussion

The results of the three studies suggest that the adaptive cycle can be applied to the

processes of making meaning in life. The stated purpose of these three studies was to address

three fundamental questions: 1) can the adaptive cycle framework be applied to the processes of

making meaning in life, 2) can the adaptive cycle as it pertains to meaning making be measured

with a self-report scale, and 3) do changes in these self-report scores vary over time as suggested

by the dynamic nature of the adaptive cycle? The results of the above-described studies suggest that the framework of the adaptive cycle can be applied to the processes of making meaning in life. Furthermore, psychometric results provide preliminary support for continued research with the ACMM and highlight specific ways in which the measure can be improved. Lastly, ACMM scores were seen to fluctuate over time among a small group of participants, suggesting that the measure may successfully capture the dynamic nature of meaning making.

In Study 1, coherence, purpose, and significance, identified in previous literature as the core components of meaning in life (Martela & Steger, 2016), were each seen to fluctuate through each of the four phases of the adaptive cycle as participants described their processes of developing a new understanding, roles, and sense of value in life following adversity. This provided evidence to justify developing the Adaptive Cycle of Meaning Making (ACMM) scale, using participants' own descriptions as the starting point for developing the scale's items.

Study 2 demonstrated some promising psychometric findings, particularly regarding the ACMM's convergent validity with a variety of measures of stress and well-being. The pattern of convergent validity was highly aligned with hypotheses, providing some evidence that the scale may be capturing the constructs it is intended to measure. The internal consistency and factor structure of each of the four phase scales were examined providing important insight regarding how future iterations of the ACMM may be improved. The findings suggested that either a two- or four-factor structure can be seen in the current version of the ACMM, which supported either fore loop and back loop factors, or a factor for each of the four phases. In both internal consistency and factor structure, the reorganization scale requires the most revision. One item in particular ("I am open to new possibilities.") appeared to be problematic in this scale. Measures of self-esteem and optimism, thought to be rather stable traits, were examined for possible

discriminant validity; however, these hypotheses were not supported. One possibility is that self-esteem and optimism fluctuate across the phases of the adaptive cycle with regard to making meaning in life. Alternatively, scores on the ACMM may not be as dynamic as had been hoped.

Study 3 examined the question of whether ACMM scores were seen to change over time. Using ecological momentary assessment, a small sample of participants repeatedly completed the ACMM over a period of approximately nine weeks, with results demonstrating notable variation in scores both within and between participants. Despite the small sample size and missing data, 476 difference scores were analyzed to examine change in participants' scores between time periods. Standard deviations were calculated for each of the four ACMM scales for each participant. More than one quarter of difference scores were greater than one standard deviation, and 8% were greater than two standard deviations. The time intervals of data collection varied over the course of the protocol, starting off as brief as two hours, and ending with a two-week interval. Even in time intervals as brief as two hours, more than a quarter of difference scores exceeded one standard deviation, suggesting that notable fluctuation in scores can occur in a short time period. Weekly sampling may be optimal for capturing change in scores given that over 40% of difference scores spanning one week were greater than one standard deviation.

In addition to examining the three foundational questions, exploratory analyses were presented regarding ways in which ACMM scores may be interpreted. The concepts of dominant phase and rising score were presented as two potential methods to consider for interpreting ACMM results. A participant's dominant phase was identified as the highest of their four phase scores at a given point in time. The phase score that showed the greatest increase between two time periods was identified as a participant's rising score. In situations in which all four phase scores decreased, the score that showed the least decrease was viewed as the rising score for that

time period. Consideration regarding how ACMM scores can be most usefully interpreted is an area for further exploration and is discussed in greater detail in the Future Research section, below.

Taken together, the results of these three studies contribute to our developing understanding of the processes of making meaning in life. Prior to these studies, meaning in life was largely conceptualized and described in more static terms. Frequently, research examined the degree of meaning in life reported by participants in various settings. These studies tended to examine how much meaning in life was perceived at a given point in time, ranging from low to high levels of meaningfulness. Furthermore, a general belief appears to be pervasive throughout much of the theoretical and empirical research that higher levels of meaning in life is better. Meaninglessness has been associated with forms of psychopathology (Glaw et al., 2017), and individuals who report higher levels of meaning being present in their lives also report higher levels of satisfaction with life and positive affect (Park, Park, & Petersen, 2010). Therefore, people who complete a self-report scale that identifies them as having high levels of meaning in life could be believed to be psychologically healthier individuals. However, the results of the current studies suggest there could be an alternative way of viewing meaning in life in terms of psychological wellness.

According to the framework of the adaptive cycle, a system such as an individual's framework of meaning in life is expected to continue to change dynamically over time as it progresses repeatedly through each of the four phases. Becoming 'stuck' in a particular phase, although impermanent, can be problematic for the system. The concept of the rigidity trap, for example, is described above in Study 1. If a system enters a state of deep conservation in which significant pressures exist to maintain the status quo, release can be inhibited and avoided for a

period of time. However, once the system inevitably does enter a release phase, it is likely that

the release will be much more significant and challenging for the system if it had been stuck in

the rigidity trap of deep conservation for some time (Burkhard, et al., 2011). When such a large

release occurs to a system, it can have such devastating effects on the system's structure that it

can be challenging for the system to overcome.

If a forest, for example, were prevented from experiencing any fires for long period of

time, it could be thought of as being stuck in a rigidity trap, unable to experience the natural

release of resources back into the environment. However, eventually a fire will occur. The longer

it has been since the last fire, the more likely it is that the subsequent fire will be very large, and

the more challenging it will be for the forest to reorganize its resources to progress through other

phases of the adaptive cycle. For example, Egan (2007) describes how old growth forests in

some regions are in a rigidity trap due to the overly dense forests that have developed. He

explains that this is in part caused by fire suppression practices, which has had a deleterious

effect on the ecosystem's resilience and well-being.

Similarly, if a person has a robustly established framework of meaning in life that has

never experienced significant challenge, they may have entered a phase of deep conservation and

be experiencing the rigidity trap, where nearly every aspect of their life and sense of self is

wrapped up with this singular framework of meaning in life. When this individual inevitably

experiences adversity that challenges this framework of meaning in life, the results are likely to

be more devastating and challenging to overcome than if they had experienced more smaller

releases to their framework of meaning in life along the way. Actively seeking opportunities to

challenge our existing frameworks of meaning in life may facilitate experiences of small releases

that could prevent the system from entering the rigidity trap, therefore preventing a future large release from a state of deep conservation.

In both examples, human interference can inhibit a system from progressing through phases of the adaptive cycle. We can actively work to prevent forests from experiencing fires (Egan, 2007), just as we can actively work to prevent our frameworks of meaning in life from experiencing challenges. Although conservation in human systems such as frameworks of meaning in life is often associated with subjectively pleasant feelings like happiness, striving to maintain perpetually high levels of meaning in life by maintaining this state of conservation for as long as possible, may not be advantageous. In line with the age-old adage, the only thing constant in life is change. Despite the fluidity of constant change, meaning in life is often posited as a construct which should be accumulated and maintained to the highest degree possible in order to live 'the good life' (Wolf, 2016). As an alternative to the almost dogmatic belief that higher levels of meaning in life is always better, the present studies suggest psychological wellness may stem from having a framework of meaning in life that is able to successfully navigate all the phases of the adaptive cycle.

Much remains to be explored about the application of the adaptive cycle framework to the processes of making meaning in life, including how best to refine the ACMM and interpret scores from this self-report measure. However, the preliminary results of these foundational studies suggest that the framework of the adaptive cycle can be effectively applied to the processes of making meaning in life. The ACMM provides an initial version of a self-report scale to provide a point-in-time measure of an individual's relative location among the phases of the adaptive cycle with regard to meaning in life. Furthermore, scores on the ACMM appear

sensitive to change over time, suggesting it may capture the dynamic nature of the processes of

making meaning in life.

Future Research

The three studies included in the development and preliminary evaluation of the Adaptive

Cycle of Meaning Making (ACMM) scale demonstrated key findings that justify the need for

future research, perhaps aimed at addressing the following identified limitations. Some possible

areas of future research have been identified throughout previous sections in response to noted

limitations of the current studies. This section aims to present areas of future study in a more

coordinated manner.

The current project posits that the framework of the adaptive cycle could be applied to all

levels of meaning-making. The focus of the initial qualitative study that informed the

development of the ACMM focused on people's descriptions of major life events such as death

and divorce, whereas Study 3 requested that participants respond with regards to an identified

moderate stressor, such as trying to decide on an academic program of study. The encouraging

results in these two areas suggest that the framework of the adaptive cycle and the ACMM may

be applied to these different levels of stress. However, future research should address the need to

evaluate the validity and utility of the ACMM with regard to a continuum of low-level to high-

level stressors.

On a similar note, the ACMM would benefit from further exploration as to the scope of

meaning in life that is implicated, and its domain specificity. Study 3 sought to have participants

respond to the ACMM with a focus on a particular domain represented by an identified stressor.

However, it is unclear whether participants were truly responding based on a single domain, or

whether there was a known or unknown influence of more global or holistic perceptions of

meaning in life contributing to participants' responses. Questions remain regarding whether

individuals can effectively respond to a single domain of meaning in life, or whether meaning in

life frameworks are intrinsically interdependent and inseparable from one another. The fluid

compensation hypothesis (Proulx & Inzlicht, 2012) suggests that one's levels of meaning in life

can vary between domains at any given point in time, and that elevating perceived meaning in

one domain can compensate for a lack of meaning in another domain. This suggests the

possibility of domain-specificity to meaning in life. Some empirical research has focused on

meaning in life as it pertains to a particular domain, such as work (e.g., Janicke-Bowles, Rieger,

& Connor III, 2019), whereas others refer to meaning in life as a more holistic construct (e.g.,

King et al., 2006).

Even if meaning in life is viewed as consisting of various domain-specific facets, these

domains may be significantly interconnected. For example, if a work-related stressor were

identified as the focus of responses for the ACMM, but the individual subsequently discovered a

loved one had been diagnosed with a terminal illness. This new stressor may affect the perceived

significance of the work-related stressor such that the responses on the ACMM focused on this

work-related stressor are notably affected by the holistic context of the individual's life. Future

research should consider exploring the validity and utility of the ACMM as it pertains to varying

scopes of meaning in life. Mixed methodological approaches that incorporate qualitative

questions about participants' responses may help to clarify the scope of the ACMM. Participants

may be able to articulate the focus of their responses in terms of context and breadth of meaning

in life being considered.

Another element that will be important to consider is how generalizable the findings are

across all three studies discussed. The validity and utility of the ACMM is limited by the lack of

representativeness of the general population in each study's sample of participants. There is a notable lack of representation for male participants, participants with lower levels of formal education, and individuals from diverse racial and ethnic backgrounds. This is not unlike the demographics seen in other scale development studies. For example, Steger and colleagues (2006) reported a sample that was 64% female and 76% Caucasian for the initial evaluation of potential items for the Meaning in Life Questionnaire. Nevertheless, it is important for future research to seek out diverse participant samples in order to determine the generalizability of results. It may also be interesting to investigate whether an individual's processes of making meaning in life vary based on factors such as religiosity.

A necessary area of future research relates to refining the psychometric properties of the ACMM. In particular, the scale as it stands currently does not appear to demonstrate adequate differentiation between the growth and reorganization scales. It will be important to revisit the items in these two scales to remove ineffective items and potentially add more items to increase the internal consistency of the scales. Although the conservation and release scales were slightly less problematic, these scales would still benefit from further examination to improve their psychometric properties such as internal consistency. Additional examination of potential discriminant validity may also be warranted. Furthermore, the factor structure of the scale has not yet been shown to be clear enough to warrant confirmatory factor analysis according to the results of the partial confirmatory factor analysis completed in accordance with recommendations by Gignac (2009). The scale could be improved by clarifying the factor structure through revising items and exploring how to best manage items that strongly negatively load onto an opposing scale. Developing stronger psychometric properties will be important for

establishing clear, empirically validated methods of scoring the ACMM that are necessary to inform how to proceed with examining the interpretation of ACMM scores.

In addition to the psychometric issues of improving the internal consistency and factor structure of the scale to clearly delineate scoring procedures that are empirically validated, future research might also consider the fundamental basis of the adaptive cycle framework as it pertains to an individual as a complex system who engages in processes of making and remaking meaning in life. It is currently unclear whether the phases of the adaptive cycle would best be considered as operating sequentially, with an individual proceeding from one phase to the next, such as is described in the exploratory dominant phase analyses included in Study 3. This is often the way that the phases of the adaptive cycle are described elsewhere in the literature. For example, Fath and colleagues (2015) explicitly refer to the four phases as successional. However, it may be beneficial to consider an alternative that elements of the four phases of the adaptive cycle work concurrently within an individual system to varying degrees of prominence. This is more akin to the exploratory rising score analyses described in Study 3. Future research should explore whether it is most effective to conceptualize an individual as being situated within a particular phase of the cycle, or rather whether there is more meaningful interpretation derived from interpreting all four phase scores in conjunction. A high score on a growth phase may be interpreted differently in the context of a concurrently elevated score on conservation than it would be for an individual who was low on conservation. This can be thought of as similar to code type interpretation of data on measures such as the Minnesota Multiphasic Personality Inventory. The score on one phase alone may not be as richly interpreted as the contextual interpretation provided by considering all four phase scores together.

The phases of the adaptive cycle may also be best considered as continuous one to the next rather than discrete entities. As is the case in the visual representation of the adaptive cycle, the sideways figure eight depicted above in Figure 1, progress from one phase to the next may consist more of gradual change rather than distinct categorical shifts. Therefore, the structure of the ACMM and its four distinct scales representing the phases of the cycle should also be considered in future research. The heuristic reduction and simplification of the adaptive cycle to these discrete scales may facilitate meaningful interpretation of data, and therefore be useful. However, it may also be the case that the structure of the adaptive cycle, when reduced to four distinct categories, becomes less effective in capturing the complexity of change that occurs in such processes as making meaning in life. Future research will have to carefully consider balancing the benefit of quantifying the adaptive cycle through use of the ACMM with the risk of once again falling into an overly simplified reduction of a complex process. The problems raised by this issue may be mitigated through interpreting a phase score within the context of the other three phase scores rather than viewing a score in isolation. Furthermore, additional research that combines quantitative and qualitative methodologies to enhance the interpretation of the ACMM will help to clarify whether it appears to be problematic to impose a categorical structure such as the ACMM onto what might be better viewed as a continuous process described by the adaptive cycle.

Exploratory research regarding the interpretation of ACMM was presented in these studies, including specifically ideas of dominant phase and rising score analyses. Within the concept of rising scores, standard deviations of scores were calculated for each participant. Future research may consider work towards establishing norms to which a participant's scores can be compared in order to explore whether the magnitude of an individual's scores on the four

phases can be meaningfully interpreted when compared to the scores of peers. The way that such normative groups will be defined should be carefully considered. For example, it may be appropriate to follow typical processes of basing normative groups on some combination of sex, age, and education. However, depending on results from above-described future studies aimed at addressing issues of generalizability, other demographic factors may become relevant to consider when defining a normative reference group.

Along a similar line of thinking, it will be important to consider whether normative reference groups are appropriate for use with the ACMM. It is as of yet unknown whether a 'large' change in a phase score would be interpreted the same way for a change of the same magnitude for a different person. It is possible that individuals may have notable differences in response style on the ACMM, perhaps varying in the degree to which they respond according to a particular domain or in a more holistic way. Previous research has suggested that acquiescent and extreme response styles, for example, are relatively stable in individuals when measured over a period of eight years (Wetzel et al., 2016). Therefore, it should be considered that the magnitude of changes in an individual's phase score may be more usefully considered with reference to their own pattern of scores over time, rather than being compared with a normative reference group. A change in phase score of three points, for example, may be interpreted differently for a person who has shown relatively consistent scores over time compared to an individual whose pattern of scores has been more unstable over time. Mixed methodology will likely be an important avenue of future research for clarifying such interpretive questions in future studies.

Overall, the subjective experiences of changes associated with ACMM scores is an area that warrants future exploration. In the framework of the adaptive cycle, resilience can be viewed

as successfully navigating all phases and not becoming 'stuck' in any particular phase. As such,

it might be the case that individuals who show more variability in their ACMM scores may

exhibit higher degrees of resilience. This could be viewed as akin to the increased health benefits

associated with increased heart rate variability. The ability of a human heart to readily adjust its

rate of beating is viewed as an indicator of cardiovascular health (Shaffer & Ginsberg, 2017).

High heart rate variability has been also associated with indicators of cognitive health, such as

improved attention and working memory (Hansen, Johnsen, & Thayer, 2003). The capacity to

embrace change may be a marker of health. Similarly, the more readily a system is able to

change, the more variability there may be in scores on the ACMM, representing increased

variation among phases of the adaptive cycle for that individual. Future studies should consider

whether there is an association with the degree of variability seen in ACMM scores and

measures of well-being and resilience. On the other hand, individuals who demonstrate very low

levels of variation in ACMM scores may be more inclined to become 'stuck' in a particular

phase of the adaptive cycle, therefore experiencing a reduced level of resilience. Because of the

notable degree of missing data and attrition seen particularly in the third study, the possible

association between changes in scores on the ACMM and measures of well-being and stress is an

area that has not yet been well explored.

It is possible that as individuals move through the various phases of the adaptive cycle of

meaning-making, their frameworks of meaning in life become increasingly complex. As they

experience releases, and reorganize their understanding of reality, they may develop more

nuanced sets of guiding principles as the building blocks of their meaning in life frameworks.

Future studies may consider how to evaluate the complexity of an individual's framework of

meaning in life and determine whether there is a relationship between the complexity of one's

framework and the number of times they have moved through the phases of the adaptive cycle. Specifically, it may be possible to determine an approximation of the number of releases an individual has experienced throughout their lifetime. This could serve as a proxy for the number of cycles they have proceeded through. It may be interesting to explore if there is an association between complexity of meaning framework, number of releases, and measures of resilience and well-being. This line of research would likely relate to the existing body of research regarding the effects of exposure to adversity. However, it would elaborate on this by examining the effects that it might have on an individual's understanding of meaning in life.

Once the ACMM has been refined in such a way that it demonstrates consistently strong psychometric properties and its relationships with resilience, stress, and well-being are better understood, this line of research could lead to the identification and development of strategies to help individuals navigate each of the phases of the adaptive cycle of meaning-making. One participant in Study 3 appeared to be 'stuck' in a release phase, exhibiting release as their dominant phase on more than twenty occasions. This suggests that it is possible for individuals to be 'stuck' in a phase, creating opportunities for future studies to explore strategies that may facilitate movement among phases for individuals who may be 'stuck'. If the view of resilience as successful navigation of all four phases is supported, it may be possible to create strategies to enhance resilience that can be monitored and evaluated through ongoing use of the ACMM. These strategies may be akin to ideas discussed by Fath and colleagues (2015) regarding "key preparedness features" (p. 4) that an organizational social system can work to develop. The details of these sorts of strategies are beyond the scope of the current project and further research on the ACMM is required before these sorts of strategies could be evaluated with regards to how they affect variability in ACMM score, for example. However, it is possible that in the future

some such strategies will be developed, and outcome monitoring of their implementation may be possible with repeated assessments with the ACMM.

It is possible that by identifying the processes of making meaning in life as described by the adaptive cycle, individuals may become more willing and able to effectively navigate all four phases of the adaptive cycle of meaning making, rather than resisting the progression through the various phases. If we can recognize that releasing our framework of meaning in life is part of an ongoing dynamic process, despite its associated subjective discomfort, perhaps we can learn to more effectively navigate this and all phases of the adaptive cycle of meaning making. Future studies may consider examining individuals' willingness to experience release, perhaps in relation to existing constructs such as openness to experiences. It may be interesting to explore whether prompting individuals to perceive processes of making meaning in life in terms of the adaptive cycle has an effect on the way they view challenges, the rate at which they move through phases, and their acceptance of the less comfortable backloop phases.

It is likely that the ongoing development of the ACMM will itself take a phased approach. First, the psychometric properties of the scale will have to be improved. Next, larger scale questions regarding the interpretation of phase scores will be examined in relation to existing constructs, clarifying the experience of each of the four phases in turn. This is the phase in which many of the proposed questions for future research will be examined, including studies evaluating generalizability, domain-specificity of meaning in life, the sequential versus concurrent nature of phases, and the relationship with complexity of frameworks for meaning in life and resilience. In the third phase of research, studies can explore the implications of ACMM scores on an individual level. During this phase of research, elements regarding becoming 'stuck' and potential strategies for facilitating progress from one phase to another may be

examined. This is the section of research that may lead to more practical rather than purely theoretical insights regarding the processes of making meaning in life as evaluated by the ACMM.

Conclusion

Each of the three studies described in this paper present a key finding that advances the understanding of the processes of making meaning in life. The first study provided qualitative evidence to support the application of the adaptive cycle framework to the processes of making meaning in life. The language used by participants in this first study served as a starting point for generating items in the initial iteration of the self-report scale, the Adaptive Cycle of Meaning Making (ACMM). The second study conducted a preliminary psychometric analysis of the ACMM, providing key insights to revise and improve the scale's construction. These results effectively situated the ACMM within existing measures of stress, well-being, and meaning in life with a strong matrix of convergent validity. Finally, the third study examined the dynamic nature of the processes of making meaning in life by exploring changes in scores over time among a small group of individuals using ecological momentary assessment. Taken together, these three studies support the application of the adaptive cycle to the processes of making meaning in life, provide a preliminary scale for evaluating one's relative position in the adaptive cycle of meaning making, and demonstrate that ACMM scores fluctuate over time in ways that may represent the dynamic processes of making meaning in life.

The ACMM provides a compelling alternative to the existing measures of meaning in life by changing the question. Rather than asking how much meaning in life does an individual perceive, the ACMM asks where in the dynamic process of making meaning in life is this individual at a given point in time. By changing this fundamental question, the ACMM opens the

door to myriad research projects that are both theoretical and practical in nature. The ACMM

challenges the belief that more is better when it comes to meaning in life and emphasizes the

ability to navigate ALL phases of the adaptive cycle of meaning making in order to maintain

resilience. Perhaps the answer to the existential quest for a life filled with meaning is to embrace

its release as much as we embrace its growth.

References

Abeyta, A. A., & Routledge, C. (2018). The need for meaning and religiosity: An individual

differences approach to assessing existential needs and the relation with religious

commitment, beliefs, and experiences. *Personality and Individual Differences, 123,* 6-13.

DOI:10.1016/j.paid.2017.10.038

Abeyta, A. A., Routledge, C., Juhl, J., & Robinson, M. D. (2015). Finding meaning through

emotional understanding: Emotional clarity predicts meaning in life and adjustment to

existential threat. *Motivation and Emotion, 39,* 973-983. DOI: 10.1007/s11031-015-9500-

3

Allan, B. A., Duffy, R. D., & Douglass, R. (2015). Meaning in life and work: A developmental

perspective. *The Journal of Positive Psychology, 10*(4), 323-331. DOI:

http://dx.doi.org/10.1080/17439760.2014.950180

American Psychiatric Association. (2013). *The Diagnostic and Statistical Manual of Mental

Disorders* (5th ed.). Arlington, VA: Author.

Angeler, D. G., Allen, C. R., Garnestani, A. S., Gunderson, L. H., Hjerne, O., & Winder, M.

(2015). Quantifying the adaptive cycle. *PLOS ONE, 10*(12), 1-17.

DOI:10.1371/journal.pone.0146053

Bagley, C., Bolitho, F., & Bertrand, L. (1997). Norms and construct validity of the Rosenberg

Self-Esteem Scale in Canadian high school populations: Implications for counselling.

Canadian Journal of Counselling, 31(1), 82-92.

Battista, J. & Almond, R. (1973). The development of meaning in life. *Psychiatry, 36*(4), 409-

427. DOI: 10.1080/00332747.1973.11023774

Baumeister, R. F. (1991). *Meanings of Life*. New York: The Guildford Press.

Baumeister, R. F., & Vohs, K. D. (2002). The pursuit of meaningfulness in life. In C. R.

Snyder & S. J. Lopez (Eds.), *Handbook of positive psychology* (pp. 608-618). New York:

Oxford University Press.

Bering, J. M. (2003). Towards a cognitive theory of existential meaning. *New Ideas in*

Psychology, 21, 101-120. DOI:10.1016/S0732-118X(03)00014-X

Boyer, J. (2020). Toward an evolutionary and sustainability perspective of the innovation

ecosystem: Revisiting the panarchy model. *Sustainability,12,* 1-17. DOI:

10.3390/su12083232

Brassai, L., Piko, B. F., & Steger, M. F. (2011). Meaning in life: Is it a protective factor for

adolescents' psychological health? *International Journal of Behavioral Medicine, 18,* 44-

51. DOI: 10.1007/s12529-010-9089-6

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in*

Psychology, 3(2), 77-101. DOI: 10.1191/1478088706qp063oa

Burkhard, B., Fath, B. D., & Müller, F. (2011). Adapting the adaptive cycle: Hypotheses on the

development of ecosystem properties and services. *Ecological Modelling, 222,* 2878-

2890. DOI: 10.1016/j.ecolmodel.2011.05.016

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress.

Journal of Health and Social Behavior, 24(4), 385-396.

Costello, A. B., & Osborne, J. W. (2005). Best practices in exploratory factor analysis: Four

recommendations for getting the most from your analysis. *Practical Assessment,*

Research, & Evaluation, 10(7), 1-9. DOI: https://doi.org/10.7275/jyj1-4868

Crumbaugh, J. C. (1968). Cross-validation of Purpose-in-Life test based on Frankl's concepts.

Journal of Individual Psychology, 24(1), 74-81.

Crumbaugh, J. C., & Maholick, L. T. (1964). An experimental study in existentialism: The

    psychometric approach to Frankl's concept of noogenic neurosis. *Journal of Clinical*

    Psychology, 20, 200-207.

Davis, C. G., Nolen-Hoeksema, S., & Larson, J. (1998). Making sense of loss and

    benefiting from the experience: Two construals of meaning. *Journal of Personality and*

    Social Psychology, 75, 561-574.

Delle Fave, A., Brdar, I., Wissing, M. P., & Vella-Brodrick, D. A. (2013). Sources and motives

    for personal meaning in adulthood. *The Journal of Positive Psychology, 8*(6), 571-529.

    DOI:10.1080/17439760.2013.830761

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction With Life Scale.

    Journal of Personality Assessment, 29(1), 71-75.

Diener, E., Wirtz, D., Tov, W., Kim-Prieto, C., Choi, D., Oishi, S., & Biswas-Diener, R. (2010).

    New well-being measures: Short scales to assess flourishing and positive and negative

    feelings. *Social Indicators Research, 97,* 143-156. DOI:10.1007/s11205-009-9493-y

Dulaney, E. S., Graupmann, V., Grant, K. E., Adam, E. K., & Chen, E. (2018). Taking on the

    stress-depression link: Meaning as a resource in adolescence. *Journal of Adolescence, 65,*

    39-49. DOI: 10.1016/j.adolescence.2018.02.011

Egan, D. (2007). Conserving and restoring old growth in frequent-fire forests: Cycles of

    disruption and recovery. *Ecology and Society, 12*(2). DOI: 10.5751/ES-02175-120223

Fath, B. D., Dean, C. A., & Katzmair, H. (2015). Navigating the adaptive cycle: An approach to

    managing the resilience of social systems. *Ecology and Society, 20*(2). DOI:

    http://dx.doi.org/10.5751/ES-07467-200224

Fletcher, S. K. (2004). Religion and life meaning: Differentiating between religious beliefs and

religious community in constructing life meaning. *Journal of Aging Studies, 18,* 171-185.

DOI:10.1016/j.jaging.2004.01.005

Forkmann, T., Spangenberg, L., Rath, D., Hallensleben, N., Hegerl, U., Kersting, A., &

Glaesmer, H. (2018). Assessing suicidality in real time: A psychometric evaluation of

self-report items for the assessment of suicidal ideation and its proximal risk factors using

ecological momentary assessments. *Journal of Abnormal Psychology, 127*(8), 758-769.

DOI: http://dx.doi.org/10.1037/abn0000381

Frankl, V. E. (1966). Self-transcendence as a human phenomenon. *Journal of Humanistic*

Psychology, 6, 97-106. DOI:10.1177/002216788600600201

Frankl, V. E. (1963). *Man's Search for Meaning: An Introduction to Logotherapy.* New York:

Pocket Books.

Garland, E. L., Farb, N. A., Goldin, P. R., & Fredrickson, B. L. (2015). The Mindfulness-to-

Meaning theory: Extensions, applications, and challenges at the attention-appraisal-

emotion interface. *Psychological Inquiry, 26,* 377-387.

DOI:10.1080/104784X.2015.1092493

Garland, E. L., Hanley, A., Farb, N. A., & Froeliger, B. E. (2015). State mindfulness during

meditation predicts enhanced cognitive reappraisal. *Mindfulness (N Y), 6*(2), 234-242.

DOI:10.1007/s12671-013-0250-6

Gershon, A., Kaufmann, C. N., Torous, J., Depp, C., & Ketter, T. A. (2019). Electronic

ecological momentary assessment (EMA) in youth with bipolar disorder: Demographic

and clinical predictors of electronic EMA adherence. *Journal of Psychiatric Research,*

116, 14-18. DOI: http://doi.org/10/1016/j.jpsychires.2019.05.026

Gignac, G. E. (2009). Partial confirmatory factor analysis: Described and illustrated on the NEO-

    PI-R. *Journal of Personality Assessment, 91*(1), 40-47. DOI:

    10.1080/00223890802484126

Glaw, X., Kable, A., Hazelton, M., & Inder, K. (2017). Meaning in life and meaning of life in

    mental health care: An integrative literature review. *Issues in Mental Health Nursing,*

    38(3) 243-252. DOI:10.1080/01612840.2016.1253804

Gordon, A. M. (2018). How men experience sexual shame: The development and validation of

    the male sexual shame scale. *Journal of Men's Studies, 26*(1), 105-123. DOI:

    10.1177/1060826517728303

Gunderson, L. H., & Holling, C. S. (2002). *Panarchy: Understanding transformations in human*

    and natural systems. Island Press.

Hansen, A. L., Johnsen, B. H., & Thayer, J. F. (2003). Vagal influence on working memory and

    attention. *International Journal of Psychophysiology, 48,* 263-274. DOI: 10.1016/S0167-

    8760(03)00073-4

Haughan, G., & Moksnes, U. K. (2013). Meaning-in-life in nursing home patients: A validation

    study of the Purpose-in-Life test. *Journal of Nursing Measurement, 21*(2), 296-319.

    DOI:10.1891/1061-3749.21.2.296

Heine, S. J., Proulx, T., & Vohs, K. D. (2006). The Meaning Maintenance Model: On the

    coherence of social motivations. *Personality and Social Psychology Review, 10*(2), 88-

    110. DOI:10.1207/s15327957pspr1002_1

Holling, C. S. (2001). Understanding the complexity of economic, ecological, and social

    systems. *Ecosystems, 4,* 390-405. DOI: 10.1007/s10021-001-0101-5

Hurst, D. K. (2012). *New ecology of leadership*. Columbia University Press: New York.

Janicke-Bowles, S. H., Rieger, D., & Connor III, W. (2019). Finding meaning at work: The role of inspiring and funny YouTube videos on work-related well-being. *Journal of Happiness Studies, 20,* 619-640. https://doi.org/10.1007/s10902-018-9959-1

Joffe, H. (2012). Thematic analysis. In D. Harper & A. R. Thompson (Eds.), *Qualitative research methods in mental health and psychotherapy: A guide for students and practitioners* (209-223). West Sussex: Wiley-Blackwell.

Keeley, J., Zayac, R., & Correia, C. (2008). Curvilinear relationships between statistics anxiety and performance among undergraduate students: Evidence for optimal anxiety. *Statistics Education Research Journal, 7*(1), 4-15.

King, L. A., & Hicks, J. A. (2009). Detecting and constructing meaning in life events. *The Journal of Positive Psychology, 4*(5), 317-330. DOI:10.1080/17439760902992316

King, L. A., Hicks, J. A., Krull, J. L., & Del Gaiso, A. K. (2006). Positive affect and the experience of meaning in life. *Journal of Personality and Social Psychology, 90*(1), 179-196. DOI:10.1037/0022-3514.90.1.179

Klinger, E. (1977). *Meaning and Void*. Minneapolis: University of Minnesota Press.

Leontiev, D. (2017). The divine knot: A relational view of meaning. *Journal of Constructivist Psychology, 30*(1), 50-56. DOI: 10.1080/10720537.2015.1119081

Lomas, T., & Ivtzan, I. (2016). Second wave positive psychology: Exploring the positive-negative dialects of wellbeing. *Journal of Happiness Studies, 17,* 1753-1768. DOI:10.1007/s10902-015-9668-y

Margolis, S., Schwitzgebel, E, Ozer, D. J., & Lyubomirsky, S. (2018). A new measure of life satisfaction: The Riverside Life Satisfaction Scale. *Journal of Personality Assessment,* 1-10. DOI:10.1080/00223891.2018.1464457

Martela, F. & Steger, M. F. (2016). The three meanings of meaning in life: Distinguishing

coherence, purpose, and significance. *The Journal of Positive Psychology, 11*(5), 531-

545. DOI:10.1080/17439760.2015.1137623

Morgado, F. F. R., Meireles, J. F. F., Neves, C. M., Amaral, A. C. S., & Ferreira, M. E. C.

(2017). Scale development: Ten main limitations and recommendations to improve future

research practices. *Psicologia: Reflexão e Crítica, 30*(3), 1-20. DOI:10.1186/s41155-016-

0057-1

Morgan, J., & Farsides, T. (2009). Measuring meaning in life. *Journal of Happiness Studies, 10,*

197-214. DOI:10.1007/s10902-007-9075-0

Nakamura, Y., & Ho, S. S. (2015). A causal versus enabling impact of mindfulness on the

genesis of meaning. *Psychological Inquiry, 26,* 358-364.

DOI:10.1080/1047840X.2015.1075851

Park, C. L. (2017). Unresolved tensions in the study of meaning in life. *Journal of Constructivist*

Psychology, 30(1), 69-73. DOI: 10.1080/1072537.2015.1119083

Park, C. L., & Folkman, S. (1997). Meaning in the context of stress and coping. *Review of*

General Psychology, 1(2), 115-144. DOI:10.1037/1089-2680.1.2.115

Park, N., Park, M., & Peterson, C. (2010). When is the search for meaning related to life

satisfaction? *Applied Psychology: Health and Well-Being, 2*(1), 1-13.

DOI:10.1111/j.1758-0854.2009.01024.x

Preacher, K. J., & MacCallum, R. C. (2003). Repairing Tom Swift's electric factor analysis

machine. *Understanding Statistics, 2*(1), 13-43. DOI:

https://doi.org/10.1207/S15328031US0201_02

Proulx, T., & Inzlicht, M. (2012). The five "A"s of meaning maintenance: Finding meaning in

the theories of sense-making. *Psychological Inquiry, 23,* 317-335.

DOI:10.1080/1047840X.2012.703472

Routledge, C., Roylance, C., & Abeyta, A. A. (2017). Miraculous meaning: Threatened meaning

increases belief in miracles. *Journal of Religion and Health, 56,* 776-783.

DOI:10.1007/s10943-015-0124-4

Rosenberg, M. (1965). *Society and the Adolescent Self-Image*. Princeton, NJ: Princeton

University Press.

Ruscio, A. C., Muench, C., Brede, E., MacIntyre, J., & Waters, A. J. (2016). Administration and

assessment of brief mindfulness practice in the field: A feasibility study using ecological

momentary assessment. *Mindfulness, 7,* 988-999. DOI: 10.1007/s12671-016-0538-4

Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of

psychological well-being. *Journal of Personality and Social Psychology, 57*(6), 1069-

1081.

Sanger, M., & Giddings, M. M. (2012). A simple approach to complexity theory. *Journal of

Social Work Education, 48*(2), 369-376. DOI:10.5175/JSWE.2012.201000025

Scheier, M. F., Carter, C. S., & Bridges, M. W. (1994). Distinguishing optimism from

neuroticism (and trait anxiety, self-mastery, and self-esteem): A reevaluation of the life

orientation test. *Journal of Personality and Social Psychology, 67*(6), 1063-1078.

Scheier, M. F., Wrosch, C., Baum, A., Cohen, S., Martire, L. M., Matthews, K. A., Schulz, R., &

Zdaniuk, B. (2006). The Life Engagement Test: Assessing purpose in life. *Journal of

Behavioral Medicine, 29*(3), 291-298. DOI:10.1007/s10865-005-9044-1

Schmitter-Edgecombe, M., Sumida, C., & Cook, D. J. (2020). Bridging the gap between

performance-based assessment and self-reported everyday functioning: An ecological

momentary assessment approach. *The Clinical Neuropsychologist, 34*(4), 678-699. DOI:

https://doi.org/10.1080/13854046.2020.1733097

Seligman, M. E. P. (1998). The President's Address (Annual Report). *American Psychologist,*

54, 559-562.

Shaffer, F. & Ginsberg, J. P. (2017). An overview of heart rate variability metrics and norms.

Frontiers in Public Health, 5, 1-17. DOI: 10.3389/fpubh.2017.00258

Shrira, A., Palgi, Y., Ben-Ezra, M., & Shmotkin, D. (2011). How subjective well-being and

meaning in life interact in the hostile world? *The Journal of Positive Psychology, 6*(4),

273-285. DOI:10.1080/17439760.2011.577090

Steger, M. F. (2006). An illustration of issues in factor extraction and identification of

dimensionality in psychological assessment data. *Journal of Personality Assessment,*

86(3), 263-272.

Steger, M. F. (2007). Structural validity of the Life Regard Index. *Measurement and Evaluation*

in Counseling and Development, 40, 97-109.

Steger, M. F., & Frazier, P. (2005). Meaning in life: One link in the chain from religiousness to

well-being. *Journal of Counseling Psychology, 52*(4), 574-582. DOI:10.1037/0022-

0167.52.4.574

Steger, M. F., Frazier, P., Oishi, S., & Kaler, M. (2006). The Meaning in Life Questionnaire:

Assessing the presence of and search for meaning in life. *Journal of Counseling*

Psychology, 53(1), 80-93. DOI:10.1037/0022-0167.53.1.80

Steger, M. F., Oishi, S., & Kashdan, T. B. (2009). Meaning in life across the life span: Levels

and correlates of meaning in life from emerging adulthood to older adulthood. *The*

Journal of Positive Psychology, 4(1), 43-52. DOI:10.1080/17439760802303127

Streiner, D. L., & Norman, G. R. (2003). *Health Measurement Scales: A practical guide to their development and use, 3rd edition*. Oxford University Press: New York.

Streufert, S. (1997). Complexity: An integration of theories. *Journal of Applied Social Psychology, 27*(23), 2068-2095.

Taubman-Ben-Ari, O. (2011). Is the meaning of life also the meaning of death? A terror management perspective reply. *Journal of Happiness Studies, 12,* 385-399. DOI:10.1007/s10902-010-9201-2

Tedeschi, R. G., & Calhoun, L. G. (1996). The Posttraumatic Growth Inventory: Measuring the positive legacy of trauma. *Journal of Traumatic Stress, 9*(3), 455-471.

Tedeschi, R. G., & Calhoun, L. G. (2004). Posttraumatic growth: Conceptual foundations and empirical evidence. *Psychological Inquiry, 15*(1), 1-18.

van der Akker, K., Havermans, R. C., & Jansen, A. (2017). Appetitive conditioning to specific times of day. *Appetite, 116,* 232-238. DOI: https://dx.doi.org/10.1016/j.appet.2017.05.014

Van Manen, M. (2014). *Phenomenology of Practice: Meaning-Giving Methods in Phenomenological Research and Writing*. New York: Routledge.

Van Togneren, D. R., Hook, J. N., & Davis, D. E. (2013). Defensive religion as a source of meaning in life: A dual meditational model. *Psychology of Religion and Spirituality, 5*(3), 227-232. DOI:10.1037/a0032695

Vohs, K. D., Aaker, J. L., & Catapano, R. (2019). It's not going to be that fun: Negative experiences can add meaning to life. *Current Opinion in Psychology, 26*, 11-14. DOI: 10.1016/j.coppsyc.2018.04.014

Wall Kimmer, R. (2013). *Braiding Sweetgrass: Indigenous wisdom, scientific knowledge, and the teachings of plants*. Milkweed Editions.

Wetzel, E., Lüdtke, O., Zettler, I., & Böhnke, J. R. (2016). The stability of extreme response style and acquiescence over 8 years. *Assessment, 23*(3), 279-291. DOI: 10.1177/1073191115583714

Wolf, S. (2016). Meaningfulness: A third dimension of the good life. *Foundations of Science, 21*(2), 253-269. DOI: 10.1007/s10699-014-93384-9

Wong, P. T. P. (2011). Positive psychology 2.0: Towards a balanced interactive model of the good life. *Canadian Psychology, 52*(2), 69-81. DOI:10.1037/a0022511

Wong, P. T. P. (2015). Meaning therapy: Assessments and interventions. *Existential Analysis, 26*(1), 154-167.

Yalom, I. (1980). *Existential Psychotherapy*. Basic Books.

Appendix A – Study 1 Information and Consent Forms

Overcoming Challenging Life Events – Letter of Information

Dear Potential Participant:

You are invited to participate in an interview about your personal experience of having overcome a challenging event in your life. Before you decide whether or not you would like to take part in this study, please read this letter carefully to understand what is involved.

PURPOSE
The purpose of this study is to explore the processes that people engage in when having to overcome a challenging event. This is the first study in a two-study design that will lead to the eventual development of a self-report questionnaire aimed at understanding the dynamic processes involved in overcoming challenging events. This study is being conducted by Hillary Jones, a PhD student in clinical psychology, under the supervision of Dr. Mirella Stroink (mstroink@lakeheadu.ca). There are no real or potential/perceived conflicts of interest identified in this research team.

It is important to note that the interview is **not intended to have any therapeutic element** (i.e., this is NOT a therapy session). As such, the intention is not to discuss a current challenge in your life, but rather a difficult situation that you have already overcome.

WHAT INFORMATION WILL BE COLLECTED?
You will be asked to provide basic demographic information (gender identity, age, ethnic identity) and engage in an audio-recorded semi-structured interview, lasting approximately 60 to 90 minutes. This information will be used to further the understanding of how people cope with adversity.

WHAT ARE MY RIGHTS AS A PARTICIPANT?
Your participation in this study is completely voluntary. You have the right to skip any questions that you do not wish to answer or stop participating at any point during the interview. Your interview will be transcribed and sent to you for approval. You may withdraw your data up until you approve the transcript of your interview, or two weeks after it is sent to you if we do not hear back from you. There are no consequences for withdrawing from the study. You may email the researchers regarding the study and will be provided with detailed answers. You will be provided with all necessary information to make an informed decision about whether or not you wish to participate in the study. Following completion of the interview, you will be given a debriefing form with additional information related to the study.

WHAT ARE THE RISKS AND BENEFITS?
By participating in this study, you will contribute to the scientific understanding of the processes by which individuals overcome challenging life events. In appreciation for your participation, you will be given a $5 Tim Horton's gift card.

Participation in this study involves only minimal risk. However, it is possible that you may find some of the conversation distressing since you will be asked to reflect on a previously challenging event. Following your participation, you will again be provided with resources to help you cope with any potential distress that may have arisen from your participation in this interview (resources listed below).

- Lakehead U. Student Health and Counselling Centre (for students): 1-807-343-8361.
- Ontario Mental Health Helpline: 1-866-531-2600
- Canadian Mental Health Association Crisis Response Services –
  Thunder Bay: 807-346-8282 or Toll free/district: 1-888-269-3100

HOW WILL MY CONFIDENTIALITY BE MAINTAINED?
Information provided through participation in this interview will be kept confidential unless the researcher has reason to be concerned for a person's safety. You will be given the option to review your transcript following the interview and make minor changes if desired. Once you have approved the transcript, it will be anonymized (i.e., identifying information will be removed). If we do not hear from you for two weeks following your transcript being sent to you, it will be assumed that you approve the transcript and information will be anonymized. No identifying information will be included in any oral or written presentation of results from this study. The audio-recording and resulting anonymized written transcript will be stored on a secure computer and only the research team (Hillary Jones and Dr. Mirella Stroink) will be able to access this information.

WHAT WILL MY DATA BE USED FOR:
It is our intention to present the findings from this research at professional academic conferences and to submit a manuscript to a peer-reviewed academic journal. No identifying information will be associated with the data for these purposes.

WHERE WILL MY DATA BE STORED?
Your anonymized data will be stored electronically on a password-protected computer at Lakehead University for a minimum of 5 years following the completion of the project.

HOW CAN I RECEIVE A COPY OF THE RESEARCH RESULTS?
You may request a summary of results by contacting the research team following your participation (Hillary Jones: hjones@lakeheadu.ca).

RESEARCH ETHICS BOARD REVIEW AND APPROVAL:
This research study has been reviewed and approved by the Lakehead University Research Ethics Board. If you have any questions related to the ethics of the research and would like to speak to someone outside of the research team, please contact Sue Wright at the Research Ethics Board at 807-343-8283 or research@lakeheadu.ca.

If you are interested in participating in this study please contact: Hillary Jones (hjones@lakeheadu.ca), 807-633-2037.

Overcoming Challenging Life Events – Consent Form:

I agree to the following:
- ✓ I have read and understand the information contained in the Information Letter
- ✓ I agree to participate
- ✓ I understand the risks and benefits to the study
- ✓ I understand I am a volunteer and can withdraw from the study up until I approve my transcript, or two weeks after the transcript is sent to me if I do not reply
- ✓ That the data will be securely stored at Lakehead University for a minimum period of 5 years following completion of the research project
- ✓ I understand that the research findings will be made available to me upon request
- ✓ The interview will be audio-recorded
- ✓ All approved transcripts will be anonymized
- ✓ All of my questions have been answered

By signing below, I am indicating that I have read and agree to the above information and consent to proceed to the online survey.

Name (printed): _____

Signature: _____

Date: _____

Appendix B – Study 1 Interview Questions

1. Please provide your age, gender, ethnicity, and highest level of education.
2. Please briefly describe a time that you had to overcome a challenging/adverse event in your life. A challenging/adverse life event is one that was difficult for you to get through because of the effect it had on your functioning, relationships, role in your family or society, sense of self, etc. For example, a significant change or loss in life (e.g., death, job loss, relationship separation) is often considered a challenging or adverse life event.
3. How long ago did this event take place?
4. How much did you expect or anticipate this event?
5. How did your sense of structure, order, or predictability in life change throughout the process of overcoming this event? Were there times when your life felt less predictable or that you had lost your sense of order or stability in life?
6. How did your goals, or sense of direction in life change throughout the process of overcoming this event?
7. How did your sense of worth or significance change throughout the process of overcoming this event?
8. Immediately after the event (hours, days), what did you do to cope? How did you think about the event?
9. In the weeks or months following the event, what did you do to cope? How did you think about the event?
10. At what point did you feel you had successfully overcome the event? Approximately how long did it take to get to this point, and what did you notice had changed that made you believe you had overcome it?
11. How do you view your life now that you have overcome this event in terms of its stability, order, or predictability? In terms of goals/life direction? In terms of worth/significance?
12. Are you aware of any sequence in the stages/phases of how you typically cope with challenging/adverse events in life?
13. How would you say your perception of meaning in your life changed immediately after the event, throughout your process of coping with it, and once you had successfully overcome it?

*Note: These are a rough guideline for a semi-structured interview, which will include a variety of prompts, clarifications, and follow-up questions as needed.

Appendix C – Study 1 Debriefing Form

Dear Participant,

Thank you for your participation in this interview.

Contact Information

Should you have any further questions, please do not hesitate to contact any of the following individuals:

Hillary Jones (Clinical psychology PhD student): hjones@lakeheadu.ca

Dr. Mirella Stroink (Associate professor of psychology): mstroink@lakeheadu.ca

Additional Support

If any aspect of having participated in this study has been distressing, please do not hesitate to reach out to any of the following services for additional support:

      Ontario Mental Health Helpline: 1-866-531-2600
      Canadian Mental Health Association Crisis Response Services:
      (807)-346-8282 or 1-888-269-3100

Study Information

The aim of the study is to gather experiential evidence of the processes involved in making meaning in life following a challenging event. This is the first of several steps towards testing the utility of applying the adaptive cycle of change to the processes of meaning making. The adaptive cycle consists of four phases: exploitation, conservation, release, and reorganization, and has been broadly applied in many fields as a framework for understanding cyclical change in systems. The current study is exploring whether these same four phases emerge from the descriptions that individuals give regarding the process of overcoming adversity that may challenge existing meaning frameworks in their life, pushing them towards developing a new meaning framework.

Additional studies will follow this current phase of research with the hopes of working towards developing a self-report questionnaire evaluating the process of meaning making within an adaptive cycle framework.

For questions or concerns regarding the ethics of this research, please contact Sue Wright at the Research Ethics Board at 807-343-8283 or research@lakeheadu.ca.

Thank you again for your participation.

Regards,

Hillary Jones, M.Sc. hjones@lakeheadu.ca
Department of Psychology, Lakehead University

Dr. Mirella Stroink, Ph.D. mstroink@lakeheadu.ca
Professor, Department of Psychology, Lakehead University

Appendix D – Adaptive Cycle of Meaning Making (ACMM)

Think back to the **moderately stressful life event** you wrote about at the beginning of your participation in this study. Please rate how much you agree with each of the following statements **right now**, in this moment. There are no right or wrong answers. Please answer according to the scale below:

<u>7-point Likert scale</u>
1. Strongly disagree
2. Disagree
3. Slightly disagree
4. Mixed or neither agree nor disagree
5. Slightly agree
6. Agree
7. Strongly agree

1. I have a new focus in my life. (Growth)
2. My life feels very settled. (Conservation)
3. I feel like I'm falling apart. (Release)
4. I am reorganizing my life. (Reorganization)
5. A weight has been lifted off my shoulders. (Growth)
6. I have some established routines in my life. (Conservation)
7. My life feels out of control. (Release)
8. I am trying lots of different solutions after a challenge in my life. (Reorganization)
9. I have a new sense of understanding in my life. (Growth)
10. I feel comfortable in my life. (Conservation)
11. I am losing something important to me. (Release)
12. I am in a time of transition. (Reorganization)
13. I am in a period of personal growth. (Growth)
14. There is a lot of consistency in my life. (Conservation)
15. My life feels unpredictable. (Release)
16. I am open to new possibilities. (Reorganization)
17. I feel reinvigorated and/or rejuvenated. (Growth)
18. My life has a clear purpose. (Conservation)
19. I have lost my direction in life. (Release)
20. I am trying to make sense of a difficult experience. (Reorganization)
21. I feel stuck in my life. (Rigidity Trap – Conservation)

Scoring: Sum items in each of the 4 phases.

Appendix E – Study 2 Information and Consent Form

Letter of Information & Consent for Potential Participants

Dear Potential Participant:

You are invited to participate in an online study about meaning, stress, and well-being. Taking part in this study is voluntary. Before you decide whether or not you would like to take part in this study, please read this letter carefully to understand what is involved. After you have read the letter, please ask any questions you may have.

PURPOSE
The purpose of this study is to explore the relationship between people's perception of meaning in life, stress, and their overall sense of well-being. The proposed study is testing the psychometric properties (i.e., reliability/validity/factor structure) of a newly developed questionnaire that looks at an individual's relative positioning along four phases believed to be implicated in the processes of making meaning in life. This study is being conducted by Hillary Jones, a clinical psychology PhD student, under the supervision of Dr. Mirella Stroink.

WHAT INFORMATION WILL BE COLLECTED?
Participation in the study will involve completing several questionnaires about your perceptions of stress, meaning, and well-being. Responses will not be analyzed individually, but only as a group after identifying information has been removed. Data will be combined in any presentation or publication so no individual responses will be identifiable.

WHAT IS REQUESTED OF ME AS A PARTICIPANT?
If you choose to participate, you will be invited to complete a series of online questionnaires that ask about your perceptions of meaning in life, stress, and well-being. Participation is estimated to take approximately 20-30 minutes.

WHAT ARE MY RIGHTS AS A PARTICIPANT?
If you choose to participate you, these are your rights:
- You are under no obligation to participate, are free to withdraw at any time, until you have submitted your responses, without prejudice to pre-existing entitlements
- Your decision to participate will not affect your academic status/employment
- You will be given, in a timely manner throughout the course of the research project, information that is relevant to their decision to continue or withdraw from participation
- You will be allowed to withdraw your responses at any time by exiting the survey platform before clicking to submit your responses. Once your responses are submitted, they cannot be withdrawn.

WHAT ARE THE RISKS AND BENEFITS?
Participation in this study involves only minimal risk. However, it is possible that you may find some of the questions distressing. Following your participation, you will be provided with

resources to help you cope with any potential distress that may have arisen from your participation in this study.

Participants are not expected to benefit significantly from this study; however, it is possible some participants may experience positive emotions as a result of reflecting on their sense of meaning, self-esteem, or well-being. Society may benefit from this study through its contribution to the scientific understanding of meaningfulness. If the new scale that is being tested is found to have adequate psychometric properties, it could enable to future research on the dynamic processes of meaning making. This might lead to improved understanding of how to facilitate meaning making and therefore individual well-being. In appreciation for your participation, you will be given the option of providing contact information to be entered into a draw for a $20 Chapters gift card.

HOW WILL MY CONFIDENTIALITY BE MAINTAINED?
All data will be stored electronically without any identifying information and only researchers (Hillary Jones and Dr. Mirella Stroink) will be able to access it. Data will be combined in any presentation or publication so no individual responses will be identifiable.

Please note that the online survey tool used in the study, Survey Monkey, is hosted by a server located in the USA. The US Patriot Act permits U.S. law enforcement officials, for the purpose of anti-terrorism investigation, to seek a court order that allows access to the personal records of any person without the person's knowledge. In view of this we cannot absolutely guarantee the full confidentiality and anonymity of your data. With your consent to participate in this study, you acknowledge this.

WHAT WILL MY DATA BE USED FOR:
There is no intention for commercialized use of these research findings. The intended use of data is limited to academic publication and presentation of data findings. Only the research team (Hillary Jones and Dr. Mirella Stroink) will have access to the data.

WHERE WILL MY DATA BE STORED?
Data will be stored electronically on a password protected computer. Data will be kept for a minimum of 5 years following the completion of the project.

HOW CAN I RECEIVE A COPY OF THE RESEARCH RESULTS?
Participants will not be directly identified in the dissemination of results. If you would like to receive a copy of the results following completion of the project, you can request it from Hillary Jones (hjones@lakeheadu.ca).

WHAT IF I WANT TO WITHDRAW FROM THE STUDY?
You are free to withdraw from the study at any point until you have submitted your responses. To withdraw from the study, you simply need to close the web browser before submitting your responses at the end of the surveys. Once you have submitted surveys, data will be separated from identifying information and cannot be withdrawn.

RESEARCHER CONTACT INFORMATION:
Should you have any further questions, please do not hesitate to contact any of the following individuals:

       Hillary Jones: hjones@lakeheadu.ca

       Dr. Mirella Stroink: mstroink@lakeheadu.ca

There are no real, potential, or perceived conflicts of interest on the part of the researchers involved in this project.

RESEARCH ETHICS BOARD REVIEW AND APPROVAL:
This research study has been reviewed and approved by the Lakehead University Research Ethics Board. If you have any questions related to the ethics of the research and would like to speak to someone outside of the research team, please contact Sue Wright at the Research Ethics Board at 807-343-8283 or research@lakeheadu.ca.

<div align="center">

Consent Form for Potential Participants

</div>

MY CONSENT:
I agree to the following:

- ✓ I have read and understand the information contained in the Information Letter
- ✓ I agree to participate
- ✓ I understand the risks and benefits to the study
- ✓ That I am a volunteer and can withdraw from the study at any time prior to submitting my responses, and may choose not to answer any question
- ✓ That the data will be securely stored electronically on a password protected computer for a minimum period of 5 years following completion of the research project
- ✓ I understand that the research findings will be made available to me upon request
- ✓ I will remain anonymous
- ✓ All of my questions have been answered

By consenting to participate, I have not waived any rights to legal recourse in the event of research-related harm.

For anonymous surveys:

I have read and agree to the above information and by completing and submitting this survey, agree to participate.

Appendix F – Meaning in Life Questionnaire

Meaning in Life Questionnaire (MLQ)
Please take a moment to think about what makes your life feel important 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:

      <u>7-point Likert scale</u>
1= Absolutely untrue
2= Mostly untrue
3= Somewhat untrue
4= Can't say true or false
5= Somewhat true
6= Mostly true
7= Absolutely true

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.

Appendix G – Flourishing Scale

The Flourishing Scale
Below are 8 statements with which you may agree or disagree. Using the 1–7 scale below,
indicate your agreement with each item by indicating that response for each statement.

     <u>7-point Likert scale</u>
     1= Strongly disagree
     2= Disagree
     3= Slightly disagree
     4= Mixed or neither agree nor disagree
     5= Slightly agree
     6= Agree
     7= Strongly agree

1. I lead a purposeful and meaningful life.
2. My social relationships are supportive and rewarding.
3. I am engaged and interested in my daily activities.
4. I actively contribute to the happiness and well-being of others.
5. I am competent and capable in the activities that are important to me.
6. I am a good person and live a good life.
7. I am optimistic about my future.
8. People respect me.

Appendix H – Riverside Life Satisfaction Scale

Riverside Life Satisfaction Scale
Please rate your agreement with each of the statements below. Use the 7-point scale provided.
<u>7-point Likert scale</u>
1 = strongly disagree
2 = moderately disagree
3 = slightly disagree
4 = neither agree nor disagree
5 = slightly agree
6 = moderately agree
7 = strongly agree

1. I like how my life is going.
2. If I could live my life over, I would change many things.
3. I am content with my life.
4. Those around me seem to be living better lives than my own.
5. I am satisfied with where I am in life right now.
6. I want to change the path my life is on.

Appendix I – Scale of Positive and Negative Experiences

Scale of Positive and Negative Experiences
Please think about what you have been doing and experiencing today. Then report how much you experienced each of the following feelings, using the scale below. For each item, select a number from 1 to 5.
1 = very rarely or never
2 = rarely
3 = sometimes
4 = often
5 = very often or always

1. Positive
2. Negative
3. Good
4. Bad
5. Pleasant
6. Unpleasant
7. Happy
8. Sad
9. Afraid
10. Joyful
11. Angry
12. Contented

Appendix J – Perceived Stress Scale

Perceived Stress Scale – modified to one week timeframe
The questions in this scale ask you about your feelings and thoughts over the past **week**. In each case, you will be asked to indicate your response by selecting the appropriate number on the scale below representing HOW OFTEN you felt or thought a certain way. Although some of the questions are similar, there are differences between them and you should treat each one as a separate question. The best approach is to answer fairly quickly. That is, don't try to count up the number of times you have felt a particular way, but rather indicate the alternative that seems like a reasonable estimate.
0 = never
1 = almost never
2 = sometimes
3 = fairly often
4 = very often

1. In the last week, how often have you been upset because of something that happened unexpectedly?
2. In the last week, how often have you felt that you were unable to control the important things in your life?
3. In the last week, how often have you felt nervous or "stressed"?
4. In the last week, how often have you dealt successfully with irritating life hassles?
5. In the last week, how often have you felt that you were effectively coping with important changes that were occurring in your life?
6. In the last week, how often have you felt confident in your ability to handle your personal problems?
7. In the last week, how often have you felt that things were going your way?
8. In the last week, how often have you found that you could not cope with all the things that you had to do?
9. In the last week, how often have you been able to control irritations in your life?
10. In the last week, how often have you felt that you were on top of things?
11. In the last week, how often have you been angered because of things that happened that were outside of your control?
12. In the last week, how often have you found yourself thinking about things that you have to accomplish?
13. In the last week, how often have you been able to control the way you spend your time?
14. In the last week, how often have you felt difficulties were piling up so high that you could not overcome them?

Perceived Stress Scale – Original Wording (One-Month Timeframe)
The questions in this scale ask you about your feelings and thoughts over the past **month**. In each case, you will be asked to indicate your response by selecting the appropriate number on the scale below representing HOW OFTEN you felt or thought a certain way. Although some of the questions are similar, there are differences between them and you should treat each one as a separate question. The best approach is to answer fairly quickly. That is, don't try to count up the

number of times you have felt a particular way, but rather indicate the alternative that seems like a reasonable estimate.

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?
2. In the last month, how often have you felt that you were unable to control the important things in your life?
3. In the last month, how often have you felt nervous or "stressed"?
4. In the last month, how often have you dealt successfully with irritating life hassles?
5. In the last month, how often have you felt that you were effectively coping with important changes that were occurring in your life?
6. In the last month, how often have you felt confident in your ability to handle your personal problems?
7. In the last month, how often have you felt that things were going your way?
8. In the last month, how often have you found that you could not cope with all the things that you had to do?
9. In the last month, how often have you been able to control irritations in your life?
10. In the last month, how often have you felt that you were on top of things?
11. In the last month, how often have you been angered because of things that happened that were outside of your control?
12. In the last month, how often have you found yourself thinking about things that you have to accomplish?
13. In the last month, how often have you been able to control the way you spend your time?
14. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

Appendix K – Life Orientation Test – Revised

Life Orientation Test – Revised

Please indicate how much you agree with each of the following statements using the scale below. Please be as accurate and honest as you can throughout, and try not to let your answer to one question influence your answer to another question. There are no right or wrong answers.
0 = strongly disagree
1 = disagree
2 = neutral
3 = agree
4 = strongly agree

1. In uncertain times, I usually expect the best.
2. It's easy for me to relax.
3. If something can go wrong for me, it will.
4. I'm always optimistic about my future.
5. I enjoy my friends a lot.
6. It's important for me to keep busy.
7. I hardly ever expect things to go my way.
8. I don't get upset too easily.
9. I rarely count on good things happening to me.
10. Overall, I expect more good things to happen to me than bad.

Appendix L – Rosenberg Self-Esteem Scale

Rosenberg Self-esteem Scale (RSES)
Please record the appropriate answer for each item, depending on whether you strongly agree, agree, disagree, or strongly disagree with it.
> <u>4-point Likert scale</u>
>> 1. Strongly agree
>> 2. Agree
>> 3. Disagree
>> 4. Strongly disagree

1. On the whole, I am satisfied with myself.
2. At times I think I am no good at all.
3. I feel that I have a number of good qualities.
4. I am able to do things as well as most other people.
5. I feel I do not have much to be proud of.
6. I certainly feel useless at times.
7. I feel that I'm a person of worth.
8. I wish I could have more respect for myself.
9. All in all, I am inclined to think that I am a failure.
10. I take a positive attitude toward myself.

Appendix M – Study 2 Debriefing Form

Dear Participant,

Thank you for participating in this study. Should you have any further questions, please do not hesitate to contact any of the following individuals:

> Hillary Jones (Clinical psychology PhD student): hjones@lakeheadu.ca
> Dr. Mirella Stroink (Associate professor of psychology): mstroink@lakeheadu.ca

Additional Support

If any aspect of having participated in this study has been distressing, please do not hesitate to reach out to any of the following services for additional support:

> Lakehead University Student Health and Wellness: 807 343-8316
> Ontario Mental Health Helpline: 1-866-531-2600
> Canadian Mental Health Association Crisis Response Services:
> (807)-346-8282 or 1-888-269-3100

Study Information

The purpose of this study is to explore the relationship between people's perception of meaning in life, stress, and their overall sense of well-being. The aim of this study is to gather empirical evidence to test the psychometric properties of a newly proposed scale evaluating meaning making processes through an adaptive cycle framework. The adaptive cycle consists of four phases: growth, conservation, release, and reorganization, and has been broadly applied in many fields as a framework for understanding cyclical change in systems. The current study is exploring whether these same four phases are supported by empirical data in participants' reports of meaning-making.

Ethics

For questions or concerns regarding the ethics of this research, please contact Sue Wright at the Research Ethics Board at 807-343-8283 or research@lakeheadu.ca.

Thank you,

Hillary Jones, M.Sc.
Department of Psychology, Lakehead University
hjones@lakeheadu.ca

Dr. Mirella Stroink, Ph.D.
Professor, Department of Psychology, Lakehead University
mstroink@lakeheadu.ca

Appendix N – Study 3 Information and Consent Form

Letter of Information & Consent for Potential Participants
Dear Potential Participant:

You are invited to participate in a study about meaning, stress, and well-being. Taking part in this study is voluntary. Before you decide whether or not you would like to take part in this study, please read this letter carefully to understand what is involved. After you have read the letter, please ask any questions you may have.

PURPOSE
The purpose of this study is to explore the relationship between people's perception of meaning in life, stress, and their overall sense of well-being and how these change over time. This study is being conducted by Hillary Jones, a clinical psychology PhD student, under the supervision of Dr. Mirella Stroink.

WHAT INFORMATION WILL BE COLLECTED?
Participation in the study will involve completing a brief questionnaire about how you feel about your life in that moment. You will be asked to complete the same questionnaire 26 times over a period of roughly 2 months. In order to assign bonus points after you have participated, you will need to provide your name and Lakehead email address. This information will be deleted before any analyses are done and will be kept separately from their data.

WHAT IS REQUESTED OF ME AS A PARTICIPANT?
If you choose to participate, you will be asked to download an app called Expimetrics on your iOS or Android device. All aspects of participation will be completed through this app.

On your first completion of the questionnaire, you will be asked to provide a brief written description (at least 1 word, up to a maximum of 100 words) of a current moderate stressor in your life (roughly 3-5 out of 10 on a subjective stress scale, where 10 is the most stressful event you can imagine). This information will be used to broadly qualify the nature of your stressful event (e.g., social, academic, work-related, etc.). You can provide as much of as little detail as you feel comfortable giving about the nature of the stressful event. You will not be asked to provide specific identifying information (e.g., people's names). You will be asked to think about this same moderate stressor each time you complete the questionnaire. After providing this description, you will then be asked to complete 7 questionnaires, taking 10 minutes altogether.

One of these is a brief 21-item questionnaire about how you feel about this moderate stressor in that moment. You will be asked to repeat this questionnaire multiple times over a period of two months, each time thinking about this same moderate stressor. Each completion of this 21-item questionnaire is estimated to take approximately 2 minutes and will be repeated 26 times over 2 months for a total of 52 minutes.

You will be prompted to complete the 21-item questionnaire on the following schedule:

- 7 times a day for 2 days, (at 9am, 11am, 1pm, 3pm, 5pm, 7pm, and 9pm) followed by
- once a day for 1 week, followed by
- once a week for 3 weeks, followed by
- every 2 weeks for 4 weeks.
(each completion will take approximately 2 minutes)

During your last completion of the questionnaire, you will be asked to complete the same 7 brief questionnaires and provide a brief written description of the same moderate stressor in your life (at least 1 word, up to a maximum of 100 words). This final completion will take roughly 10 minutes. Thus, the total time commitment of this study is approximately 75 minutes.

WHAT ARE MY RIGHTS AS A PARTICIPANT?
If you choose to participate you, these are your rights:
- You are under no obligation to participate, are free to withdraw at any time, until you have submitted your responses, without prejudice to pre-existing entitlements
- Your decision to participate will not affect your academic status/employment
- You will be given, in a timely manner throughout the course of the research project, information that is relevant to their decision to continue or withdraw from participation
- You will be allowed to withdraw your responses at any time by exiting the survey platform before clicking to submit your responses. Once your responses are submitted, they cannot be withdrawn.

WHAT ARE THE RISKS AND BENEFITS?
Participation in this study involves only minimal risk. However, it is possible that you may find it distressing to repeatedly think back to a moderately stressful event. Following your participation, you will be provided with resources to help you cope with any potential distress that may have arisen from your participation in this study.

By participating in this study, you will also have the opportunity to be exposed to Ecological Momentary Assessment as a research method. This method involves repeatedly completing the same survey at prompted time intervals (schedule provided above). If you are enrolled in a psychology course that has the opportunity for bonus points for research participation, full participation in this study will make you eligible to receive **TWO** bonus points through SONA. Note, full participation means completing a minimum of 85% of the prompts to complete the questionnaire (22 out of the 26 prompts). If you complete a minimum of 50% of the prompted surveys (13/26) you will be eligible for **ONE** bonus point. In order to receive your bonus points, you will have to provide researchers with your name/Lakehead email address so the bonus points can be assigned to you through SONA. Dr. Stroink will not have access to this identifying information. **NOTE:** each time you are prompted by the Expimetrics app to complete a survey, you need to do so within **20 minutes**, or the survey will close.

If you experience any distressing thoughts or emotions from participating in this study, please contact one of the supports below:

Lakehead University Student Health and Wellness: 807 343-8361 (Thunder Bay); 705-330-4008 ext. 2116 (Orillia)
Ontario Mental Health Helpline: 1-866-531-2600
Canadian Mental Health Association Crisis Response Services:
(807)-346-8282 or 1-888-269-3100

HOW WILL MY CONFIDENTIALITY BE MAINTAINED?
All data will be stored electronically and only researchers (Hillary Jones and Dr. Mirella Stroink) will be able to access it. Identifying information will be deleted once bonus points are assigned through SONA. No analyses will be conducted prior to removing identifying information. Responses will not be analyzed individually, but only as a group after identifying information has been removed. Data will be combined in any presentation or publication so no individual responses will be identifiable.

Please note that the online survey tool used in the study, Expimetrics, is hosted by a server located in the USA. The US Patriot Act permits U.S. law enforcement officials, for the purpose of anti-terrorism investigation, to seek a court order that allows access to the personal records of any person without the person's knowledge. In view of this we cannot absolutely guarantee the full confidentiality and anonymity of your data. With your consent to participate in this study, you acknowledge this.

WHAT WILL MY DATA BE USED FOR:
There is no intention for commercialized use of these research findings. The intended use of data is limited to academic publication and presentation of data findings. Only the research team (Hillary Jones and Dr. Mirella Stroink) will have access to the data.

WHERE WILL MY DATA BE STORED?
Data will be stored electronically on a password protected computer. Data will be kept for a minimum of 5 years following the completion of the project.

HOW CAN I RECEIVE A COPY OF THE RESEARCH RESULTS?
Participants will not be directly identified in the dissemination of results. If you would like to receive a copy of the results following completion of the project, you can request it from Hillary Jones (hjones@lakeheadu.ca).

WHAT IF I WANT TO WITHDRAW FROM THE STUDY?
You are free to withdraw from the study at any point until the end of the two-month protocol. Once you have submitted survey responses, you cannot withdraw them. To stop participating in the study, you can simply stop completing prompted questionnaires, ignore any subsequent requests to complete surveys, and delete the Expimetrics app off your phone.

RESEARCHER CONTACT INFORMATION:
Should you have any further questions, please do not hesitate to contact any of the following individuals:

Hillary Jones: hjones@lakeheadu.ca
Dr. Mirella Stroink: mstroink@lakeheadu.ca
There are no real, potential, or perceived conflicts of interest on the part of the researchers involved in this project.

RESEARCH ETHICS BOARD REVIEW AND APPROVAL:
This research study has been reviewed and approved by the Lakehead University Research Ethics Board. If you have any questions related to the ethics of the research and would like to speak to someone outside of the research team, please contact Sue Wright at the Research Ethics Board at 807-343-8283 or research@lakeheadu.ca.

Consent Form for Potential Participants

MY CONSENT:
I agree to the following:
- ✓ I have read and understand the information contained in the Information Letter
- ✓ I agree to participate
- ✓ I understand the risks and benefits to the study
- ✓ That I am a volunteer and can withdraw from the study at any time until submitting my surveys, and may choose not to answer any question
- ✓ That the data will be securely stored electronically on a password protected computer for a minimum period of 5 years following completion of the research project
- ✓ I understand that the research findings will be made available to me upon request
- ✓ I will remain anonymous
- ✓ All of my questions have been answered

By consenting to participate, I have not waived any rights to legal recourse in the event of research-related harm.

For anonymous surveys:

I have read and agree to the above information and by completing and submitting this survey, agree to participate.

Appendix O – Identifying a Moderate Life Stressor

Moderate Life Stressor

Please think about a moderately stressful event in your life currently. If you were to rate how stressful this event is on a scale from 0-10, 0 being not at all stressful, 10 being the most stressful event imaginable, this event would fall around 3-5/10. Some examples of life events that might be moderately stressful are starting a new job or school program, experiencing a challenge in an important relationship/friendship, questioning your career path, or moving to a new city.

In the space below, please briefly describe a moderately stressful current event in your life. (at least 1 word, max. 100 words).

Appendix P – Modified Perceived Stress Scale

Perceived Stress Scale - Modified
The questions in this scale ask you about your feelings and thoughts **about the moderately stressful event you just described**. In each case, you will be asked to indicate your response by selecting the appropriate number on the scale below representing **HOW OFTEN** you felt or thought a certain way.
0 = never
1 = almost never
2 = sometimes
3 = fairly often
4 = very often

1. Been upset because of this event?

2. Felt that you were unable to control aspects of this event?

3. Felt nervous or "stressed" about this event?

4. Dealt successfully with aspects of this event?

5. Felt that you were effectively coping with this event?

6. Felt confident in your ability to handle this event?

7. Felt that things were going your way?

8. Found that you could not cope with all the things that you had to do about this event?

9. Been able to control irritations in your life relating to this event?

10. Felt that you were on top of things regarding this event?

11. Been angered because of things that happened relating to this event that were outside of your control?

12. Found yourself thinking about things that you have to accomplish relating to this event?

13. Been able to control the way you spend your time?

14. Felt difficulties relating to this event were piling up so high that you could not overcome them?

Appendix Q – Available Supports Message

Available Supports
Thank you for completing your first round of surveys for this Experience Sampling study on changes in meaning-making, well-being, and stress over time. If any aspect of having participated in this study has been distressing, please do not hesitate to reach out to any of the following services for additional support:

Lakehead University Student Health and Wellness: 807 343-8316

Ontario Mental Health Helpline: 1-866-531-2600

Canadian Mental Health Association Crisis Response Services:

(807)-346-8282 or 1-888-269-3100

Your next notification to complete another survey will arrive shortly.

Appendix R – Study 3 Debriefing Form

Dear Participant,

Thank you for participating in this study. Should you have any further questions, please do not hesitate to contact any of the following individuals:

 Hillary Jones (Clinical psychology PhD student): hjones@lakeheadu.ca
 Dr. Mirella Stroink (Associate professor of psychology): mstroink@lakeheadu.ca

Additional Support

If any aspect of having participated in this study has been distressing, please do not hesitate to reach out to any of the following services for additional support:

 Lakehead University Student Health and Wellness: 807 343-8361 (Thunder Bay);
 705-330-4008 ext. 2116 (Orillia)
 Ontario Mental Health Helpline: 1-866-531-2600
 Canadian Mental Health Association Crisis Response Services:
 (807)-346-8282 or 1-888-269-3100

Study Information

The aim of this study is to gather empirical evidence to test the psychometric properties of a newly proposed scale evaluating meaning making processes through an adaptive cycle framework. The adaptive cycle consists of four phases: growth, conservation, release, and reorganization, and has been broadly applied in many fields as a framework for understanding cyclical change in systems. The current study is exploring whether these same four phases are supported by empirical data in participants' reports of meaning-making.

Ethics

For questions or concerns regarding the ethics of this research, please contact Sue Wright at the Research Ethics Board at 807-343-8283 or research@lakeheadu.ca.

Thank you,

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