Eastern Illinois University

The Keep

Fall 2020

Relationship between One's Motive for Curiosity and Meaning in Life

Charles Reither
Eastern Illinois University

Relationship between One's Motive for Curiosity and Meaning in Life

Charles Reither

Eastern Illinois University

Abstract

Meaning in life as a psychological construct has many demonstrated benefits for psychological well-being and optimal functioning (Steger, 2013), and the treatment of clinical populations (Thir & Batthyány, 2016). This study investigated in greater detail than is currently available in the psychological literature how meaning in life is related to curiosity. Meaning in life was explored using top-down (the presence of and the search for meaning) and bottom-up (the specific sources of meaning) approaches. Curiosity was examined in its two motivation-based forms: curiosity motivated by the anticipation and enjoyment of discovery (an appetitive interest-type of curiosity) and curiosity motivated by a need to reduce uncertainty by filling in worrisome gaps in knowledge (a deprivation-type anxiety-reducing type of curiosity).

Data were obtained from an Amazon Mechanical Turk sample of 190 participants. The two types of curiosity were not associated with the presence of meaning in life. However, deprivation-type curiosity was more strongly related to the search for meaning in life than interest-type curiosity. While both types of curiosity were positively related to an overall endorsement of sources of meaning in life, interest-type curiosity was specifically more related to self-transcendence and achievement as sources of meaning and negatively related to intimacy and religion. Deprivation-type curiosity was related to greater self-transcendence as a meaning source. This study adds to the existing literature by demonstrating how the relationship between curiosity and meaning in life does depend on the motives for one's curiosity.

Table of Contents

Relationship between One's Motive for Curiosity and Meaning in Life

Finding meaning in life is simultaneously an intimately personal journey and a lofty aim shared by most, if not all, of humanity. The benefits of understanding one's life as meaningful are vast, from the comfort of knowing that the indignities, toil, and pain accompanying our existence are not endured in vain (Kang et al., 2009), to illuminating one's path forward amidst a life's worth of difficult decisions and a world of ever-increasing complexity (Baumeister & Vohs, 2002). Having a sense of meaning endows individuals with a lens through which they might interpret the world and themselves, and provides a source of stability and peace by resolving comprehension from the disorder of daily life (Park & Folkman, 1997). In particular, individuals grappling with external and psychological challenges stand to benefit considerably from attaining and maintaining a sense of meaning (Vos, Craig & Cooper, 2015; Miao, Zheng & Gan, 2017). Viktor Frankl demonstrated the utility of psychotherapy interventions promoting meaning in life (Thir & Batthyány, 2016), thus paving the way with his logotherapy for the application of the scientific method to meaning in life. It is, therefore, essential to identify antecedents of a sense of meaning in life.

Early efforts to examine the relationship between curiosity and meaning in life have demonstrated that curiosity that is motivated by an anticipated enjoyment of discovering new information and experiences (called 'appetitive interest-type curiosity') is associated with higher levels of perceived presence of meaning in daily life (Kashdan & Steger, 2007; Steger, Kashdan, Sullivan, & Lorentz, 2008). Investigations into curiosity have also identified another motive for being curious, called 'deprivation-type uncertainty reducing curiosity.' This is curiosity driven by a desire to reduce the negative arousal caused by uncertainty and novel stimuli (Litman, 2008). The present study aimed to compare the roles of these two motives for curiosity in

fostering meaning in life. More specifically, which motive for curiosity is: 1) more predictive of perceived presence of meaning in life; 2) better at predicting search for meaning in life, and; 3) more associated with the various sources of meaning in life. Interventions aimed at stimulating curiosity are abundant within educational and cognitive psychology, but the clinical value of curiosity has yet to be explored in depth. The current study examined if specific motives of curiosity might be influential in the attainment of meaning in life.

Meaning in Life and its Benefits

Meaning in life, within the context of psychological investigations and interventions, refers to how each of us finds something significant in ourselves, others, and the world, what sorts of things that we attach significance to, and how this process functions or benefits us. A very straightforward approach to meaning starts with the concept that "meaning is relation"; it connects "things to other things in expected ways, anything and any way that things can be connected" (Heine, Proulx, & Vohs, 2006). This includes parts of the self (thoughts, behaviors, and abilities, for instance), elements of the outside world (by cause-effect relationships, category membership, etc.), and what connects the self to the world around us (Heine et al., 2006). Many theories assert that people use these connections and associations to build what has been termed a "framework" (Debats, 1990), set of schemas (Janoff-Bulman, 1989), "global meaning" (Reker & Wong, 1988) or "life schemes" (Thompson & Janigian, 1988), in other words, a broad, unifying meaning construct. This larger meaning construct does more than simply organize all connections and relationships a person perceives; it enables a person to view life in such a way "that provides a sense of purpose or direction" to be followed in the pursuit of fulfillment (Mascaro & Rosen, 2008). According to Proulx and Inzlicht (2012), these meanings might also provide a "teleological account of our experiences"; why things happen and what purpose these

events might serve in some scheme higher than or beyond the control of the individual (such as "will" of fate, nature or a deity).

The "sense of coherence" model of meaning in life (Antonovsky. 1993) proposes that meaning in life arises from the extent that one judges both the world and one's own life in context, to be "comprehensible", "manageable" and "meaningful". "Comprehensibility" is the cognitive component, referring to the strength of one's belief that they and the world are understandable, consistent, and predictable. "Manageability" is the behavioral or problem-solving component, describing the confidence one has in one's ability to deal with anticipated demands posed by themselves and the world. "Meaningfulness" is the emotional or motivational component that describes how much one feels that the demands expected are "challenges worthy of time, effort and engagement" (Chiesi, Bonacchi, Primi, Toccafondi, & Miccinesi, 2018).

Conceptually similar, the "assumptive worlds" approach to meaning in life (Janoff-Bulman, 1989) proposes that each person constructs a unique representation of the world using three categories of assumptions: benevolence, meaningfulness, and worthiness. "Benevolence" categorizes assumptions concerning the ratio of positive to negative outcomes. It answers questions like "are most of the events which take place in the world good or bad?", "are people good or bad in general?" It provides the individual with a general idea of how frequently they should expect good or bad things to happen to them. "Meaningfulness" describes how one assumes these outcomes are distributed and whether their behavior can influence this distribution. People can believe good and bad outcomes happen to "deserving" people according to their character or behavior (justice), according to chaos, or some mixture of the two. They may or may not assume that specific precautionary or anticipatory actions "reduce one's vulnerability" to adverse outcomes to a varying degree (controllability). "Worthiness" describes

one's assumptions about their vulnerability based on their character and behavior as it relates to the two previous categories, i.e., "I am a moral or well-prepared person, it is reasonable to expect better outcomes in general", or "My conduct is often harmful or selfish; however, opportunities and rewards are randomly distributed in the world so I will not experience any more difficulty or tragedy than others."

The "tripartite" view of meaning in life (George & Park, 2017, Martela & Steger, 2016) bears a strong resemblance to both preceding concepts (sense of coherence, assumptive worlds) in terminology, theorizing that meaning is comprised of "coherence", "comprehension", "purpose" and "significance"/"mattering". It focuses more on the individual, emphasizing the importance of judgments made regarding the value of one's own life and one's impact on the world. These judgments then endow certain aspects of one's life (goals, personal value, or worth) with meaning in the context of their world. For example, "purpose" addresses how much one's life is "directed and motivated by valued life goals", and "mattering" describes the significance and impact one's life has on the world. As such, the tripartite approach differs from the "sense of coherence" and "assumptive worlds" theories, as those are primarily concerned with how individuals use their own experiences and wisdom to create understanding about the world, a world they can then connect to more fully to find meaning.

There are considerable theoretical and empirically-demonstrated benefits associated with the understanding and conviction that one's life is meaningful. From a theoretical perspective, meaning as a framework that "imposes a coherent structure on events" allows people to make sense of a confusing world. They can then better determine whether their efforts are moving them in a beneficial or detrimental direction relative to the world and make adjustments to their lives as necessary (Baumeister & Vohs, 2002). Meaning in life is thought to "reduce the

perceived strain of life" through "existential healing", according to Antonovsky's salutogenesis theory (1987); it improves one's ability to manage health and avoid stress-related health complications (Ventegodt, Omar, & Merrick, 2011). Viktor Frankl theorized that the search to find meaning is the "primary motivational force in man", resulting in the creation and resolution of tension generated by life's challenging circumstances and striving towards one's goals. The recurring experience of fulfilling one's meaning through process provides resilience in the face of adverse life events, robust life satisfaction, and resources to cope with fear and anxiety (Frankl, 1963).

Psychological investigations have demonstrated considerable support for the theorized significance of meaning in life as a contributor to psychological well-being. Meaning in life is associated with lower levels of depressive symptoms and a greater likelihood of experiencing hope in both non-clinical populations (Mascaro & Rosen, 2005; 2006) and individuals living with heart failure (Sacco, Park, Suresh & Bliss, 2014). Lower levels of meaning in life are positively associated with depression and anxiety (Debats, van der Lubbe, & Wezeman, 1993) and a greater need for therapy (Battista & Almond, 1973). People with more meaning in their lives tend to experience less stress, hostility, and aggression (Steger, et al., 2008; Frenz, Carey, & Jorgensen, 1993). It is associated with a greater likelihood of engaging in proactive coping strategies (Miao, Zheng, & Gan, 2017), with reduced psychological distress, the experience of positive affect, and life satisfaction across a broad range of populations (Schnell, 2009; Zika & Chamberlain, 1992; Steger, Oishi & Kesebir, 2011) including adolescents experiencing significant life stress (Moksnes & Haugan, 2015) and Chinese students experiencing acculturative stress while studying abroad (Pan, Wong, Chan, & Joubert, 2008). Following

exposure to a traumatic event, meaning in life is associated with more frequent pro-social helping behaviors (Frazier et al., 2013).

Meaning in life is an essential dimension of mental health treatment. It may serve to reduce the impact of mental illness stigma on the quality of life for individuals receiving mental health treatment (Świtaj et al., 2017). Addictions are thought to impair one's ability to form positive meaning in their life (Singer, Singer & Berry, 2013) and findings have shown that higher levels of meaning are associated with increased functioning and quality of life in those who have managed long-term recovery from an addiction (Hart & Singh, 2009). For individuals experiencing addiction (Singer, Singer & Berry, 2013), meaning-based group therapy interventions have been shown to have benefits exceeding treatment as usual, particularly in increasing self-efficacy and reducing levels of psychopathology (Vos, Craig & Cooper, 2015). In individuals with serious mental illnesses such as schizophrenia and bipolar disorder, perceived meaning in life is associated with the perception of control over one's life and ability to make improvements to one's quality of life (Strack & Schulenberg, 2009).

The advantages of meaning in life may extend beyond psychological health. A review of findings from numerous nursing and public health studies indicate that high meaningfulness was correlated with various measures of overall health such as perceived health, frequency of health complaints and effectiveness of interventions for chronic pain (Flensborg-Madsen, Ventegodt, & Merrick, 2005), although reduced stress and healthier behaviors may moderate these effects. Higher levels of meaning in life, as assessed by the Sense of Coherence Scale (Antonovsky, 1987), was associated with older adults' perception of their physical health as better (Suominen, Helenius, Blomberg, Uutela, & Koskenvuo, 2001; Steiner et al., 1996). In individuals with cancer, meaning was associated with increased cognitive and social functioning in the period

following their diagnosis (Rohani, Abedi, Sundberg, & Langius-Eklöf, 2015). There are also some preliminary findings indicating that higher levels of meaning were associated with increased levels of cancer-killing T cells, following hope-based interventions (Post-White, 1998). In a large cross-sectional study of the Hungarian population, meaning in life was related to perceived health, freedom from disability, and inversely related to several measures of mortality (Skrabski, Kopp, Rózsa, Réthlyi & Rahe, 2005).

Perceived Absence of Meaning in Life

An absence of perceived meaning or a sense of purpose in life is generally understood to be an undesirable state; it has been reported to be the primary source or cause of distress for a significant proportion of psychiatry patients treated by prominent psychotherapists such as Carl Jung and Viktor Frankl (Yalom, 1980, p. 421). Salvatore Maddi, a clinician contemporary of Jung and Frankl, used the term "existential neuroses" to describe this a state of alienation from one's self and others that results from perceived meaninglessness. The characteristic symptoms of existential neuroses are apathy, boredom, and a lack of investment in what one does with their time (Maddi, 1967). A significant body of empirical data corroborates these profiles drawn from clinical perspectives. Melton and Schulenberg (2008) conducted a review of many prominent measures of meaning in life and found that perceived meaning is negatively correlated with various dimensions of psychological distress, including depression, anxiety, neuroticism, and emotional stability. Lower levels of meaning in life are associated with illicit drug use and other unhealthy behaviors, reduced quality of life and psychological well-being in adolescents (Brassai, Piko & Steger, 2011), with clinical depression (Thakur & Basu, 2010), and with likelihood of suicidal ideation in college students (Dogra, Basu & Das, 2011).

Lacking a strong sense of meaning does not always lead to existential malaise, significant psychological distress, or inability to navigate their lives decisively. Lower levels of meaning in life affects different people in different ways, most notably in terms of well-being. In a large representative sample, Schnell (2010) determined that while 39% of respondents reported low levels of meaning in their life, only 4% of the overall sample reported experiencing a current crisis of meaning. The remaining 35% of the sample were "existentially indifferent," low in meaning but not experiencing a crisis. This group tended to report lower self-knowledge, religious affiliation, spirituality, and less interest in creating or doing things that will outlast them (Schnell, 2010). It is also important to note that in many cases, feeling that one's life is low in or absent of meaning may result from rather than causing or contributing to mental illness (Schnell, 2009). Using the "Presence" subscale of the Meaning in Life Questionnaire (Steger, Frazier, Oishi, & Kaler, 2006), the present study examined the relationship between curiosity and the participants' sense that their life is meaningful.

Searching for Meaning in Life

Much of the recent investigation into meaning in life expands upon the work of Viktor Frankl. He observed persistent suffering in himself and others following their liberation from their imprisonment in a Nazi concentration camp. He asserted that "striving to find a meaning in one's life is the primary motivational force in man" (Frankl, 1963, p. 45), a significant departure from other prominent psychological theories regarding the primary driving force of human beings. The search for meaning involves more than merely a desire for meaning; it also includes distinct, active efforts to "establish and/or augment meaning" (Steger et al., 2008, p. 200) "that cause one to gain some type of feedback, real or imagined" (Crumbaugh, 1977, p. 901).

The relationship between meaningfulness and the search for meaning is more complicated than representing opposite endpoints of the same spectrum. The desire for meaning in life and activity of searching for it do not solely arise from a sense of meaninglessness, nor must they necessarily cease once a strong sense of meaning is present; the search for meaning is separate (Reker & Cousins, 1979; Schulenberg, Baczwaski & Buchanan, 2014). For example, those who continue to seek out new or stronger confirmations of already existing meaning in life experience greater life satisfaction (Park, Park, & Peterson, 2010), and searching for meaning does not appear to reliably predict the eventual establishment of meaning (Steger et al., 2008). Searching for meaning is moderately correlated with lower life satisfaction in general, although this relationship is moderated by presence of meaning and degree of striving for self-actualization (Steger, 2011; Cohen & Cairns, 2012); as a person experiences greater presence of meaning or self-actualization, the expected reduction in satisfaction associated with searching for meaning shrinks considerably.

According to Steger et al.'s (2008) "search to presence" model, individuals who tend to be drawn to experiences for the promise of positive outcomes may be more likely to keep searching after attaining meaning compared to those who are primarily motivated to search as a way of avoiding negative outcomes. This model makes a distinction between healthy searching for meaning through "aspirations and insights drawn from life's challenges" and dysfunctional attempts borne of an "inability to engage with or resolve negative or challenging experiences" (p.203). Those who profess to be searching for meaning tend to be higher in personality dimensions of openness, absorption with tasks and learning, show more drive and are more likely to be interested in artistic pursuits (Steger et al., 2008). The present study used the "Search" subscale of the Meaning in Life Questionnaire (Steger et al., 2006) to assess the degree to which

the participants are searching for meaning in their lives. The relationship between curiosity and search for meaning was explored using this scale.

Sources of Meaning in Life

Sources of meaning in life are the aspects of one's experience that individuals recognize as contributors to their sense of meaningfulness (Cotton Bronk, 2014). The composition of meaningfulness is unique to each individual; people draw meaning from different sources and in different amounts (Grouden & Jose, 2014), although many specific sources of meaning (for example, "contemplation of the scriptures" or "spending time with my best friend") fall within broader meaning categories such as "religion" or "relationships", based on conceptual commonalities (Schnell, 2009; Reker, 1991; MacDonald, Wong & Gingrass, 2012).

The conceptual basis for many of these theorized sources of meaning in life can be found in the literature on eudaimonic well-being, a concept popularized by Aristotle (1924). He described eudaimonia by stating, "the good man ought to be self-loving: because by doing what is noble, he will have advantage himself and will do good to others" (p. 555). Psychological accounts characterize eudaimonia as living by one's true self by identifying and fulfilling one's potentials as a human and as a unique individual (Waterman, 1990) and in the expression of virtue (Ryan & Deci, 2001). Sources of meaning in life are explicitly mentioned as both a crucial aspect and as an outcome of eudaimonic well-being in many modern psychological theories and models. McMahan and Estes (2011) describe eudaimonic well-being as an "orientation to meaning and engagement." Self-Determination Theory model contends eudaimonic well-being is the fulfillment of autonomy, competence, and relatedness that "delineates many of the meanings and purposes underlying human actions" (Ryan & Deci, 2001). The Psychological Well-Being model characterizes it as "living a life rich in purpose and meaning, continued growth and

quality ties to others" (Ryff & Singer, 2008). This theory identifies self-acceptance, life purpose, and personal growth as potential meaning sources (Ryff & Singer, 2008). The Personal Expressiveness theory (Waterman, 1990) and Huta and Ryan's Eudaimonic Motives theory (2009) enumerate perception of achievement, and personal ideals or values, as sources of meaning in life.

Other theorized sources of meaning in life originate outside the eudaimonic well-being literature. Viktor Frankl (1963) emphasized the importance of self-transcendence, being outer-directed in the pursuit and achievement of meaning, as a critical aspect of meaning in life. Religion and spirituality are also important sources of meaning in life for many as providers of values and goals (Emmons, 2005), as facilitating the construction of personal meaning (Park, 2005, Ivtzan, Chan, Gardner, & Prashar, 2013) and as explicit sources of meaning themselves (Krause, 2003). Baumeister and Vohs (2002) theorized that meaning in life comes from the fulfillment of four needs: purpose, carefully selected personal values, a basis for self-worth, and a sense of efficacy. Macdonald et al. (2012) took a more experimental approach, asking participants what attributes or characteristics make life meaningful, and sorting the answers into categories: achievement, religion, intimacy, fair treatment, relationships, self-transcendence, and self-acceptance. The Brief Personal Meaning Profile (PMP-B) was then constructed to measure these seven sources. The present study used this instrument to assess the degree participants endorse each of these seven meaning sources. They are described in greater detail below.

Self-acceptance. Self-acceptance is the capacity to recognize one's strengths and weaknesses accurately while also having positive self-regard (Ryff et al., 2004). Individuals who have achieved self-acceptance can be thought of as seeing themselves as they are and possessing a "positive evaluation of oneself and one's past life events" (Ryff & Keyes, 1995). The concept

of self-acceptance is better understood with some background on self-discrepancy theory (Higgins, 1987). Inconsistencies between how we are, how we would like to be, and how we believe we should be, create discomfort. Changing one's attitude regarding these discrepancies or reducing them allows for greater self-acceptance.

Self-acceptance is one of the seven sources of meaning in life assessed in the Personal Meaning Profile (Wong, 1998; McDonald, Wong, & Gingras, 2012). It correlates with presence of meaning in life (Ryff, 1989; Steger et al., 2008) and is linked with multiple measures of life satisfaction in adolescents (Rathi & Rastogi, 2007).

Self-transcendence. While discussing the notion of self-transcendence in his 1963 treatise on logotherapy, Viktor Frankl asserted that meaning in life is to be discovered out in the world, rather than within one's self. Self-transcendence can be understood as involving perception and devotion aspects. Le & Levenson (2005) describe the perception component as an ability to detach from the perceptual limitations imposed by biological and social conditioning (survival, self-consciousness), and awareness centered on one's self. This results in unfettered perception, enabling one to see things as they are (Le & Levenson, 2005). Frankl (1963) described devotion as an interactional or behavioral component involving action; "giving (one)self to a cause to serve or another person to love" (p. 50). Meaning through self-transcendence is thus found via two pathways: "experiencing something or encountering someone" and "creating a work or doing a deed" (p. 50). Frankl elaborates on this experience/encounter aspect, explaining that one can find meaning in "goodness, truth or beauty-by experiencing nature and culture" or by "experiencing another human being in his very uniqueness; by loving him" (Frankl, 1963). The "work and deed" aspect involves altruistic

behavior and making a positive contribution to society through work or actions (Emmons, 2003; Reker, 1994).

To summarize, self-transcendence involves an orientation to the outside world, not characterized by "what does it mean to me and what do I need?" but instead, "these things are meaningful and important as they are, and I experience meaning in my life by connecting with them." Some conceptualizations of meaning in life also include spirituality or religion as aspects of self-transcendence (Reker, 1996; Schnell, 2009); however, the current study has elected to use a measure in which they represent separate sources of meaning in life (MacDonald et al., 2012). Higher levels of self-transcendence are associated with greater meaning in life across multiple measures and with more positivity in life meaning (Reker, 1994; Reker & Woo, 2011; Wong, 1998; Damásio & Koller, 2015).

Achievement. Achievement as a source of meaning involves "being committed to one's work, believing in its worth, and liking challenge" (Emmons, 2005, p. 108). This "work" becomes meaningful when it lines up with one's understood purpose in life, appears to serve some greater good, and leads to an understanding of the self and world (Steger, Dik & Duffy, 2012). Outside of generating positive affect via success, achievement contributes to meaning in life in several ways. Mascaro and Rosen (2005) hypothesized that although meaning is not something one can be pursued directly (the meaning-making process cannot be forced), meaning can be arrived at tangentially through active effort aimed at fulfilling one's goals. The Life Stories theory (McAdams, 2001) argues that moments of achievement and success are the "anchors" around which people organize their memories as their life story. One's struggles and hardships can thus take on more positive meaning, lending gravitas to subsequent achievements as prerequisite striving and sacrifice. Achievement may also lead to meaning as it invokes

elements of an approach orientation (Carver & White, 1994) regarding life goals. Individuals with an approach orientation maintain a higher presence of meaning while simultaneously search for meaning (Steger et al., 2008).

Multiple prominent measures of meaning in life have included achievement as a dimension (Wong, 1998; Schnell, 2009; Debats, 1990; Steger, Dik, & Duffy, 2012). Daily achievement is a predictor of perceived meaning in life beyond its tendency to generate positive affect (Machell, Kashdan, Short, & Nezlek, 2014). The pursuit of meaningful work is correlated with meaning in life, life satisfaction, and inversely related to measures of psychological distress (Steger, Dik & Duffy, 2012).

Relationship and intimacy. A multitude of psychological accounts characterize connections to other people in their various forms: purely social relationships, intimate bonds, and belonging to a family and community, as an important contributor to meaning in life (Wong, 1998; Frankl, 1963; Reker, 1996; Emmons, Cheung, & Tehrani, 1998; Ryan & Deci, 2000; Martela, Steger & Ryan, 2017; Zhang, Zhiqin, Chan, & Schlegel, 2019). For example, Erik Erickson (1959) explicitly includes "Intimacy" and "Generativity" (guidance of others) as successful resolutions to developmental "crises" in his Stages of Psychosocial Development. Baumeister and Leary (1995) cite the development of closeness to others as a primary motivation of humans, and if obstructed, this motivation gives way to purposelessness.

Considerable evidence supports relationships and intimacy as essential sources of meaning in life. Married couples living together experience higher meaning and are less likely to experience crises of meaning compared to single or divorced individuals, and caring for one's self is closely linked to caring for others (Schnell, 2009). In a study using open-ended questions to find the most common sources of meaning in respondent's lives, family and interpersonal

relations were the most often reported (Grouden & Jose, 2014). In another study, half of all respondents listed social relationships as a source of meaning, and those that did so reported a greater sense of meaning in life (Zhang et al., 2019). One's tendency to be liked and desired as a friend by people who interact with and observe them was better predicted by a strong sense of meaning in life than extraversion, happiness, or self-esteem (Stillman, Lambert, Fincham & Baumeister, 2011).

Intimacy goals of "self-disclosure, trust, and interdependence" both in romantic relationships (Sanderson & Karetsky, 2002) and friendships (Sanderson, Rahm & Beigbeder, 2005) facilitate greater relationship satisfaction. Intimacy motivation is associated with career satisfaction and life satisfaction, and it predicted various measures of psychosocial adjustment (McAdams & Vaillant, 1982) when compared to other motives (such as affiliation, achievement, and power) in a longitudinal study.

Religion. Religion and spirituality can be understood as particularly straightforward sources of meaning in life, as they explicitly concern exploring and understanding the broad questions that are posed by life and one's existence (Ivtzan et al., 2013). Much of the literature concerning meaning in life makes a distinction between religion and spirituality; Miller and Thoresen (2003) provide a particularly concise account of the difference, stating that religions are generally concerned with spirituality but are "differentiated by particular beliefs and practices, modes of social organization and requirements of membership." This description goes further to explain that "Spirituality is understood at the level of the individual within certain contexts… Religion can be seen as fundamentally a social phenomenon."

Religious observance (for example, praying or attending religious services) correlates with more meaning in life, and meaning in life appears to influence the effect religious

observance has on overall well-being (Steger & Frasier, 2005). Research also indicates that individuals who rate religion highly as a primary motive or "approach to life" arrive at meaning as a way to cope with life stress and loss more than others (Park, 2005). The spirituality domains of "harmony" ("inner peace and a personal connection with the world") and "ethical sensitivity" ("prosocial beliefs about the world and humanity"), and spirituality in general, have been found to predict meaning in life (Krok, 2015; Bamonti, Lombardi, Duberstein, King, & Van Orden, 2016).

Fair Treatment. Fair treatment refers to an essential component of the broader meaning construct or framework people use to make sense of the world, but most measures of meaning in life sources do not include it. It describes the degree to which one's understanding of the world and others involves an equitable and manageable amount of both positive and negative outcomes and opportunities to them (Wong, 1998). This is similar to the "justice" and "benevolence" assumptions from the Janoff-Bulman "assumptive worlds" theory (1989) but diverges in one important way. Fair treatment, as defined in the instrument used in the current study, does not involve a belief that more moral or prosocial behavior predisposes one to greater frequency of positive outcomes or opportunities (or vice versa) (MacDonald et al., 2012). If an individual does not have opportunities to work towards their purpose, or if their efforts are repeatedly frustrated by unrelated behavior of others or external circumstances, or if there appear to be no rules or order to events, this can reduce their trust in their overall beliefs or understandings about the world, and thus reduce their sense of meaning in life (Park & Folkman, 1997; Lilly, Valdez & Graham-Bermann, 2011).

The central focus of research using fair treatment as a contributor to meaning in life is the interplay between fair treatment, trauma and adverse life events, and psychological outcomes. In

individuals who experience trauma, those whose assumptions about fair treatment such as benevolence of the world and people were weaker tended to have more significant PTSD symptoms (Elklit, Shevlin, Solomon & Dekel, 2007). Fair treatment was negatively associated with depression and anxiety in a sample of cancer patients (Jaarsma, Pool, Ranchor & Sanderman, 2007), and positively associated with self-esteem and happiness in a small sample of adolescents and pre-adolescents (Rathi & Rastogi, 2007).

Curiosity as a Pathway to Meaning in Life

Meaning in life research has proposed various mechanisms for the development of meaning in life: discovering or reinforcing one's assumptions about the world following disruptive, stressful events (Park, 2008), facing reminders of one's mortality (Simon, Arendt, Greenberg, Pyszczynski, & Solomon 1998), experiencing positive affect regularly (King, Hicks, Krull, & Del Gaiso et al., 2006), understanding universal truths by rejection of suffering and acceptance of unavoidable pain (Frankl, 1963), by maintaining devotion to others and a purpose or cause (Frankl, 1963; Baumeister & Vohs, 2002), satisfying the human need for self-determination and human development (Martela et al., 2017), and creating a unique profile of meaning from different sources (Wong, 1998).

It should be noted that most (if not all) of these pathways involve an indirect focus rather than straightforward means to attain meaning in life. Most are contingent on uniquely personal factors or life circumstances, and several accounts characterize the process of achieving meaning in life as somewhat resistant to direct pursuit (Michaels, Parkin, & Vallacher, 2014; Baumeister & Vohs, 2002). There does not seem to be a straightforward approach to meaning in life that applies to all people. It would be beneficial if a universal psychological construct could be

identified that contributes to meaning in life, and the recent rise of positive psychology may provide one such avenue: curiosity.

Curiosity prompts humans to obtain more information and diverse experiences, to approach and enjoy challenges and intellectual efforts. This study proposes that curiosity might promote meaning in life through several processes: by inspiring one to engage with their environment and those around them, by generating interest in understanding themselves, and by promoting a mastery-orientation to life's challenges. Relatively few empirical investigations examine the role curiosity might play in the attainment and search for meaning in life, and there appears to be no available research into whether curiosity promotes specific sources of meaning in life. This study was constructed to fill some of these gaps in the research literature.

Curiosity and its Benefits

Curiosity is a concept nearly as timeless as meaning in life, with written accounts of both dating back to ancient Greece. Aristotle's Metaphysics (350 BCE) begins by introducing curiosity, "All men by nature desire to know. An indication of this is the delight we take in our senses; for even apart from their usefulness they are loved for themselves…" explaining the broad nature of curiosity as both a thirst for knowledge and an appreciation for sensory experiences. A 1914 translation of Cicero's 45 BCE text *De Finibus Bonorum Et Malorum* highlights another important aspect of this "innate love of learning and of knowledge": "man's nature is strongly attracted to these things even without the lure of any profit" (p. 430). Curiosity has been studied extensively within psychology since its emergence as a scientific field, with early treatments by Sigmund Freud and William James depicting it as an innate drive (Loewenstein, 1994). It remains a popular topic of psychological inquiry, as a resource and means to positive outcomes in positive psychology (Spielberger, 2009; Kashdan et al., 2018;

Kashdan & Steger, 2007) and as a way to enhance learning in education psychology (Eren, 2009;

Kang et al., 2009; Oudeyer, Gottlieb, & Lopes, 2016).

      Curiosity involves a set of behaviors, such as the investigation and manipulation of our

external environment, and the examination of ourselves. Subjective, cognitive responses are also

essential for curiosity, as the stimuli we encounter in our interactions with our world prompts

follow-up questions and inspires one to guess at possible answers. At the source of these

cognitions and behaviors logically, there should be some drive or motivation. For example,

seeking out and attending to sensory information in the environment (also known as perceptual

curiosity) can be understood as providing unique and enjoyable sensory experiences that

reinforce curious behaviors and cognitions (Berlyne, 1954). But why might one engage in

epistemic curiosity; specifically, seeking out new topics to explore and information to learn?

Knowledge acquired by a curious mind's investigation generally cannot be used right away; this

makes it difficult to pinpoint any traditional reinforcement for curiosity behaviors. Behaviorism

would attribute such epistemic curiosity behaviors to a drive, some internal motivation for

engaging in these investigative and learning behaviors that satisfies a human need. In response to

this, some researchers postulated that emotional states regulate this behavior instead (Berlyne,

1954).

      This idea presents some difficulty, as curiosity appears to operate differently than other

typical emotional states in motivating behavior. Where emotional states generally influence

people to behave in ways that would reduce emotional arousal, curious behavior appears to

increase arousal by highlighting a lack of information (Loewenstein, 1994). Berlyne (1957) and

contemporaries sought to explain this discrepancy with an example; people derive enjoyment

from puzzle games and reading mysteries, but these activities induce traditionally negative

arousal states such as doubt, perplexity, and ambiguity. According to the information gap theory, such sensations generally underscore a lack of control in a situation and should provoke anxiety (Loewenstein, 1994); this anxiety should drive people to reduce these feelings rather than inspire them to seek out experiences and information that increase such feelings. One proposed explanation characterizes curiosity as a unique, positive emotional state, "a desire to acquire new knowledge and experience that motivates exploratory behavior" (Spielberger & Reheiser, 2009). It acts contrary to traditional negative emotional states such as depression, anxiety, and anger, and serves as a key resource for solving problems in one's life (Berlyne, 1954; Loewenstein, 1994).

Emotional states like anger, anxiety, and depression wax and wane in accordance with shifts in life circumstances, biological factors, and the actions of those around us, but what of individual differences between people? Some individuals experience certain emotional states such as curiosity and anxiety more often and more acutely than others, a propensity that is stable over time and often characterized as a "trait" (Spielberger, 1979). The same situation that might or might not spark mild, temporary interest in a person of average trait curiosity, instead consistently drives a person high in trait curiosity to great lengths to learn more. Research on curiosity as a trait has linked it to several "Big Five" personality traits, such as "Openness to Experience" and "Extraversion" (Kashdan & Steger, 2007), which suggest it might be more trait-like, an innate or learned propensity for engaging in curiosity-type behaviors.

To reconcile these perspectives, we might define curiosity as a combination of behaviors and cognitions, that some individuals are more prone to engage or experience than others, and that are motivated at least in part by emotion. Although vague and somewhat simplistic, this

introductory description illustrates how curiosity exists at an intersection of many of the essential topics in psychology.

Individuals frequently engrossed in curiosity's diverse quests gain access to a wide range of benefits. There is a strong relationship between curiosity and resilience, defined as "the human capacity to overcome adverse conditions and trauma to be freed of biopsycho-pathological consequences" (Hiew, Mori, Shimizu, & Tominaga, 2000). Curiosity is associated with the expression and regulation of positive emotions (Kashdan et al., 2009), although it is demonstrably independent of hope, optimism, positive affect, well-being, and life satisfaction (Kashdan et al., 2004). This relationship is understandable in light of findings from an extensive correlational study on trait curiosity that demonstrated links between curiosity and a whole host of positive subjective experiences: "positive evaluations of the self, world, and future; beliefs that goals are attainable and obstacles can be circumvented; general tendencies to enjoy effortful cognitive endeavors and be open to new experiences and ideas; self-determined tendencies to recognize, pursue, and thrive in pleasure, excitement, and challenge." (Kashdan, Rose & Fincham, 2004, p. 301).

Curiosity is an important facilitator of mindfulness (Reiss, 2000; Bishop et al., 2004). Mindfulness is a collection of techniques and philosophies currently captivating clinical psychology and counseling with its putative efficacy. In fact, "I am curious", "I like to investigate things", and "I like to figure out how things work" are all items on a measure of mindfulness called the Langer Mindfulness Scale (Pirson, Langer, Bodner, & Zilcha-Mano, 2012). Along with mindful meditation, trait curiosity is instrumental in reducing the difference between one's perception of themselves as they are and how they wish to be (Ivtzan, Gardner & Smailova, 2011), a discrepancy linked to many detrimental outcomes. Another study found that

mindful awareness alone was ineffective at predicting a non-judgmental response to worldview threatening information; when paired with curiosity however, individuals responded with more positive ratings of the information (Kashdan et al., 2009).

The actions and behaviors attributed to curiosity contribute to a bevy of beneficial outcomes. Exploring and engaging with meaningful subjects and activities can provide one with a "sense of life direction and purpose" (Kashdan, Rose & Fincham, 2004, p. 302), and is strongly correlated with life satisfaction (Park, Peterson, & Seligman, 2004). As a crucial part of intrinsic motivation driving people to obtain information of a symbolic, semantic nature such as trivia (Baranes, Oudeyer, & Gottlieb, 2015), curiosity is linked to the development of vocal communication and memory enhancement (Gruber, Gelman, & Ranganath, 2014). Curiosity is a significant predictor of job performance (Mussel, 2013) and academic success (Lounsbury et al., 2009; Von Stumm, Hell, & Chamorro-Premuzic, 2011) due to engagement with material and intellectual investment.

Personal development is a beneficiary of curiosity, too. Daily feelings of curiosity are linked to feelings of well-being, goal commitment, meaning in life, and some growth behaviors engaged in, even when controlling for hedonistic behaviors (Kashdan & Steger, 2007).

Motives for Curiosity: Appetitive Interest vs. Deprivation Uncertainty Reducing

One drive for curiosity is termed "intrinsic motivation", drawn from Self-Determination Theory. According to Self-Determination Theory, there are three important needs for optimal functioning that drive development as a person and provide motivation for development-related behaviors: autonomy, competence, and relatedness (Stone, Deci, & Ryan 2009). Intrinsic motivation moves individuals towards optimal functioning by stimulating them to participate in traditional curious behaviors like "seek(ing) out novelty and challenges, to extend and exercise

one's capacities, to explore, and to learn" (Ryan and Deci, 2000, p.70). These behaviors promote autonomy, competence and relatedness as personal growth. The amount of intrinsic motivation each person experiences depends on the social conditions and growth opportunities that one encounters throughout their life (Ryan and Deci, 2000).

The pursuit of personal growth, however, may not be the only mechanism motivating curiosity. The Information-Gap hypothesis states that the promise of acquiring information is a motivation in its own right, not only as a means to reduce uncertainty and decrease arousal. It suggests that with each small bit of knowledge learned, the amount of knowledge one desires increases sharply (Loewenstein, 1994). In this sense, little interesting tidbits act on curiosity by increasing one's anticipation of rewarding information and stimulating behaviors necessary to acquire that information.

Recent investigations into curiosity propose that curiosity consists of various facets that can be differentiated from one another by what one's motivation for being curious is in a given situation. The broadest of these new investigations is a further development of Berlyne's (1954) "specific" and "diversive" types of "epistemic curiosity" (Litman & Spielberger, 2003). Litman (2008) suggests that there are two distinct motivations for seeking out and learning new information: interest and being deprived of information. Appetitive interest-type curiosity stems from intrinsic motivation and is associated with more positive affect (seeking enjoyment from learning new information), "mastery-oriented learning," and exploring new topics. The measures developed by Litman et al. for appetitive interest-type curiosity are similar to classic trait-measures of curiosity but focus exclusively on the desire for information rather than novel experiences or sensations. Deprivation-type uncertainty reducing curiosity is characterized by the desire to reduce the anxiety generated by the perception of a "gap" in one's knowledge, or a

"need" to know particular information. This particular information is sought to increase performance or reduce perceived vulnerability to failure due to lack of understanding something important; deprivation- type uncertainty reducing curiosity is associated with "performance-oriented learning" and avoiding failure. With deprivation-type uncertainty reducing curiosity, the acquisition of new information will only be rewarding if it increases understanding and reduces uncertainty (Litman, Crowson, & Kolinski, 2010). This differs from appetitive interest curiosity, whereby new knowledge can increase uncertainty and highlight a lack of understanding while remaining a pleasant experience, and potentially foster even more curiosity.

Evidence supports these two types as distinct facets of trait epistemic curiosity; in particular, each has been found to correlate with different Big-Five personality traits. Appetitive interest-type curiosity is linked to openness, extraversion, agreeableness, and negatively correlated with neuroticism; deprivation-type uncertainty reducing curiosity is linked to conscientiousness (Litman & Mussel, 2013). The measure for deprivation-type uncertainty reducing curiosity may over-emphasize persistence and preoccupation while ignoring other possible aspects such as positive absorption and problem-solving (Litman & Mussel, 2013). Litman, Hutchins, and Russon (2005) conducted a study that illustrated some functional differences between these two types by asking participants general knowledge questions. A minimal knowledge gap, such as when participants felt that they should already know the fact, or knew it and forgot it, stimulated deprivation-type uncertainty reducing curiosity. When individuals were sure they did not know the information being requested, appetitive interest-type curiosity prevailed. Importantly, deprivation-type uncertainty reducing curiosity was the more intense of the two types, associated with more exploratory behaviors and higher in-the-moment feelings of curiosity (Litman, Hutchins, & Russon, 2005).

The Present Study

Very few studies have examined the relationship between curiosity and meaning in life. Principally, Kashdan and Steger have examined a connection between the two concepts (Kashdan & Steger, 2007; Steger et al. 2008), finding that higher levels of appetitive interest-type curiosity are associated with higher levels of perceived presence of daily meaning, as well as openness, extraversion, daily life satisfaction, and lower levels of neuroticism.

Curiosity research, however, has proposed numerous independent facets of curiosity, including curiosity specifically about information and knowledge (Berlyne, 1962; Litman & Spielberger, 2003; Kang et al., 2009) and curiosity as a feeling of uncertainty or deprivation (Berlyne 1969; Litman & Jimerson, 2004). These specific facets of curiosity are quite different and may even operate via different motivations. For example, a relationship has been found between deprivation-type uncertainty reducing curiosity, caution, and thoughtfulness, whereas higher scores in appetitive interest-type curiosity were related to optimistic approaches to learning (Lauriola et al., 2015). Does the drive to acquire and understand particular information to satisfy a craving or relieve an uncomfortable deficiency, ultimately result in knowledge necessary for a comforting perception of meaning in life? Or is a non-specific attraction to knowledge in the world, and excitement about broad topics of interest, more likely to yield the insights conducive to perceived meaning in life?

This study sought to add specificity to the curiosity and meaning in life literature by examining the relationship between curiosity as prompted by different motivations, and meaning in life. This study focused on the distinction between curiosity as an appetitive, pleasurable drive characterized by approaching novel stimuli (appetitive interest-type), and curiosity to reduce negative arousal caused by uncertainty and novel stimuli (deprivation-type uncertainty reducing).

The relationships were examined between these two types of curiosity and the presence of meaning in life, the search for meaning, and specific sources of meaning.

Educational psychology literature contains many instances of successful interventions aimed at increasing curiosity: task based learning and problem based learning (Pluck & Johnson, 2011; Leas, Nelson, Grandgenett, Tapprich, & Cutucache, 2017), information value intervention (Dubey, Griffiths, & Lombrozo, 2019), the attention, relevance, confidence and satisfaction model (Arnone & Small, 1995; Orji et al., 2019), soliciting question-asking during interactive simulations (Kowalski & Kowalski, 2012) and generating predictions (Brod & Breitwieser, 2019). Likewise, meaning in life has significant beneficial aspects, particularly in coping with trauma and stressful experiences (Lilly et al., 2011; Miao et al., 2017; Kallay, 2008; Park, 2008). As such, this research has the potential to inform clinical interventions and guide future psychological research into these two areas.

This study was comprised of the following research questions:

Research Question 1: Motive for curiosity and perceived presence of meaning in life. Which motive for being curious (appetitive interest-type vs. deprivation-type uncertainty reducing) is more predictive of how meaningful one feels life is?

Both motives for curiosity were expected to be positively correlated with presence of meaning in life. However, it was predicted that curiosity motivated by excitement about discovering new information and experiences (appetitive interest-type curiosity) would be a stronger predictor of how much meaning people find in their lives than curiosity motivated by a desire to reduce the anxiety felt due to not having certain information and experiences (deprivation-type uncertainty reducing curiosity).

Appetitive interest-type curiosity forms a significant part of one's intrinsic motivation (Berlyne, 1965; Robinson, 1974). Intrinsic motivation and meaning in life share two common necessary elements according to self-determination theory: competence and autonomy (Ryan & Deci, 2000). Competence and autonomy (along with relatedness and beneficence) form the basis for meaning in life according to self-determination theory, and each contributes to meaning in life (Martela et al., 2017). Thus, strong appetitive interest-type curiosity should enhance one's intrinsic motivation, increasing the likelihood that they fulfill two of the four major contributors to meaning in life.

Appetitive interest-type curiosity provides people with an incentive to acquire a broader understanding of their world by encouraging exploration and the acquisition of diverse types of information through novel and challenging experiences (Kashdan & Steger, 2007). A person high in appetitive interest-type curiosity may, therefore, have access to more broad information about the world and novel experiences from diverse sources. A richer firsthand knowledge of the world should provide a person high in appetitive interest-type curiosity with more opportunities and learned associations with which to make meaning.

Another mechanism through which appetitive interest-type curiosity was hypothesized to increase meaning in life was the enhancement of one's ability to work through a traumatic event. Traumatic events have been theorized as potentially disruptive to one's meaning in life, as they highlight the discrepancies between the trauma and one's previously held assumptions about the world and goals (Janoff-Bulman & Timko, 1987; Park & Folkman, 1997). There are differences in how one might handle these discrepancies, and curiosity can be understood to play a role. Appetitive interest-type curiosity is associated with a mastery-orientation (Litman, 2008) and promotes the approaching of difficult life situations as challenges (Kashdan & Silva, 2009). An

orientation to mastery and viewing traumatic events as challenges to be surmounted rather than threatening situations are necessary for the development of coping mechanisms (Bandura, 1977) and their enlistment (Park & Folkman, 1997) following a traumatic event. Individuals prone to appetitive interest-type curiosity then may be more likely to successfully cope with difficult and traumatic situations, preventing a loss of meaning in their lives and resulting in higher overall meaning in life.

Positive affect is another avenue by which appetitive interest-type curiosity was hypothesized to augment one's experience of meaning in life. The link between positive affect and meaning in life is somewhat complex and possibly bidirectional; however, the amount of daily positive affect experienced has been identified as a reasonably reliable predictor of one's experience of meaning in their life (King et al., 2006), stating that positive moods "may predispose individuals to feel that life is meaningful" and "may increase sensitivity to the meaning-relevance of a situation." In a study evaluating curiosity as a pathway to well-being, appetitive interest-type curiosity was associated with tendencies to seek out activities and cognitive endeavors that provide enjoyment, as well as promoting "positive evaluations of the self, world, and future" (Kashdan, Rose & Fincham, 2004). The activities and outlook promoted by curiosity represent sources of positive affect that can regularly enhance one's short-term perception of meaning in life and aid in the construction of additional meaning.

A positive relationship between one measure of appetitive trait curiosity and meaning in life has previously been established (Kashdan & Steger, 2007). Prior research has also found that meaning in life is more strongly related to appetitive interest-type curiosity than to curiosity conceptualizations similar to deprivation-type uncertainty reducing curiosity (Kashdan et al., 2018). As such, deprivation-type uncertainty reducing curiosity was hypothesized to be a

weaker predictor of presence of meaning in life. This type of curiosity is not theoretically associated with autonomy in the same sense that appetitive interest-type curiosity is (Kashdan et al., 2018) and probably results from a perceived lack of competence (Litman & Silva, 2006; Loewenstein, 1994). It is, therefore, less likely to foster a eudaimonic pathway to meaning in life. It is also associated with rumination (Kashdan & Silva, 2009) which can forestall meaning-making if engaged in for too long (Park et al., 2008).

Research Question 2: Motive for curiosity and searching for meaning in life. Which motive for curiosity is more predictive of the degree to which one is searching for meaning in life?

Both motives for curiosity were expected to be positively correlated with searching for meaning in life. However, searching for meaning in life was predicted to be more strongly associated with curiosity motivated by a desire to reduce the unpleasant uncertainties felt (deprivation-type uncertainty reducing curiosity).

Curiosity and searching for meaning in life are both concerned with wanting to understand or experience more. However, the two conceptions of curiosity are related to search for meaning in life in different ways. Curiosity motivated by a desire to reduce uncertainty is indicative of a person actively searching for information to be more confident of themselves, their environment, and to increase their sense of competence (Litman & Silva, 2006; Litman, Robinson, & Demetre, 2017). This desire to improve one's sense of competence may come from indications or observations that one lacks the competence necessary for daily life rather than a drive to excel. Uncertainty-reducing curiosity is associated with concerns about objective performance instead of mastering a skill or topic of knowledge (Litman et al., 2010), supporting this interpretation. A sense of competence (one of the four needs for a meaningful life, according

to self-determination theory) does contribute to a sense of meaning in life (Martela et al., 2017). As such, seeking competence might be part of an overall search for meaning in one's life.

Deprivation-type uncertainty reducing curiosity is associated with the perception that one is in a life-stage crisis (Robinson, Demetre, & Litman, 2017), and sources of meaning change between developmental stages of life (Reker & Wong, 2012) even if the amount of meaning in life remains relatively consistent. Navigating the different stages in life is one nearly universal challenge; it can be very stressful or somewhat traumatic by itself (Erikson, 1968), or can become so with the introduction of external events (Robinson, 2008; Wethington, 2000). A tendency to experience a lot of uncertainty-reducing curiosity may be a response to shifting sources of meaning during life's transitions.

Empirical investigations have found a small but significant positive relationship between appetitive interest-type curiosity and the search for meaning as a persistent personal experience (Steger et al., 2008). Kashdan and Steger (2007) identified a strong relationship between appetitive interest-type curiosity and searching for meaning on a day-to-day basis, along with experiencing meaning in life. For those already high in meaning, the search for meaning has been associated with positive indications of well-being (Park, Park, & Peterson, 2010), as search is thought to "increase the salience of meaning-relevant information" (Steger, Oishi & Kesebir, 2011). In other words, for those who feel their life is already meaningful, continuing to search alerts them to new sources of meaning. Kashdan and Steger (2007) concluded, following in-depth analyses, that appetitive interest curiosity leads to a pleasurable state due to engagement in personal growth-stimulating activities and openness to complexity and challenges that both formed meaning in life and promoted the anticipation of future meaning-making (search for meaning).

Research Question 3: Motive for curiosity and sources of meaning in life. Do people's motives for curiosity play a role in what people find to be most meaningful in their lives? More specifically, what sources of meaning in life are most associated with being motivated by the anticipated pleasure of enjoying new information and experiences (appetitive interest-type curiosity). Likewise, what sources of meaning in life are most associated with being motivated to reduce anxiety from lacking certain pieces of information or experiences)? Are these two motives for curiosity associated with different sources of meaning in life?

For the present study, this research question was exploratory. As such, only initial and tentative hypotheses regarding the relationship between the motives for curiosity and the various sources of meaning in life were presented. These are summarized in Table 1 below. Where predictions were made, associated justifications follow the table.

Table 1

Hypothesized Relationships between the Motives for Curiosity and the Sources of Meaning in Life

Source of Meaning in life	Predicted Correlation with the Motives for Curiosity
Achievement	Positive correlations with both Appetitive interest-type and Deprivation-type uncertainty reducing Curiosity
Relationship	Positive correlation with Appetitive interest-type curiosity
Intimacy	Positive correlation with Appetitive interest-type curiosity
Self-Transcendence	Positive correlation with Appetitive interest-type curiosity
Self-Acceptance	No prediction made
Fair Treatment	No prediction made
Religion	No prediction made

Both appetitive interest-type curiosity and uncertainty-reducing curiosity are related to the NEO-PI-R dimension of achievement striving (Litman & Mussel, 2013; Kashdan & Silva, 2009). This suggests that curiosity, in general, should help with identifying what individuals

believe they should be working towards, and then following through. Thus, achievement as a source of meaning in life was expected to be positively associated with both types of curiosity.

Intimacy and relationships as sources of meaning are similar in that they draw upon necessary interpersonal skills and behaviors responsible for fostering bonds between individuals. Intimacy contributes to meaning through the perceived quality of family life, sharing of emotional support and intimate feelings, and being in a loving relationship (Wong, 1998; Kashdan, Goodman, Stiksma, Milius & McKnight, 2018; Mikulincer & Shaver, 2014). Intimacy requires trust, self-disclosure, and attentiveness to others to develop (Collins & Miller, 1994; Kashdan et al., 2004; Kashdan & Roberts, 2006; Rempel, Holmes & Zanna, 1985). Relationships as a source of meaning involve having friends, relating well to others, and being trusted and well-liked or well-regarded by others (Wong, 1998).

Appetitive interest-type curiosity is typified by an approach orientation and engagement with the world around oneself (Kashdan & Roberts, 2004). This approach orientation has specific implications for social interactions. Appetitive interest-type curiosity is linked to increased trust in others (Litman & Mussel, 2013), a focus on others (Hartung, 2010), and with increased self-disclosure in interactions (Kashdan & Roberts, 2004). The emphasis of curiosity on others, therefore, promotes many of the behaviors that foster the development of intimacy with family and in romantic relationships, as well as non-intimate relationships.

Deprivation-type uncertainty reducing curiosity describes a different focus, split between concern about one's knowledge gaps, and exploring the specific topics of those gaps (Litman, 2008; Litman, 2019). This split focus appears to affect the way people approach and relate to others; uncertainty-reducing curiosity is negatively associated with trust in others as a personality trait (Litman & Mussel, 2013). It has also been linked to public self-consciousness (Litman et al.,

2017) describing a self-focus, and is related to negative affect when in the presence of others (Trapnell & Campbell, 1999). Since deprivation-type uncertainty reducing curiosity involves some level of preoccupation with oneself, a person who experiences higher levels of uncertainty-reducing curiosity might find it harder to develop intimate attachments to others and draw satisfaction from relationships. The amount of meaning one derives from intimacy and relationships was thus not expected to be significant.

Self-transcendence describes an orientation or sense of connection towards other people and the world around oneself as a source of meaning beyond or instead of oneself (Koltko-Rivera, 2006; Frankl, 1963; Van Cappellen & Rime, 2013). Appetitive interest-type curiosity produces positive affect in response to exploring one's world and novel experiences around them (Kashdan et al., 2004; Hartung, 2010). The generation of positive feelings in response to aspects of the world outside oneself is closely linked to the development of self-transcendence (Van Cappellen & Rime, 2013). As appetitive interest-type curiosity emphasizes the world and others as the primary focus of one's attention and engagement (Kashdan et al., 2004), there are more opportunities to develop concern for people and causes outside of one's self. Curiosity then can be thought of as providing a push towards potential sources of purpose outside the self, and a mechanism to reinforce outer-directed purpose by providing positive affect as a reward. Greater appetitive interest-type curiosity should then promote more meaning in life derived from self-transcendence. Research linking appetitive interest-type curiosity with personality dimensions such as altruism and tender-mindedness supported this prediction (Litman & Mussel, 2013).

No predictions were made regarding possible relationships between the two motives of curiosity, and self-acceptance, fair treatment, or religion.

Method

Participants

This study used a sample of participants recruited from an online crowdsourcing data collection marketplace service, Amazon's Mechanical Turk (MTurk). Some studies have established that the honesty and attentiveness of MTurk subject pool participants when responding to surveys is comparable to traditional undergraduate and convenience samples in both non-clinical (Kees, Berry, Burton, & Sheehan, 2017; Paolacci & Chandler, 2014) and clinical samples (Shapiro, Chandler, & Mueller, 2013). The use of MTurk to study topics such as meaning in life and curiosity is not uncommon. MTurk has been widely used for recent curiosity research with survey designs (Sinha, Bai & Cassell, 2017; Metcalfe, Schwartz & Bloom, 2017), including one investigation incorporating facets of curiosity very similar to those examined in this study (Kashdan et al., 2018). A broad spectrum of meaning in life research has used MTurk for participant recruitment, including several experiments utilizing the same Meaning in Life Questionnaire that this proposed study used (Ashton-James, Kushlev & Dunn, 2013; Waytz, Herschfield, & Tamir, 2015; Coffey, Wray-Lake, Mashek, & Branand, 2016).

Participants were paid $0.50 for their participation in this survey. The participants were drawn from the MTurk pool of master workers for an initial run, which began on July 10 and ran through July 15, 2020. This initial run collected data from 140 respondents, however only 62 were able to complete the survey due to a linking issue from Qualtrics (the website hosting the survey). A second run of 140 MTurk participants was then conducted (from July 16 to July 20), resulting in 202 completed participant data sets. Eight participants spent less than two minutes responding to the entire survey (averaging less than two seconds per question), and as planned, were removed. Another four participants provided the same response to each question across

multiple tests, indicating a systematic response style rather than considered responses to each question. The total number of participants providing usable data was 190.

Demographic information on the participants indicated that this sample exhibits some notable deviations from the population as a whole and from convenience samples often used for university research. Respondents' ages were spread across a broad range between 24 and 67 years of age, with an average age of 38 (*S.D.* = 10.45). A third of the participants were below 31 years of age, another third between 32 and 39 years of age, and the remaining third above 40. The largest proportion of participants reported Caucasian/Non-Hispanic White (64%) ethnicity, with the next largest group of respondents reporting Asian/Pacific Islander ethnicity (20%), then Black or African-American (6%), Hispanic, Latino, or Spanish (5%), and American Indian or Alaska Native (2%). 125 of the respondents reported being male (66%), 64 of the participants reported female as their gender (34%), and one participant reported non-binary as their gender.

The participants' education level was relatively high, with 75% claiming a bachelor's degree, some graduate school, or a graduate degree. Just under 7% percent had completed a high school diploma, 10% had undergone some college or technical school education, 10% had an associate's degree or technical school, 56% had a bachelor's' degree, 4% had some graduate school, and 15% of the sample had completed graduate school. It is important to note that Amazon Turk does not filter out participants based on their geographical location and should not be expected to mirror American population statistics. This study did not ask participants about country of residence and origin.

Materials

The Interest- and Deprivation-type Epistemic Curiosity Scale (EC-I & EC-D). This scale measured the two motives for curiosity. The Interest- and Deprivation-type Epistemic

Curiosity Scale (Litman, 2008) is a combination and refinement of the Curiosity as a Feeling of

Deprivation Scale (Litman & Jimerson, 2004) and the Epistemic Curiosity Scale (Litman &

Spielberger, 2003). It conceptualizes epistemic curiosity as the specific desire to obtain

knowledge and is separated into two different subscales based on the motivation for said

curiosity: to reduce an unpleasant feeling of knowledge "Deprivation", or "Interest" in the

pleasure brought by learning. The Deprivation subscale consists of five items such as "I work

like a fiend at problems that I feel must be solved" and "I can spend hours on a single problem

because I just can't rest without knowing the answer", and likewise the Interest subscale has five

items including "I enjoy learning about subjects that are unfamiliar to me" and "I enjoy

discussing abstract concepts." The entire scale can be found in Appendix A. Respondents rank

how frequently these statements apply to them on a scale from 1 (Almost Never) to 4 (Almost

Always). Each subscale is totaled and used separately; thus, higher scores on the Interest-

subscale indicate higher appetitive interest-type curiosity alone, and likewise for the deprivation-

type uncertainty reducing scale.

These two curiosity subscales have been established as distinct from one another in

studies showing different correlations with theoretically-related constructs (Litman, 2006;

Litman & Mussel, 2013). The similarity between the Interest and Deprivation constructs as

drives behind the desire for knowledge is responsible for an observed .47 correlation between

them. Internal consistency for the Interest and Deprivation scales is acceptable, with Cronbach's

αs of .82 and .76, respectively (Litman, 2008).

Meaning in Life Questionnaire (MLQ). The Meaning In Life Questionnaire (Steger et

al., 2006) assesses presence as well as search for meaning in life. It asks respondents to rate how

true ten statements are regarding meaning in their life, on a scale from 1 (Absolutely Untrue) to 7

(Absolutely True). It is composed of two five-item subscales. The Presence subscale measures one's sense that their life is meaningful, with five items such as "I understand my life's meaning" and "My life has a clear sense of purpose". The Search subscale measures the degree to which one is searching for meaning in life, using five items, including "I am looking for something that makes my life feel meaningful" and "I am seeking a purpose or mission for my life". The Presence subscale score is obtained by adding all subscale items together with item #9 being reverse scored; the Search subscale involves adding all the subscale items together. Scores for both scales can range from 5 to 35. Internal consistency for both subscales was acceptable, with a Cronbach's α of .86 for Presence and .87 for Search. The Presence subscale is correlated with several theoretically related quality of life measures such as life satisfaction, love and joy (Steger et al., 2006). The Search subscale was not significantly correlated with the Presence subscale but was found to have significant correlations with several measures of negative affect (Steger, Frazier, et al., 2006). A copy of the questionnaire can be found in Appendix B.

Brief Personal Meaning Profile (PMP-B). The Personal Meaning Profile (McDonald, Wong & Gingras, 2012) assesses which sources individuals derive meaning from by asking participants to indicate the extent that each of 21 statements reflects their own lives on a seven-point scale, from 1 (Not at all) to 7 (A great deal). It is comprised of 7 subscales with three items each, representing many of the theorized contributors to meaning (Cronbach's α values are listed in parentheses): Religion (α = .92), Achievement (α = .75), Relationship (α = .75), Intimacy (α = .80), Self-Transcendence (α = .76), Self-Acceptance (.66) and Fair Treatment (α = .78). The total scale (obtained by adding up all subscale scores) has acceptable internal consistency, with a demonstrated Cronbach's α of .84. This study used all the subscale scores independently to determine which sources of meaning individuals identify with most, with higher scores

indicating that the participant understands this source to be a prominent source of meaning in their life. The score for each subscale is obtained by adding up the ratings from all three items composing that scale, then dividing by three. A copy of the measure appears in Appendix C. As it is a copyrighted instrument, Dr. Paul Wong was contacted to secure approval to use the instrument in this study.

Procedure

This study used Qualtrics to collect responses electronically over the internet from a population provided by Amazon's Mechanical Turk service. Upon reading a short introduction about the study and consent form (see Appendix E), a link directed consenting participants to Qualtrics for the survey. Once there, respondents began by completing a demographics questionnaire (see Appendix D), followed by all the curiosity and meaning in life instruments presented in a randomized order to control for order of presentation effects. Participants took 7 minutes on average to complete the full battery of instruments, after which participants were thanked for their participation and given a debriefing statement. This statement provided participants with an overview of the study's purpose, contact information for the researcher should there be any questions or concerns following the study and ways to access nationally available mental health and trauma resources.

<div align="center">

Results

</div>

Internal Consistency

Internal consistency, as measured by Cronbach's *α,* exceeded .70 for all measures except Self-Acceptance (.67) (see Table 5). Cronbach's alpha values for the 5-item Interest and Deprivation subscales of the Epistemic Curiosity Scale (.82 and .85, respectively) indicated good

internal consistency. Likewise, the Meaning in Life Questionnaire Presence and Search 5-item

subscales had excellent internal consistencies (.91 and .95, respectively).

Table 5

Internal Consistency of Measures (N =190)

Measures	Cronbach's α
Epistemic Curiosity Scale (ECS)	
Interest subscale(ECS-I)	.82
Deprivation subscale (ECS-D)	.85
Meaning in Life Questionnaire (MILQ)	
Presence subscale (MILQ-P)	.91
Search subscale (MILQ-S)	.95
Personal Meaning Profile-Brief (PMP-B)	
Achievement (PMP-B Ach)	.77
Relationship (PMP-B Rlt)	.77
Religion (PMP-B Rlg)	.94
Self-Transcendence (PMP-B S-T)	.85
Self-Acceptance (PMP-B S-A)	.67
Intimacy (PMP-B Imc)	.89
Fair Treatment (PMP-B FT)	.87
Total PMP-B	.91

In the PMP-B Self-Acceptance subscale, internal consistency dropped below .70, the

level at which the internal consistency index is deemed acceptable (Schmitt, 1996). Further

examination indicated a very low inter-item correlation for item 21 ("I have learned to live with

suffering and make the best of it.") and the two other items in the subscale (.33 and .39). As the

PMP-B subscales consist of only three items, one weak item can have a demonstrable impact on

the overall internal consistency. It is important to note that the internal consistency of .67 for

Self-Acceptance exceeds the previously established value found by McDonald et al. (2012) of .66 and so was not be treated as an aberration for the purposes of analysis.

Descriptive Statistics

The distributions of scores for the variables at the focus of this study (interest and deprivation-type curiosity, search for meaning in life, presence of meaning in life, and the seven sources of meaning in life) yielded several notable results upon examination (see Table 2).

There was no significant difference in the degree to which the participants reported having meaning in their lives ($M = 24.54$, $SD = 7.86$) and the degree to which they searched for meaning in their lives ($M = 22.89$, $SD = 8.62$), $p = .06$. These levels of presence of meaning and search for meaning are comparable to results obtained by the scale's authors across various studies (Steger & Kashdan, 2007; Steger et al., 2008) for presence ($M = 23.50$, $SD = 6.60$ and $M = 24.10$, $SD = 6.20$) and search ($M = 23.10$, $SD = 6.60$ and $M = 23.50$ and $SD = 6.40$). These studies used university convenience samples, with a mean participant age (19 years of age) lower than the youngest participant in this study's Amazon Turk sample (24 years of age).

The mean for the interest subscale of the Epistemic Curiosity Scale (ECS) ($M = 14.97$, $SD = 3.27$) was significantly higher than the mean for the deprivation subscale ($M = 11.99$, $SD = 3.59$), $p < .001$, indicating that the participants engaged in appetitive interest-type curiosity significantly more than deprivation anxiety-reducing curiosity. These means were similar to previous findings by the instrument's authors when using a community sample (Litman et al., 2010) with ages ranging from 18-70. They reported an interest subscale mean of 15.93 ($SD = 3.76$) and a deprivation subscale mean of 12.80 ($SD = 4.30$). Participants in both studies reported more interest-type curiosity than deprivation-type curiosity.

Table 2

Descriptive Statistics of the Measures (N = 190)

Measures	*Mean*	*SD*	Scale Range	Sample Range
Epistemic Curiosity Scale (ECS)				
Interest subscale (ECS-I)	14.97	3.27	5.0-20.0	6.0-20.0
Deprivation subscale (ECS-D)	11.99	3.59	5.0-20.0	7.0-20.0
Meaning in Life Questionnaire (MILQ)				
Presence subscale (MILQ-P)	24.54	7.86	5.0-35.0	4.0-28.0
Search subscale (MILQ-S)	22.89	8.62	5.0-35.0	5.0-35.0
Personal Meaning Profile-Brief (PMP-B)				
Achievement (PMP-B Ach)	15.47	3.59	3.0-21.0	3.0-21.0
Relationship (PMP-B Rlt)	15.90	3.65	3.0-21.0	3.0-21.0
Religion (PMP-B Rlg)	11.99	6.39	3.0-21.0	3.0-21.0
Self-Transcendence (PMP-B S-T)	13.62	4.21	3.0-21.0	3.0-21.0
Self-Acceptance (PMP-B S-A)	14.97	3.55	3.0-21.0	6.0-21.0
Intimacy (PMP-B Imc)	15.09	5.34	3.0-21.0	3.0-21.0
Fair Treatment (PMP-B FT)	15.03	4.08	3.0-21.0	3.0-21.0
Total PMP-B	102.06	21.20	21.0-147.0	33.0-144.0

For the Personal Meaning Profile – Brief (McDonald, Wong, & Gingras, 2012), there were only two large deviations from previously demonstrated means; the Religion subscale and the Self-Transcendence subscale. The observed mean for religion was 11.99 (*SD* = 6.39) compared to 16.82 in the original authors' (McDonald et al., 2012) data, and a mean of 13.62 (*SD* = 4.21) observed for the Self-Transcendence subscale in this study was lower than the 16.12 from the original author's data. The other five subscales all had means around 15 or above, comparable to the original authors' findings (see Table 2).

Relationships of the Main Variables with Gender, Age, and Level of Education

Women and men were not significantly different with respect to the principal variables of this study. Only one participant identified their gender as non-binary and could not be analyzed as a third group with the main variables. However, religion as a source of meaning in life approached significance ($p = .056$) where women ($M = 13.28$, $SD = 6.37$) appeared to endorse religion as a source of meaning more than the men ($M = 11.40$, $SD = 6.32$).

Table 3

Relationships Between Age and the Main Variables

Measures	*R*	*p*
Epistemic Curiosity Scale		
Interest (ECS-I)	-.11	.13
Deprivation (ECS-D)	-.29	< .001
Meaning in Life Questionnaire (MILQ)		
Presence (MILQ-P)	-.06	.39
Search (MILQ-S)	-.22	.003
Personal Meaning Profile – Brief (PMP-B)		
Achievement (PMP-B Ach)	-.12	.10
Relationship (PMP-B Rlt)	-.10	.15
Religion (PMP-B Rlg)	.05	.19
Self-Transcendence (PMP-B S-T)	-.19	.007
Self-Acceptance (PMP-B S-A)	.12	.11
Intimacy (PMP-B Imc)	.02	.77
Fair Treatment (PMP-B F-T)	-.13	.07
Total PMP-B	-.06	.39

The relationships between age and the study's main variables were also examined (see Table 3). Older participants reported experiencing less uncertainty-reducing deprivation-type

curiosity ($r = -.29$), were searching for meaning in life less ($r = -.22$), and reported less prominence of self-transcendence as a source of meaning in their lives ($r = -.19$). Age has been linked to certain curiosity-type profiles, with older individuals being more likely to have lower overall curiosity (Kashdan et al., 2018; Giambra et al., 1992). A reduction in searching for meaning as age increases has also been demonstrated (Steger et al., 2009; Park et al., 2010).

Table 4

Relationship Between Highest Level of Education Attained and the Main Variables

| | Education | | | | |
| | Bachelor's Degree or Higher ($N = 143$) | | Some College or Lower ($N = 47$) | | |
Measures	*Mean*	*SD*	*Mean*	*SD*	*p*
Meaning In Life Questionnaire (MILQ)					
Presence (MILQ-P)	25.21	7.30	22.49	9.13	.07
Search (MILQ-S)	23.90	8.37	19.81	8.71	.004
Epistemic Curiosity Scale (ECS)					
Interest (ECS-I)	15.06	3.01	14.72	3.99	.60
Deprivation (ECS-D)	12.20	3.55	11.36	3.72	.18
Personal Meaning Profile-Brief (PMP-B)					
Achievement (PMP-B Ach)	15.72	3.46	14.70	3.90	.09
Relationship (PMP-B Rlt)	16.36	3.43	14.51	3.98	.002
Religion (PMP-B Rlg)	12.22	6.36	11.30	6.54	.39
Self-Transcendence (PMP-B S-T)	14.22	3.97	11.79	4.41	.001
Self-Acceptance (PMP-B S-A)	15.09	3.22	14.57	4.44	.38
Intimacy (PMP-B Imc)	15.38	5.24	14.21	5.63	.19
Fair Treatment (PMP-B F-T)	15.50	3.84	13.57	4.48	.005
Total PMP-B	104.49	20.68	94.66	21.27	.006

The participants were sorted into two groups based on completion of a bachelor's degree. Individuals who reported having a bachelor's degree or beyond searched for meaning significantly more ($M = 23.90$, $SD = 8.37$) than those who reported lower education levels ($M = 19.81$, $SD = 8.71$), $p = .004$. Although only approaching significance ($p = .07$), they also experienced more meaning in life. Likewise, they endorsed Relationship, Self-Transcendence, and Fair Treatment as sources of meaning in their lives significantly more than those who had lower education levels (see Table 4).

Bivariate Correlations of the Main Variables

A full zero-order correlation matrix was constructed for a preliminary analysis of the main variables this study is concerned with (see Table 6). Appetitive interest-type of curiosity was positively correlated with deprivation-type uncertainty-reducing curiosity, $r = .42$. This is comparable to previously established correlations in the literature of $r = .47$ in a university student sample (Litman, 2008) and $r = .36$ (Litman et al., 2010) in a general sample.

Presence and search for meaning in life were not correlated. Neither type of curiosity was associated with presence of meaning in life, although both interest-type ($r = .28$) and deprivation-type ($r = .38$) had positive correlations with search for meaning in life. All the sources of meaning in life were positively related to one another.

Table 6
Zero-Order Correlation Matrix for All Variables (N=190)

Var	Itr	D	PM	SM	Ach	Rlt	Rlg	S-T	S-A	Imc	FT	PMP-T
Itr	-	.421*	-.020	.283*	.454*	.297*	-.081	.398*	.119	.084	.221*	.266*
D	.421*	-	.033	.382*	.329*	.152!	.186!	.395*	.103	.070	.117	.274*
PM	-.020	.033	-	-.059	.516*	.476*	.231*	.405*	.259*	.525*	.517*	.595*
SM	.283*	.382*	-.059	-	.195*	.210*	.287*	.467*	.055	.117	-.059	.289*
Ach	.454*	.329*	.516*	.195*	-	.591*	.192*	.599*	.288*	.461*	.491*	.707*
Rlt	.297*	.152!	.476*	.210*	.591*	-	.201*	.573*	.410*	.484*	.625*	.758*
Rlg	-.081	.186!	.231*	.287*	.192*	.201*	-	.435*	.304*	.157!	.265*	.597*
S-T	.398*	.395*	.405*	.467*	.599*	.573*	.435*	-	.302*	.376*	.534*	.778*
S-A	.119	.103	.259*	.055	.288*	.410*	.304*	.302*	-	.272*	.430*	.590*
Imc	.084	.070	.525*	.035	.461*	.484*	.157!	.376*	.272*	-	.482*	.674*
FT	.221*	.117	.517*	.117	.491*	.625*	.265*	.534*	.430*	.482*	-	.763*
PMP-T	.266*	.274*	.595*	.289*	.707*	.758*	.597*	.778*	.590*	.674*	.763*	-

Itr(ECS Interest), D(ECS Deprivation), PM(MILQ Presence), SM(MILQ Search), Ach(PMP-B Achievement), Rlt(PMP-B Relationship), Rlg(PMP-B Religion), S-T(PMP-B Self-Transcendence), S-A(PMP-B Self-Acceptance), Imc(PMP-B Intimacy), FT(PMP-B Fair Treatment), PMP-T(Personal Meaning Profile Total Score).

* denotes significance at $p < .001$ level, **!** denotes significance at $p < .05$ level

Research Question 1: Presence of Meaning in Life and the Two Types of Curiosity

The first research question in this investigation concerned the relationship between the two different types of curiosity and the presence of meaning in life. The hypothesis predicted that interest-type appetitive curiosity would have a stronger positive relationship with presence of meaning in life than deprivation-type uncertainty reducing curiosity.

Table 7

Multiple Regression Analysis for Variables Predicting Presence of Meaning (N = 190)

Variable	*B*	*SE B*	*β*	*T*	*P*
Interest	-.10	.19	-.04	-.50	.62
Deprivation	.11	.18	.05	.62	.54

Note: R^2 = .002, adjusted R^2 = -.008

A multiple regression was employed to determine whether appetitive interest-type curiosity or deprivation-type uncertainty-reducing curiosity is a better predictor of how participants feel meaning is present in their lives. The model combining these two facets of curiosity did not account for a significant variance of presence of meaning in life, R^2 = .002, F(2, 187), p = .80. Neither type of curiosity was a significant predictor of presence of meaning in life.

Tests of multicollinearity were performed, resulting in a tolerance index value of .82 and variance inflation factor (VIF) of 1.22. Since the tolerance index is above .2 and the VIF is below 4, there were no multicollinearity issues.

Positive relationships between presence of meaning in life and other measures of curiosity theoretically similar to interest-type curiosity have been demonstrated (Kashdan & Steger, 2007, Kashdan et al., 2018); however, no such relationship was found in this study when the Presence subscale of the Meaning in Life Questionnaire (MILQ) was used.

The Meaning in Life Questionnaire (MILQ) takes a top-down approach to determine whether participants feel that their lives are meaningful and purposeful; it explicitly asks them if they understand their lives as meaningful. Another way of measuring presence of meaning in life would be to take a bottom-up approach; ask people how important different theorized sources of meaning are to themselves. Combining the seven sources of meaning from the Personal Meaning Profile – Brief (PMP-B) allows for an approximation of this bottom-up approach. The PMP-B was designed to both identify what is important in people's lives and measure their perception of overall personal meaning in their lives (McDonald, Wong & Gingras, 2012).

As shown in Table 6, presence of meaning in life (Presence subscale of the MILQ) and the total score on the Personal Meaning Profile – Brief (PMP-B) were significantly positively correlated at .60 (see Table 4). Thus there is significant theoretical and statistical overlap between presence of meaning in life as measured by the Meaning in Life Questionnaire (MILQ) Presence subscale and the overall endorsement of prominent sources of meaning in life as measured by the Personal Meaning Profile – Brief (PMP-B) total score. Overall endorsement of prominent life meaning sources (PMP-B Total score) had statistically significant zero-order correlations with presence of meaning in life ($r = .60$), search for meaning ($r = .29$), interest-type curiosity ($r = .27$) and deprivation-type curiosity ($r = .27$).

Although not proposed in research question 1, a multiple regression was performed to examine any relationship between the two different types of curiosity and the overall endorsement of prominent sources of meaning in life (Personal Meaning Profile – Brief Total scale score).

Table 8

Multiple Regression Analysis for Variables Predicting the Total Score on the Personal Meaning Profile – Brief (PMP-B) (N = 190)

Variable	*B*	*SE B*	*β*	*T*	*P*
Interest	1.19	.50	.18	2.41	.02
Deprivation	1.16	.45	.20	2.57	.01

Note: $R^2 = .10$, adjusted $R^2 = .09$

The model combining interest-type appetitive curiosity and deprivation-type uncertainty-reducing curiosity accounted for 10% of the variance in presence of meaning in life as measured by the endorsement of seven sources of meaning in life, $F(2, 187) = 10.69$, $p < .001$. Interest-type curiosity accounted for 3% of the total variance, while deprivation-type accounted for 4% of the total variance. Possessing higher interest-type and deprivation-type curiosity were both associated with a greater overall endorsement of the seven sources of meaning (see Table 8). A multicollinearity test yielded a tolerance index value of .82 and a variance inflation factor (VIF) of 1.22, indicating no multicollinearity issues among the predictors.

Research Question 2: Search For Meaning in Life and the Two Types of Curiosity

The second research question asked which type of curiosity would better predict how engaged the participants are in a search for meaning. The hypothesis predicted a stronger positive relationship between deprivation-type curiosity and searching for meaning in life than interest-type curiosity and searching for meaning.

Table 9

Multiple Regression Analysis for Variables Predicting Search for Meaning (N = 190)

Variable	B	$SE\ B$	β	t	p
Interest	.39	.19	.15	2.01	.05
Deprivation	.76	.18	.32	4.33	<.001

Note: $R^2 = .16$, adjusted $R^2 = .16$

A multiple regression analysis was performed to evaluate interest- and deprivation-type curiosities as predictors of search for meaning. The set of interest- and deprivation-type curiosities accounted for 16% of the total variance in search for meaning in life, $F\ (2,\ 187) = 18.31$, $p < .001$. Both deprivation- and interest-type curiosities made significant independent contributions to search for meaning variance. As participants' reported levels of deprivation-type uncertainty reducing curiosity or interest-type appetitive curiosity increased, so did their propensity to search for meaning in their lives. However, deprivation-type curiosity accounted for more of the total variance in search for meaning in life (10%) than interest-type curiosity did (2%). With a tolerance index statistic of .82 and a variance inflation factor (VIF) of 1.22, no multicollinearity issues were present.

Research Question 3: Sources of Meaning in Life and the Two Types of Curiosity

For the third research question, there were two parts. The first concerned the relationship between appetitive interest-type curiosity and specific sources of meaning in life. This relationship was examined using a hierarchical regression that controlled deprivation-type curiosity at step one of the regression analysis. The relationship between the deprivation- and interest-type curiosity was significant, $R^2 = .18$, $F(1,\ 188) = 40.53$, $p < .001$. The two types of curiosity were positively correlated with each other.

In the second step of the regression analysis, the seven sources of meaning in life were added to determine if each accounted for any variance in interest-type curiosity. The addition of these seven sources of meaning significantly improved the prediction of interest-type curiosity, R^2 change = .21 $F(8, 181) = 14.18$, $p < .001$. Of the seven sources of meaning, four were predictive of interest-type curiosity. Religion accounted for 9% of the total variance in interest-type curiosity. However, this relationship with interest-type curiosity was inverse. Greater interest-type curiosity was associated with lesser endorsement of religion as a source of meaning in life. Achievement accounted for 8% of the total variance in interest-type curiosity, followed by self-transcendence (7%). Higher endorsement of achievement and self-transcendence as sources of meaning in life were associated with greater interest-type curiosity. Intimacy accounted for 2% of the total variance in interest-type curiosity but was inversely correlated. Greater interest-type curiosity was associated with lesser endorsement of intimacy as a source of meaning in life. See Table 10.

The predictors in the hierarchical regression analyses were screened for any multicollinearity issues, but with no tolerance indices below .2 and no variance inflation factors (VIF's) above 4, multicollinearities were not present.

Table 10

Hierarchical Regression Analysis for Variables Predicting Interest-Type Curiosity (N = 190)

Variable	B	SE B	β	t	P
Step 1					
Deprivation	.38	.06	.42	13.81	<.001
Step 2					
Deprivation	.25	.06	.28	4.24	<.001
Achievement	.27	.08	.29	3.56	<.001
Relationship	.04	.08	.04	.50	.62
Religion	-.15	.03	-.30	-4.48	<.001
Self-Transcendence	.20	.07	.26	2.87	.005
Self-Acceptance	.03	.06	.04	.53	.59
Intimacy	-.09	.04	-.16	-2.29	.02
Fair Treatment	.02	.07	.02	.28	.78

Note: $R^2 = .18$ for Step 1 (*p < .001*), $\Delta R^2 = .21$ for Step 2 (*p* < .001)

The second part of the third research question concerned the relationship between deprivation-type curiosity and the same seven sources of meaning in life. Step one involved controlling interest-type curiosity. The relationship between the set of deprivation- and interest-type curiosities was significant, $R^2 = .18$, $F(1, 188) = 40.53$, $p < .001$. The two types of curiosity were positively correlated with each other.

Step 2 added the seven sources of meaning in life, and the addition of this set of predictors significantly improved the prediction of deprivation-type curiosity, R^2 change = .10,

$F(8, 181) = 8.70$, $p < .001$. However, only self-transcendence as a source of meaning significantly predicted deprivation-type curiosity, accounting for 7% of the total variance in deprivation-type curiosity. Placing a high value on self-transcendence as a source of meaning in life was related to higher levels of deprivation-type curiosity. See Table 11. All the predictors had tolerance index values above .2 and variance inflation factors (VIF) below 4, indicating the absence of any multicollinearities among the predictors.

Table 11

Hierarchical Regression Analysis for Variables Predicting Deprivation-Type Curiosity (N = 190)

Variable	B	SE B	β	t	p
Step 1					
Interest	.46	.07	.42	6.37	<.001
Step 2					
Interest	.36	.09	.33	4.24	<.001
Achievement	.14	.09	.14	1.47	.14
Relationship	-.12	.09	-.13	-1.33	.18
Religion	.07	.04	.13	1.64	.10
Self-Transcendence	.23	.08	.27	2.76	.006
Self-Acceptance	.01	.07	.01	.18	.86
Intimacy	-.02	.05	-.03	-.38	.71
Fair Treatment	-.10	.08	-.11	-1.24	.22

Note: $R^2 = .18$ for Step 1 ($p < .001$), $\Delta R^2 = .10$ for Step 2 ($p = .001$)

These findings for research question three are summarized in Table 12 along with the hypothesized relationships.

Table 12

Anticipated vs. Observed Relationships between the Motives for Curiosity and the Sources of

Meaning in Life

Source of Meaning in Life	Hypothesized Relationship	Observed Relationship
Achievement	(+)Appetitive interest-type Curiosity, stronger predictor than (+)Deprivation-type uncertainty reducing curiosity	(+) Interest-type curiosity
Relationship	(+) Appetitive interest-type curiosity only	No relationship observed
Intimacy	(+) Appetitive interest-type curiosity only	(-) Interest-type curiosity
Self-Transcendence	(+) Appetitive interest-type curiosity only	(+) Interest-type & (+) Deprivation -type curiosity
Self-Acceptance	No prediction made	No relationship observed
Fair Treatment	No prediction made	No relationship observed
Religion	No prediction made	(-) Interest-type curiosity

Discovering and experiencing meaning in life is an essential factor in resilience and

psychological well-being and is a target of therapeutic interventions such as logotherapy. As a

mechanism to augment one's current experiences and understanding, curiosity has been

identified as a pathway to generating meaning (Kashdan & Steger, 2007). Different types of

curiosity were hypothesized to have different effects on the assembly of meaning in life.

Uncertainty-reducing deprivation-type curiosity is characterized by a need to satisfy a craving for

specific information or relieve an uncomfortable deficiency in one's existing knowledge. It is

associated with narrowed focus and tenacity (Litman, 2008). Appetitive interest-type curiosity

describes engagement in flexible exploration and learning because indulging emerging

fascination is enjoyable. It is associated with an openness to various novel topics or information (Kashdan, Rose & Fincham, 2004). This study was designed to add to the existing literature by determining the unique relationship these different meaning processes have with meaning in life, the search for meaning in life, and the endorsement of various sources of meaning in life.

Discussion

Findings from this study extend existing knowledge about the relationships between curiosity and meaning in life. One new finding was that deprivation-type epistemic curiosity has a stronger relationship with searching for meaning in life than does interest-type epistemic curiosity. Another novel finding made by this study was that the two types of curiosity are related to different sources of meaning in life. Interest-type epistemic curiosity was positively related to self-transcendence and achievement and inversely related to religion and intimacy as sources of meaning in life. Deprivation-type epistemic curiosity was only related to self-transcendence as a source of meaning in life. Another particularly intriguing finding was that neither type of curiosity was related to how much participants feel meaning is present in their lives, but both types of curiosity were positively related to overall endorsement of meaning sources. These various findings will be discussed below, followed by the clinical implications and limitations of this study.

Interest and Deprivation-Type Curiosity Predicting Presence of Meaning in Life

This study examined if the two curiosity types differed in their association with the strength of people's assertion that meaning is present in their lives. This study hypothesized that appetitive interest-type curiosity would better predict meaning in life compared to deprivation-type uncertainty-reducing curiosity. This was built on findings from Kashdan et al. (2018) and Kashdan and Steger (2007) of a relationship between other conceptions of curiosity and presence

of meaning in life. In the current study, however, both types of curiosity failed to predict presence of meaning in life. Potential reasons for this discrepancy in findings between previous studies and this study include the current study's use of an MTurk sample and different curiosity measures used.

The Epistemic Curiosity Scale (ECS) used as a measure of interest- and deprivation-type curiosity in this study deals primarily with curiosity about information (Litman, 2008). Although the ECS scales had moderate correlations with the curiosity measures used in other studies linking curiosity and presence of meaning (the Joyous Exploration subscale in the Kashdan Five Dimension Curiosity Scale (2018), and the Curiosity and Exploration Inventory in the Kashdan et al. (2004)), these other curiosity measures also explicitly included openness to new experiences and opportunities for growth. As measured in this study, the narrower focus of interest curiosity may not function as a tool for making meaning through trauma by approaching difficult experiences as challenges (Kashdan & Silva, 2009; Bandura, 1977) since it does not explicitly include those elements of growth and openness to experiences.

Similarly, the lack of experiential aspects of curiosity captured in the ECS may be selecting for curious individuals who have accumulated much in the way of information and knowledge, but not for curious people who experience competence and autonomy from having successfully navigated many novel experiences. Scorers high in ECS interest-type curiosity may not be able to use self-determination theory pathways to meaning (Martela et al., 2017). They also may not experience positive affect in comparable quantities to those who score higher in broader measures of curiosity, as meaning can be found through the consistent experience of positive affect (King et al., 2006),

This sample also diverges from the university undergraduate convenience sample used by one study that demonstrated a link between curiosity and meaning in life (Kashdan & Steger, 2007). The current study participants had a mean age of 38, much higher than that of a university student sample. In previous studies, age has been found to positively correlate with presence of meaning in life (Reker, Peacock & Wong, 1987, Steger, Oishi & Kashdan, 2009); however, the current study did not find an association between age and presence of meaning in life. Older participants reported less deprivation-type curiosity. This agrees with previous findings that identified an overall decrease in curiosity with age (Giambra, Camp, & Grodsky, 1992) and a change in the nature of one's curiosity (Kashdan et al., 2018); as age increased, so did the likelihood that an individual would fit "problem solver" or an "avoider" curiosity profiles, with younger participants more likely to be "empathizer" or "fascinated" curiosity profiles. "Problem solvers" were high in curiosity dimensions analogous to interest- and deprivation-type curiosity and lower in social curiosity, while "avoiders" were lower in interest- and deprivation-type curiosity but higher in social curiosity.

Furthermore, this study's participants had attained a higher average education (75% with completed bachelor's degrees or higher) than university samples where the students are generally still working on their undergraduate degree. This study did find that higher education was significantly associated with more searching for meaning in life. The findings suggest that older adults in life circumstances outside of the university environment may have pathways to meaning that differ from university students.

This study did find that both interest-type and deprivation-type curiosity have significant, positive, and roughly equal relationships with overall endorsement of meaning from various sources. This finding suggests that curious people know more about specific aspects of their life

that give them meaning than less curious people, even if they don't experience meaning as strongly present. The significant correlation between an overall endorsement of the various sources of meaning and presence of meaning would indicate that while these two variables may not be strictly equivalent, strongly endorsing many different sources of meaning in life is related to feeling a strong presence of meaning.

Both the PMP-B and the MILQ-P instruments share considerable theoretical and statistical basis, but there is a critical difference in phrasing between the items of the two scales that may affect how curious people respond. The MILQ-P refers to meaning as a singular achievement, or existential plateau one arrives at ("has a clear sense of purpose," "understand my life's meaning," "have discovered a satisfying life purpose"). This implies that a person who answers in the affirmative must have reached a sort of "meaning-in-life foreclosure" where it may no longer be necessary to keep engaging with new (and old) aspects of life to experience meaningfulness or significance from them. People might simply remind themselves that life is meaningful "because I found x," or "because I made it through y" like a personal mantra, and thereby experience reassurance or fulfillment. The Personal Meaning Profile – Brief also contains some items that imply meaning as a binary state using past-tense or declarative statements ("have found someone I love," "have learned to live with suffering and make the best of it," "I accept what cannot be changed"), but many of the other items on the PMP-B portray meaning as an effortful process or dynamic interaction between the person and the source of meaning ("seek to do God's will," "I take initiative," "strive to make this world a better place," "make a significant contribution to society"). The previously referenced items from the MILQ could be rephrased in this manner, e.g., "Much of what I am, what I do and what I have done, gives my life meaning," or, "When I examine my life, I am able to understand why it is

meaningful," or "Dedicating my life to a purpose brings me satisfaction" to avoid framing meaning as a milestone instead of a process.

In a recent review of what distinguishes curiosity vs. interest, Grossnickle (2016) named four elements that comprise curiosity: a response to "collative variables" (novelty, complexity, ambiguity, challenge, and uncertainty), a positive emotional-motivational system, exploratory behavior, and a general need for knowledge and information. A person predisposed to experience positive feelings, drive for information, and to explore when in the presence of new, interesting, or unknown elements will probably not find much utility or permanent significance in a single, immutable meaning or purpose for their life. In a sense, subscribing to a fixed, central purpose as phrased in the MILQ-P would reduce the significance of all future exploration and discoveries; the biggest prize has already been obtained.

This discrepancy between curious people's PMP-B total scores and MILQ-Presence scores suggests that highly curious people have a unique relationship with meaningfulness. Curiosity, particularly epistemic curiosity, may be characterized by a reluctance to find any purpose/life meaning definitive or absolute, as it lowers the stakes for future curious endeavors. Therefore, they would be unlikely to respond with a firm "absolutely true" when asked if they "understand my life's meaning" but also experience more meaningful lives than incurious people, as indicated by the sum of their sources of meaning in life.

Interest and Deprivation-Type Curiosity Predicting Search for Meaning in Life

To better understand how interest- and deprivation-type curiosities differentially augment how people experience meaning in life, this study also examined their relationship with searching for meaning. Both conceptions of curiosity were positively related to searching for meaning in life. The results also confirmed the hypothesis that participants with greater levels of

deprivation-type curiosity would be more likely to search for meaning in life than those who report greater levels of interest-type curiosity.

In general, curious people appear to be more prone to search for meaning in their lives and previous findings using conceptions of curiosity similar to interest-type (Kashdan & Steger, 2007; Steger et al., 2008) found a positive relationship. The reasons for the relationship between interest-type appetitive curiosity and searching for meaning in life have previously been explored, and a complex theoretical model was tested by Kashdan and Steger (2007). The current study builds on their discovery by introducing a different conception of curiosity and evaluating it alongside interest-type curiosity as a predictor of searching for meaning. Deprivation-type curiosity is a stronger predictor of searching for meaning in life than interest-type curiosity, suggesting that people frequently pushed by unpleasant arousal to reconcile gaps in their knowledge may also treat meaning deficits in life similarly, by pursuing it persistently. Theorized reasons for this unpleasant arousal might be due to suspicions that one lacks the necessary competence for daily life (Litman & Silva, 2006), or that one is undergoing a life-stage crisis (Robinson, Demetre & Litman, 2017). Further investigation, including competence and presence of crisis as variables, could evaluate these theories.

Sources for Meaning in Life and Curiosity

The findings regarding the two types of curiosity and sources of meaning in life were quite different from the hypothesized outcome. Interest-type curiosity was significantly associated with multiple sources of meaning (achievement, self-transcendence, intimacy, and religion) as predicted, but was not related to relationships as a source of meaning. Additionally, intimacy and religion were inversely related to interest-type curiosity, while self-transcendence and achievement were positively related. Individuals who experience interest-type curiosity to a

higher degree were more likely to profess achievement and self-transcendence as sources of meaning, and less likely to report religion and intimacy as meaningful. Unlike the hypothesized characterization of interest-type curiosity as a potential pathway for many different sources of meaning, it was associated with just as many reductions in meaning sources as with increases.

A simple explanation may be valid for the observed positive and inverse relationships between appetitive interest-type curiosity and the various sources of meaning in life. It hinges on the distinction between "being" and "doing," a critical theoretical divide encountered in meaning in life literature (Bellin, 2012). The sources positively related to interest-type curiosity, achievement, and self-transcendence, are quite different constructs, possibly diametrically opposed in focus (Ros, Schwartz & Surkiss, 1999). The former involves concern for personal well-being, development, and success; the latter involves concern for and involvement on others' behalf. What makes them both alike and unique among all seven sources of meaning assessed here is they require dedicated and effortful engagement in purposeful behavior, or "doing." Achievement as a psychological meaning construct is "a desire to develop, attain or demonstrate competence in an activity" (Eren, 2009, p. 130), and "being committed to one's work, believing in its worth, and liking challenge" (Emmons, 2005, p. 108). Similarly, self-transcendence is often conceptualized as an activity or engagement outside of the self: "experiencing something or encountering someone" and "creating a work or doing a deed" (Frankl, 1963, p. 50), and "make a significant contribution to society… strive to make this world a better place" from the Personal Meaning Profile – Brief's self-transcendence subscale (Wong, 2012).

The sources inversely associated with interest-type curiosity, intimacy and religion, both provide meaning from a sense of being: belonging, devotion, and communication within a relationship. Intimacy generates meaning by satisfying a desire for a "close, reciprocal

relationships" (Emmons, 2004) and a "feel like part of a larger symbolic entity" (Lambert, 2013), and religion by satisfying the desire for "a personal relationship with God" (Wong, 1998) and "recognition of a transcendent, metaempirical dimension of reality" (Emmons, 2005). Indeed, there is purposeful activity and work involved in cultivating and maintaining intimate relationships and religious faith. Still, the sense of meaningfulness arises from the realization and appreciation of these relationships, from "being" in them, not the "doing," the work invested.

Previous studies have demonstrated links between appetitive interest-type curiosity and tasks involving effort, goal commitment, and positive response to challenges, novelty, and unexpected information (Kashdan et al., 2018, Kashdan, Rose & Fincham, 2004; Litman, 2013). Appetitive interest-type curiosity may increase the salience of sources of meaning that involve "doing" or active engagement. A person who frequently experiences appetitive interest-type curiosity may be more likely to find such sources more meaningful and tend to underappreciate the meaning coming from sources that primarily involve a continued appreciation of "being," such as intimacy or religion.

The surprising inverse relationships of religion and intimacy with interest-type curiosity may also result from curious people having different emotional processing and regulation needs. Intimacy provides emotional stability as a "regulatory system that contributes to the maintenance of positive affect and the downregulation of negative affect… an important extrinsic emotion regulation strategy" (Debrot, Schoebi, Perrez & Horn, 2013, pp. 1373-1374). Sharing emotional information with an intimate partner prolongs the effects of a positive emotional experience and solicits aid to address one's various needs (socio-affective, cognitive and practical) following a negative emotional event (Rime, 2007). Intimate relationships also facilitate a sense of attachment security (Shaver & Mikulincer, 2007), significantly augmenting one's internal

emotional management resources such as perspective-taking, ability to maintain equanimity, and confidence in one's personal efficacy. Religion as a meaning framework provides a method to reframe stressful occurrences that would otherwise be emotionally destabilizing (Park, 2005). Religious practices such as reciting prayers aloud and spiritual meditation/contemplation are tools that can moderate emotional arousal, and many tenets of religion provide guiding perspectives on challenging emotions such as guilt and anger (Watts, 2007). People with a higher need for supplemental emotional regulation may value or endorse sources of meaning that provide regulation, like intimacy and religion.

People with considerable appetitive interest-type curiosity may not be utilizing external or supplemental emotional regulation systems as much as their less-curious peers. Therefore, they derive less meaning from sources that provide such systems. Interest-type curiosity has an inherent positive affective component that stimulates interest and motivates the curious behaviors (Grossnickle, 2016), which then generates more positive affect through engagement with one's environment and learning (Kashdan, Rose and Fincham, 2004). Perhaps curious people can consistently use this mechanism as a regular expression and source of positive emotion. They would have less reliance on meaning sources to provide emotional expression and regulation and place less value on intimacy and religion.

Conversely, the sources of meaning that interest-type curiosity was positively related to, self-transcendence and achievement, also share some similarities; they are both somewhat dispassionate, internally-managed, and cerebral in nature. Le and Levinson (2005) state that self-transcendence is an ability to "embrace universal concerns and ethics… perceive events and persons more clearly, accurately and impartially, without personal distortions and biases" (p. 454). The Adult Self-Transcendence Inventory (Levenson, Jennings & Aldwin, 2005) includes

statements such as "My sense of self is less dependent on other people and things," "I am more likely to engage in quiet contemplation," and "I do not become angry as easily," emphasizing strong internal emotion management and independence from external sources of positive affect. Likewise, achievement as a meaning source is found more in those with considerable independence, internal motivation, and self-regulation (Ryan & Deci, 2000). Achievement is motivated by satisfaction with engaging in a meaningful task rather than the promise of external incentives or pressures. It has a prominent cognitive aspect responsible for providing reinforcement and combating distractions (Senko, Hulleman & Harackiewicz, 2011). A significant portion of one's early life is spent in educational settings where achievement is equated with learning and demonstration of knowledge. Much of the cognitive/intellectual nature of achievement may arise from those formative years.

The positive relationship between interest-type curiosity, and achievement and self-transcendence may be due to their similar focus and content. People with higher levels of epistemic curiosity, primarily concerned with exploring knowledge and learning, find meaning sources of an unemotional, intellectual nature more compelling.

The sample composition may also explain interest-type curiosity's inverse relationship with religion. MTurk samples are less-religious than samples taken from the general population (Paolacci & Chandler, 2014); this is why religion was not hypothesized as a predictor of either type of curiosity. This sample did have a lower mean for religion as a source of meaning (11.99) than the scale's author found (16.82), and there was no significant zero-order correlation between interest-type curiosity and religion ($r = -.081$). The emergence of religion as a negative predictor in the multiple regression may be due in part to the sample's tendency to be less religious. This relationship might be even more prominent in the general population. It is an interesting finding

and warrants further examination to reproduce these results, perhaps with samples involving a general population, or one that is more religious than the baseline (for instance, clergy or practicing religious followers), and instruments measuring other conceptions of curiosity.

Deprivation-type curiosity was predicted by only one source of meaning (self-transcendence), but that source was not achievement as proposed. Significant zero-order correlations of achievement were found with both interest-type ($r = .45$) and deprivation-type curiosity ($r = .33$) as predicted. However, achievement was only a significant predictor of interest-type curiosity in the hierarchical regression. This suggests that achievement as a source of meaning shares quite a bit of the variance with the two types of curiosity.

The relationship between self-transcendence and deprivation type curiosity was not predicted, and any theoretical basis for this connection can only be supposed. Deprivation-type curiosity involves deep absorption in a task or investigation, and the questions for self-transcendence revolve around changing the world for the better and making a significant contribution. Both quantities evoke devotion or commitment exceeding normal undertakings, and perhaps there is a commonality or mechanism therein.

Clinical Implications

Curiosity from either interest or deprivation motivations may not be related to how much people believe their lives have meaning. However, both types of curiosity were linked to how much they endorse overall theoretical sources of meaning and affect the specific sources they endorse. A broad spectrum of sources is essential for psychological well-being in a clinical setting (Debats, 1999), subjective well-being in a general population (Damásio & Koller, 2015), physical well-being, and related to lower levels of depression (Wong, 1998). Interest-type curiosity is associated with finding meaning in achievement and self-transcendence, while

deprivation-type curiosity was associated with finding meaning in self-transcendence. Adapting some of the curiosity stimulation techniques being utilized within educational psychology for use in a clinical setting could be a method to augment well-being and resilience. These techniques should accomplish this by increasing overall endorsement of sources of meaning in life.

Curiosity was not beneficial for meaning in life across the board, however. Interest-type curiosity was related to lower levels of meaning from religious and intimacy sources. This could be due to peculiarities in the MTurk sample, but also potentially due to less reliance on meaning sources that provide supplementary emotion regulation strategies in curious people. Clients or patients reporting particularly high interest-type curiosity may benefit from having their attention directed towards underappreciated meaning sources and other emotion regulation methods to improve their resilience.

Furthermore, deprivation-type curiosity's stronger relationship to searching for meaning is a useful finding. Higher levels of searching for meaning can be a source of lower life satisfaction, particularly when one feels their life is currently meaningless (Steger et al., 2008). Prior literature has identified other potentially detrimental aspects of curiosity; there is substantial research correlation with addictions (Khaksari et al., 2020; Nebhinani et al., 2013) and unsated curiosity has been shown to leave reward circuitry in the brain activated, creating a risk of potentially harmful indulgence (Wiggin, Reimann & Jain, 2019).

These findings could be used to develop psychoeducational resources to augment logotherapy interventions. For example, one element could explain the distinction between being drawn into an uncomfortably intense search or investigation on a particular topic (for example, doing overly exhaustive research on a product to purchase, or prying into an acquaintance's private life to try to understand them better), and allowing oneself to become excited and freely

enjoying a new topic or new information. Learning to recognize which type of curiosity one is prone to or currently experiencing could allow for some control over it. Some mindfulness training could then be implemented to help clients let go of the need to know certain things or to open up one's perspective and start noticing topics or things to become interested in (Bieling et al., 2012; Vacca & Hoadley, 2016). Stimulating interest-type appetitive curiosity and moderating deprivation-type curiosity (particularly if the client seems to be preoccupied with a sense of meaninglessness) may result in greater overall endorsement of sources of meaning.

Limitations and Future Directions

There were several significant limitations of this study. One limitation involves the use of an online survey design, particularly one that involves MTurk as a source of participants. In online surveys, it is important to ensure that participants give the study their full attention and provide considered responses. Attempts were made to ensure that only considered responses were included in the data analysis by screening for completion time and systematic response styles. This process could be aided by the inclusion of a "catch question" that looks like all the other statements in the battery but instead gives an instruction such as "Please answer 'somewhat true' for this question." Participants providing other answers for this item may not have been reading any of the questions closely and should not be included in the analysis.

The ethnicity demographic question was designed for use in North America. As such, it does not capture the added diversity of the MTurk sample as respondents are only limited by their ability to speak English. Asking about the country of residence in addition to ethnic background would allow for a better understanding of who the participants are and for making inferences based on the type of culture predominant in their homelands.

Finally, as this is a correlational design, the causal directions cannot be determined. Various aspects of meaning in life could be responsible for changing levels of curiosity, instead of curiosity representing a pathway to meaning in life. For example, say a very curious person discovered a compelling but unexpected source of meaning in life or underwent a drastic meaning-making event (e.g., experiencing a religious conversion later in life or surviving a life-threatening illness after facing their own mortality) that inspires dramatic and lasting changes in their approach to life and their behavior. They may feel they finally "have it all figured out" and stop indulging their curiosity. This individual would report low interest-type curiosity and high meaning in life, but it would be erroneous to conclude that curiosity leads to reduced meaning in life.

Another limitation was the use of only one measure each for the types of curiosity and for presence of meaning in life. This limitation could be responsible for the discrepancy between the results from research question 1 and the existing literature. Future developments on this study's findings could utilize a more robust measure of interest curiosity to ascertain whether the ECS Interest scale is capturing the whole conceptual breadth of appetitive interest-type curiosity. Curiosity measure candidates for a follow-up study include the Five Dimension Curiosity Scale (Kashdan et al., 2018), the Novelty-Seeking and Engagement subscales of the Langer Mindfulness Scale (Pirson et al., 2012), or the Curiosity and Exploration Inventory-II (Kashdan et al., 2009). The meaning in life measure could be augmented to include measures of meaning in life that take approaches other than explicitly asking about how meaningful people feel their life is. This scale did attempt to do so by adding in the Personal Meaning Profile total scale, but other more commonly used instruments could be utilized, such as the Multidimensional

Existential Meaning Scale (George & Park, 2017) or the Sources of Meaning and Meaning in Life Questionnaire (Schnell, 2009).

The nature of curiosity itself presents a limitation for this study. Interest-type and deprivation-type curiosities were characterized as more like traits than states; participants scoring high on a type of curiosity were interpreted as experiencing this type of curiosity consistently over a considerable amount of time such that it was basically a trait. Other perspectives on curiosity assert that it may wax and wane rather than be consistent like a character trait, depending on whether interesting stimuli is present or not (Grossnickle, 2016). There was also considerable overlap between deprivation- and interest-type curiosities, with a zero-order correlation of .42, indicating that many participants experienced both. Instead of being two different trait-like quantities that exist separately, it may be that a person experiences deprivation-type curiosity in response to one stimulus and interest-type in response to another. Future research into deprivation- and interest-type epistemic curiosities could provide a wide range of stimuli and see if the curiosity stimulated is more dependent on the participant's tendencies or the type of stimuli.

To build on the findings confirming the second hypothesis, a future direction for research could be to find a more specific reason or pathway for the link between deprivation curiosity and search for meaning in life. The hypothesized reasons for this relationship include a simple propensity to seek out missing information, an unsatisfied need for competence not being met, and the presence of a life stage crisis. The Balanced Measure of Psychological Needs (Sheldon & Hilpert, 2012) and a design similar to Robinson, Demetre, and Litman (2007) could be incorporated into a replication study to evaluate these possible reasons.

Findings for the third research question suggest there may be unidentified aspects of interest-type curiosity that are responsible for its inverse relationships with intimacy and religion as sources of meaning in life. A replication of this study's methodology with a non-online sample should be done to confirm the findings and evaluate the supposition that interest-type curiosity is related to less use of supplemental or external emotion regulation strategies.

Conclusion

The central aim of the study was to provide evidence that curiosity motivated by the anticipation and enjoyment of discovery (appetitive interest-type) has a different relationship with the nature of life meaning when compared with curiosity motivated by a need to reduce uncertainty by filling in worrisome gaps in knowledge (uncertainty reducing deprivation-type). This study did not find any type of curiosity to be a significant predictor of self-reported meaning in life. The failure to detect any relationship may be due to the methodology's limitations and may indicate that splitting curiosity into narrower conceptions may reduce its overall impact on life meaning. Both types of curiosity were positively related to an overall endorsement of sources of meaning in life, and each with particular sources of meaning in life. The data confirmed the hypothesis that deprivation-type curiosity is related to more searching for meaning in life and that interest-type curiosity is linked to a broader range of sources of meaning. This study adds to the existing literature by demonstrating how the relationship between curiosity and meaning in life does depend on the motives for one's curiosity.

References

Antonovsky, A. (1987). The salutogenic perspective: Toward a new view of health and illness. *Advances, 4*(1), 47-55.

Antonovsky, A. (1993). The structure and properties of the Sense of Coherence Scale. *Social Sciences & Medicine, 36*(6), 725-733.

Aristotle, H. B., & Ross, W. D. (1924). Aristotle's Metaphysics. *Journal of Hellenic Studies, 45*(1), 1-528.

Arnone, M. P. & Small, R. V. (1995). Arousing and sustaining curiosity: Lessons from the ARCS model. Proceedings from AECT 1995: *Annual National Convention of the Association for Education Communications and Technology,* Anaheim, CA: Eric.

Ashton-James, C. E., Kushlev, K. & Dunn, E. W. (2013). Parents reap what they sow: Child-centrism and parental well-being. *Social Psychological and Personality Science,*(6), 635-642.

Bamonti, P., Lombardi, S., Duberstein, P. R., King, D. A., and Van Orden, K. A. (2016). Spirituality attenuates the association between depressive symptom severity and meaning in life. *Aging & Mental Health, 20*(5), 494-499.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191-195.

Bartneck, C., Duenser, A., Moltchanova, E. & Zawieska, K. (2015). Comparing the similarity of responses received from studies in Amazon's Mechanical Turk to studies conducted online and with direct recruitment. *PloS ONE, 10*(4), 1-1. https://doi.org/10.1371/journal.pone.0121595

Battista, J. & Almond, R. (1973). The development of meaning in life. *Psychiatry, 36*(4), 409-427.

Baumeister, R. F. & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117*(3), 497-529.

Baumeister, R. F. & Vohs, K. D. (2005). The pursuit of meaningfulness in life. In C. R. Snyder and S. J. Lopez (Eds.) *Handbook of Positive Psychology* (1st ed., pp. 608-618). New York, NY, US: Oxford University Press.

Bellin, Z. (2012). The quest to capture personal meaning in psychology. *International Journal of Existential Psychology and Psychotherapy, 4*(1), 4-30.

Berlyne, D. E. (1954). A theory of human curiosity. *British Journal of Psychology, 45,* 180-191.

Berlyne, D. E. (1957). Uncertainty and conflict: A point of contact between information-theory and behavior-theory concepts. *The Psychological Review, 64*(6), 329-339.

Berlyne, D. E. (1962). Uncertainty and epistemic curiosity. *British Journal of Psychology, 53*(1), 27-34.

Berlyne, D. E. (1965). *Structure and direction in thinking.* New York: Wiley.

Berlyne, D. E. (1969). Arousal, reward and learning. *Annals of the New York Academy of Sciences, 159*(3), 1059-1070. https://doi.org/10.1111/j.1749-6632.1969.tb12997.x

Bieling, P. J., Hawley, L. L., Blotch, R. T., Corcoran, K. M., Levitan, R. D., Young, L. T., MacQueen, G. M. & Segal, Z. V. (2012). Treatment specific changes in decentering following mindfulness-based cognitive therapy versus antidepressant medication or placebo for prevention of depressive relapse. *Journal of Consulting and Clinical Psychology, 80*(3), 365-372.

Bishop, S. R., Lau, M., Shapiro, S., Carlson, L., Anderson, N. D., Carmody, J., Segal, Z. V., Abbey, S., Speca, M., Velting, D., & Devins, G. (2004). Mindfulness: A proposed operational definition. *Clinical Psychology: Science & Practice, 11*(3), 230-241.

Brassai, L., Piko, B. E. & Steger, M. F. (2011). Meaning in life: Is it a protective factor for adolescents' psychological health? *International Journal of Behavioral Medicine, 18*(1), 44-51.

Brod, G. & Breitwieser, J. (2019). Lighting the wick in the candle of learning: generating a prediction stimulates curiosity. *NPJ science of learning, 4*(1), 1-7.

Bureau of Labor Statistics. (2018). College enrollment and work activity of recent high school and college graduates summary. Retrieved from https://www.bls.gov/news.release/hsgec.nr0.htm

Carver, C. S. and White, T. L., (1994). Behavioral inhibition, behavioral activation, and affective responses to impending reward and punishment: The BIS/BAS scales. *Journal of Personality and Social Psychology, 67*(2), 319-33.

Chiesi, F., Bonacchi, A., Primi, C., Toccafondi, A. & Miccinesi, G. (2018). Are three items sufficient to measure sense of coherence? *European Journal of Psychological Assessment, 34*(4), 229-237.

Collins, N. L. & Miller, L. C. (1994). Self-disclosure and liking: A meta-analytic review. *Psychological Bulletin, 116*(3), 457-475.

Coffey, J. K., Wray-Lake, L., Mashek, D. & Branand, B. (2016). A multi-study examination of well-being theory in college and community samples. *Journal of Happiness Studies, 17*(1), 187-211.

Cotton Bronk, K. (2014). *Purpose in life: A critical component of optimal youth development.* Dordrecht, NL: Springer.

Crumbaugh, J. C. (1977). The Seeking of Noetic Goals test (SONG): A complementary scale to the Purpose in Life test (PIL). *Journal of Clinical Psychology, 33*(3), 900-907.

Debats, D. L., (1990). The Life Regard Index: Reliability and validity. *Psychological Reports, 67*, 27-34.

Debats, D. L., van der Lubbe, P. M. & Wezeman, F. (1993). On the psychometric properties of the life regard index (LRI): A measure of meaningful life: An evaluation in three independent samples based on the Dutch version. *Personality and Individual Differences, 14*(2), 337-345.

Debats, D. L. (1999). Sources of meaning: An investigation of significant commitments in life. *Journal of Humanistic Psychology, 39*(4), 30-57.

Debrot, A., Schoebi, D., Perrez, M. & Horn, A. B. (2013). Touch as an interpersonal emotion regulation process in couples' daily lives: The mediating role of psychological intimacy. *Personality and Social Psychology Bulletin, 39*(10), 1373-1385.

Dogra, A. K., Basu, S. & Das, S. (2011). Impact of meaning in life and reasons for living to hope and suicidal ideation: A study among college students. *Journal of Projective Psychology and Mental Health, 18*(1), 89-102.

Dubey, R., Griffiths, T. L. & Lombrozo, T. (2019). If it's important, then I am curious: A value intervention to induce curiosity. Proceedings from the 41st annual *Conference of the Cognitive Science Society.* Montreal, QC: Cognitive Science Society.

Elklit, A., Shevlin, M., Solomon, Z., & Dekel, R. (2007). Factor structure and concurrent validity of the world assumptions scale. *Journal of Traumatic Stress, 20*(3), 291-301.

Emmons, R. A., Cheung, C. & Tehrani, K. (1998). Assessing spirituality through personal goals: Implications for research on religion and subjective well-being. *Social Indicators Research, 45*(3), 391-422.

Emmons, R. A. (2003). Personal goals, life meanings and virtue: Wellsprings of a positive life. In C. L. Keyes & J. Haidt (Eds.), *Flourishing: Positive psychology and the life well-lived* (pp. 105-128). Washington D.C., US: American Psychological Association.

Emmons, R. A. (2005). Striving for the sacred: Personal goals, life meaning and religion. *Journal of Social Issues, 61*(4), 731-745.

Eren, A. (2009). Examining the relationship between epistemic curiosity and achievement goals. *Eurasian Journal of Education Research, 26,* 129-144.

Erikson, E. (1968). *Identity, youth & crisis*. New York, NY: W. W. Norton & Company.

Flensborg-Madsen, T., Ventegodt, S. & Merrick, J. (2005). Sense of coherence and physical health. A review of previous findings. *The Scientific World, 5*, 665-673.

Frankl, V. (1963). *Man's search for meaning.* New York, NY: Pocket Books.

Frazier, P., Greer, C., Gabrielsen, S., Tennen, H., Park, C. L, & Tomich, P. (2013). The relation between trauma exposure and prosocial behavior. *Psychological Trauma: Theory, Research, Practice & Policy, 5*(3), 286-294.

Frenz, A. W., Carey, M. P., & Jorgensen, R. S. (1993). Psychometric evaluation of Antonovsky's Sense of Coherence scale. *Psychological Assessment, 5*(2), 145-153.

George, L. S. & Park, C. L. (2017). The Multidimensional Existential Meaning Scale: A tripartite approach to measuring meaning in life. *The Journal of Positive Psychology, 12*(3), 613-627.

Giambra, L. M., Camp, C. J. & Grodsky, A. (1992). Curiosity and stimulation seeking across the adult life span: Cross-sectional and 6- to 8-year longitudinal findings. *Psychology and Aging, 7*(1), 150-157.

Grossnickle, E. M. (2016). Disentangling curiosity: Dimensionality, definitions and distinctions from interest in educational contexts. *Educational Psychology Review, 28*(1), 23-60.

Grouden, M. E. & Jose, P. E. (2014). How do sources of meaning in life vary according to demographic factors? *New Zealand Journal of Psychology, 43*(3), 29-38.

Gruber, M. J., Gelman, B. D. & Ranganath, C. (2014). States of curiosity modulate hippocampus-dependent learning via the dopaminergic circuit. *Neuron, 84,* 486-496.

Hart, K. E. & Singh, T. (2009). An existential model of flourishing subsequent to treatment for addiction: The importance of living a meaningful and spiritual life. *Crisis & Loss, 17*(2), 125-147.

Hartung, F. M. (2010). *Social curiosity and its functions*. (Unpublished doctoral dissertation). Universitat Konstanz, Konstanz.

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.

Hiew, C. C., Mori, T., Shimizu, M., & Tominaga, M. (2000). Measurement of resilience development: Preliminary results with a state-trait resilience inventory. *Journal of Learning and Curriculum Development*, *1*, 111-117.

Higgins, E. T. (1987). Self-discrepancy: A theory relating self and affect. *Psychological Review, 94*(3), 319-340.

Huta, V. & Ryan, R. M. (2010). Pursuing pleasure or virtue: The differential and overlapping well-being benefits of hedonic and eudaimonic motives. *Journal of Happiness Studies, 11*(6), 735-762.

Ivtzan, I., Gardner, H. E., & Smailova, Z., (2011). Mindfulness meditation and curiosity: The contributing factors to wellbeing and the process of closing the self-discrepancy gap. *International Journal of Wellbeing, 1*(3), 316-327.

Ivtzan, I., Chan, C. P., Gardner, H. E. & Prashar, K. (2013). Linking religion and spirituality with psychological well-being: Examining self-actualisation, meaning in life, and personal growth initiative. *Journal of Religion and Health, 52*(3), 915-929.

Janoff-Bulman, R. & Timko, C. (1987). Coping with traumatic life events. In C. R. Snyder and C. E. Ford (Eds.) *Coping with Negative Life Events* (pp. 135-159). New York, NY: Springer.

Janoff-Bulman, R. (1989). Assumptive worlds and the stress of traumatic events. *Social Cognition, 7*(2), 113-136.

Jaarsma, T. A., Pool, G., Ranchor, A. V., & Sanderman, R. (2007). The concept and measurement of meaning in life in Dutch cancer patients. *Psycho-Oncology, 16*(3), 241-248.

Kallay, E. (2008). Investigation of the relationship between religious growth, positive affect, and meaning in life in a sample of female cancer patients. *Cognition, Brain and Behavior, 12*(2), 161-182.

Kang, K., Im, J., Kim, H., Kim, S., Song, M. & Sim, S. (2009). The effect of logotherapy on the suffering, finding meaning and spiritual well-being of adolescents with terminal cancer. *Journal of the Korean Academy of Child Health Nursing, 15*(2), 136-144.

Kang, M. J., Hsu, M., Krajbich, I. M., Lowenstein, G., McClure, S. M., Wang, J. T., Camerer, C. F. (2009). The wick in the candle of learning: Epistemic curiosity activates reward circuitry and enhances memory. *Psychological Science, 20*(8), 963-973.

Kashdan, T. B., Rose, P., & Fincham, F. D. (2004). Curiosity and exploration: Facilitating positive subjective experiences and personal growth opportunities. *Journal of Personality Assessment, 83*(2), 291-305.

Kashdan, T. B. & Roberts, J. E. (2004). Trait and state curiosity in the genesis of intimacy: Differentiation from related constructs. *Journal of Social and Clinical Psychology, 23*(6), 792-816.

Kashdan, T. B. & Roberts, J. E. (2006). Affective outcomes in superficial and intimate interactions: Roles of social anxiety and curiosity. *Journal of Research in Personality. 40*(2), 140-167.

Kashdan, T. B. & Steger, M. F. (2007). Curiosity and pathways to well-being and meaning in life: Traits, states and everyday behaviors. *Motivation and Emotion, 31*(3), 159-173.

Kashdan, T. B., Gallagher, M. W., Silvia, P. J., Winterstein, B. P., Breen, W. E., Terhar, D., and Steger, M. F. (2009). The Curiosity and Exploration Inventory-II: Development, factor structure and initial psychometrics. *Journal of Research in Personality, 43*, 987-998.

Kashdan, T. B. & Silva, P. (2009). Curiosity and interest: The benefits of thriving on novelty and challenge. In S. L. Lopez and C. R. Snyder (Eds.), *The Oxford Handbook of Positive Psychology*, (pp. 367-374). New York, NY: Oxford.

Kashdan, T. B., Goodman, F. R., Stiksma, M., Milius, C. R., & McKnight, P. E. (2018). Sexuality leas to boosts in mood and meaning in life with no evidence for the reverse direction: A daily diary investigation. *Emotion, 18*(4), 563-576.

Kashdan, T. B., Stiksma, M. C., Disabato, D. D., McKnight, P. E., Bekier, J., Kaji, J. & Lazarus, R. (2018). The five-dimensional curiosity scale. Capturing the bandwidth of curiosity and identifying four unique subgroups of curious people. *Journal of Research in Personality, 73*(1), 130-149.

Kaufmann, N., Schulze, T. & Veit, D. (2011). More than fun and money: Worker motivation in crowdsourcing- a study on Mechanical Turk. *AMCIS, 11*, 1-11.

Kees, J., Berry, C., Burton, S. & Sheehan, K. (2017). An analysis of data quality: Professional panels, student subject pools, and Amazon's Mechanical Turk. *Journal of Advertising, 46*(1), 141-155.

Khaksari, M., Nakhaei, P., Khastar, H., Bakhtazad, A., Rahimi, K. & Garmabi, B. (2020). Circadian fluctuation in curiosity is a risk factor for morphine preference. *Biological Rhythm Research,* 1-13.

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 Psychology, 90*(1), 179-196.

Koltko-Rivera, M. E. (2006). Rediscovering the later version of Maslow's hierarchy of needs: Self-transcendence and opportunities for theory, research and unification. *Review of General Psychology, 10*(4), 302-317.

Kowalski, F. V. & Kowalski, S. E. (2012, October 3-6). Enhancing curiosity using interactive simulations combined with real-time formative assessment facilitated by open-format questions on tablet computers. [Paper presentation]. 2012 Frontiers in Education Conference, Seattle, WA.

Krause, N. (2003). Religious meaning and subjective well-being in late life. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 58*(3), 160-170.

Krok, D. (2015). The role of meaning in life within the relations of religious coping and psychological well-being. *Journal of Religion and Health, 54*(6), 2292-2308.

Lauriola, M., Litman, J. A., Mussel, P., De Santis, R., Crowson, H. M., & Hoffman, R. R. (2015). Epistemic curiosity and self-regulation. *Personality and Individual Differences, 83,* 202-207.

Le, T. N. & Levenson, M. R. (2005). Wisdom as self-transcendence: What's love (& individualism) got to do with it? *Journal of Research in Personality, 39*(4), 443-457.

Leas, H. D., Nelson, K. L., Grandgenett, N., Tapprich, W. E. & Cutucache, C. E. (2017). Fostering curiosity, inquiry and scientific thinking in elementary school students: Impact of the NE STEM 4U intervention. *Journal of Youth Development, 12*(2), 103-120.

Levenson, M. R., Jennings, P. A., Aldwin, C. M. & Shiraishi, R. W. (2005). Self-transcendence: Conceptualization & measurement. *International Journal of Aging and Human Development, 60*(2), 127-143.

Lilly, M. M., Valdez, C. E. & Graham-Bermann, S. A. (2011). The mediating effect of world assumptions on the relationship between trauma exposure and depression. *Journal of Interpersonal Violence, 26*(12), 2499-2516.

Litman J. A. (2008). Interest and deprivation dimensions of epistemic curiosity. *Personality and Individual Differences, 44*, 1585–1595.

Litman, J. A. (2010). Relationships between measures of I- and D-type curiosity, ambiguity tolerance, and need for closure: An initial test of the wanting-liking model of information-seeking. *Personality and Individual Differences, 48*, 397-402.

Litman, J. A. (2019). Curiosity: Nature, dimensionality, and determinants, In K.A. Renninger & S.E. Hidi (Eds.) *The Cambridge Handbook of Motivation and Learning*. (pp. 418-442). New York, NY: Cambridge University Press.

Litman, J. A. & Jimerson, T. L. (2004). The measurement of curiosity as a feeling of deprivation. *Journal of Personality Assessment, 82*(2), 147-157.

Litman, J. A., Hutchins, T. and Russon, R. (2005). Epistemic curiosity, feeling-of-knowing and exploratory behavior. *Cognition and Emotion, 19*(4), 559-582.

Litman, J. A., Crowson, H. M., & Kolinski, K. (2010). Validity of the interest- and deprivation-type epistemic curiosity in non-students. *Personality and Individual Differences, 49,* 531-536.

Litman, J. A. & Mussel, P. (2013). Validity of the interest- and deprivation-type epistemic curiosity model in Germany. *Journal of individual differences, 34*(2), 59-68.

Litman J. A., Robinson O. C., Demetre J. D. (2017). Intrapersonal curiosity: Inquisitiveness about the self. *Self and Identity, 16*(2), 231-250.

Litman, J. A. & Silva, P. J. (2006). The latent structure of trait curiosity: Evidence for interest and deprivation curiosity dimensions. *Journal of Personality Assessment, 83*(3), 318-328.

Litman, J. A. & Spielberger, C. D., (2003). Measuring epistemic curiosity and its diversive and specific components. *Journal of Personality Assessment, 80*(1), 75-86.

Lounsbury, J. W., Fisher, L. A., Levy, J. J., and Welsh, D. P. (2009). An investigation of character strengths in relation to the academic success of college students. *Individual Differences Research, 7*(1), 52-69.

Loewenstein, G. (1994). The psychology of curiosity: A review and reinterpretation. *Psychological Bulletin, 116*(1), 75-98.

MacDonald, M. J., Wong, P. T. & Gingras, D. T. (2012). Meaning in life measures and development of a brief version of the personal meaning profile. In P. T. P. Wong (Ed.), *The human quest for meaning: Theories, research and applications* (pp. 357-382). New York, NY: Routledge.

Machell, K. A., Kashdan, T. B., Short, J. L., & Nezlek, J. B. (2014). Relationships between meaning in life, social and achievement events, and positive and negative affect in daily life. *Journal of Personality, 83*(3), 287-298.

Maddi, S. R. (1967). The existential neurosis. *Journal of Abnormal Psychology, 72*(4), 311-325.

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.

Martela, F., Steger, M. F. & Ryan, R. M. (2017). Meaningfulness as satisfaction of autonomy, competence, related and beneficence: Comparing the four satisfactions and positive affect as predictors of meaning in life. *Journal of Happiness Studies, 19*(5), 1261-1282.

Mascaro, N. & Rosen, D. H. (2005). Existential meaning's role in the enhancement of hope and prevention of depressive symptoms. *Journal of Personality, 73*(4), 985-1013.

Mascaro, N. & Rosen, D. H. (2006). The role of existential meaning as a buffer against stress. *Journal of Humanistic Psychology, 46*(2), 168-190.

Mascaro, N., & Rosen, D. H., (2008). Assessment of existential meaning and its longitudinal relations with depressive symptoms. *Journal of Social and Clinical Psychology, 27*(6). 576-599.

Mason, W. & Suri, S. (2012). Conducting behavioral research on Amazon's Mechanical Turk. *Behavior research methods, 44*(1), 1-23.

McAdams, D. P. & Vaillant, G. E., (1982). Intimacy motivation and psychosocial adjustment: A longitudinal study. *Journal of Personality Assessment, 46*(6), 586-593.

McAdams, D. P. (2001). The psychology of life stories. *Review of General Psychology, 5*(2), 100-122.

McDonald, M. J., Wong, P. T. P., & Gingras, D. T. (2012). Meaning in life measures and development of a brief version of the Personal Meaning Profile. In P. T. P. Wong (Ed.), *The human quest for meaning: Theories, research, and applications* (2nd ed., pp. 357-382). New York, NY: Routledge.

McMahan, E. A. & Estes, D. (2011). Hedonic versus eudaimonic conceptions of well-being: Evidence of differential associations with self-reported well-being. *Social Indicators Research, 103*(1), 93-108.

Melton, A. M. & Schulenberg, S. E. (2008). On the measurement of meaning. *The Humanistic Psychologist, 36*, 31-44.

Metcalfe, J., Schwartz, B. L. & Bloom, P. A. (2017). The tip-of-the-tongue state and curiosity. *Cognitive research: Principles and implications, 2(1),* 31.

Miao, M., Zheng, L., & Gan, Y. (2017). Meaning in life promotes proactive coping via positive affect: A daily diary study. *Journal of Happiness Studies, 18*(6), 1683-1696.

Michaels, J. L., Parkin, S. S. & Vallacher, R. R. (2014). Destiny is in the details: Action identification in the construction and destruction of meaning. In J. E. Hicks and C. Routledge (Eds.) *The experience of meaning in life,* (pp. 287-304). Dordrecht, NE: Springer.

Miller, W. R. & Thoresen, C. E. (2003). Spirituality, religion and health: An emerging research field. *American Psychologist, 58*(1), 24-35.

Mikulincer, M. & Shaver, P. R. (2013). Attachment orientations and meaning in life. In J. E.

    Hicks and C. Routledge (Eds.) *The experience of meaning in life,* (pp. 287-304).

    Dordrecht, NE: Springer.

Moksnes, U. K., & Haugan, G., (2015). Stressor experience negatively affects life satisfaction in

    adoolescents: The positive role of sense of coherence. *Quality of Life Research, 24*(10),

    2473-2481.

Morgan, J., & Farsides, T. (2009). Psychometric evaluation of the meaningful life measure.

    Journal of Happiness Studies, *10*(3), 351-366.

Mussel, P. (2013). Introducing the construct curiosity for predicting job performance. *Journal of

    Organizational Behavior, 34*(4), 453-472.

Orji, R., Reilly, D., Oyibo, K. & Orji, F. A. (2018). Deconstructing persuasiveness of strategies

    in behavior change systems using the ARCS model of motivation. *Behavior &

    Information Technology, 38*(4), 319-335.

Oudeyer, P. Y., Gottlieb, J. & Lopes, M. (2016). Intrinsic motivation, curiosity and learning:

    Theory and applications in educational technologies. *Progress in Brain Research, 229*(1),

    257-284.

Pan, J. Y., Wong, D. F., Chan, C. L., & Joubert, L. (2008). Meaning of life as a protective factor

    of positive affect in acculturation: A resilience framework and a cross-cultural

    comparison. *International Journal of Intercultural Relations, 32*(6), 505-514.

Paolacci, G. & Chandler, J. (2014). Inside the Turk: Understanding Mechanical Turk as a

    participant pool. *Current directions in Psychological Science, 23*(3), 184-188.

Park, C. L. & Folkman, S. (1997). Meaning in the context of stress and coping. *Review of

    General Psychiatry, 1*(2), 115-144.

Park, C. L., (2005). Religion as a meaning-making framework in coping with life stress. *Journal of Social Issues, 61*(4), 707-729.

Park, C. L. (2008). Testing the meaning making model of coping with loss. *Journal of Social and Clinical Psychology, 27*(9), 970-994.

Park, C. L., Edmondson, D., Fenster, J. R. & Blank, T. O. (2008). Meaning making and psychological adjustment following cancer: The mediating roles of growth, life meaning and restored just-world beliefs. *Journal of Consulting and Clinical Psychology, 76*(5), 863-875.

Park, N., Peterson, C. & Seligman, M. E. (2004). Strengths of character and well-being. *Journal of Social and Clinical Psychology, 22*(5), 603-619.

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.

Peer, E., Vosgerau, J. & Acquisti, A. (2014). Reputation as a sufficient condition for data quality on Amazon Mechanical Turk. *Behavior research methods, 46*(4), 1023-1031.

Pluck, G., & Johnson, H. L. (2011). Stimulating curiosity to enhance learning. *GESJ: Education Sciences and Psychology, 2*(19).

Post-White, J. (1998). The role of sense of coherence in mediating the effects of mental imagery on immune function, cancer outcome, and quality of life. In H. I. McCubbin, E. A. Thompson, A. I. Thompson & J. E. Fromer (Eds.) *Stress, coping and health in families: Sense of coherence and resiliency* (279-291). Thousand Oaks, CA, US: Sage Publications.

Proulx, M. & Inzlicht, M., (2012). The five "A"s of meaning maintenance: Finding meaning in the theories of sense-making. *Psychological Inquiry, 23*(4), 317-335.

Pirson, M., Langer, E.J., Bodner, T., & Zilcha-Mano, S., (2015). The Development and validation of the Langer mindfulness scale: Enabling a socio-cognitive perspective of mindfulness in organizational contexts. *Academy of Management Annual Meeting Proceedings 2015*(1). DOI: 10.5465/AMBPP.2015.11308abstract

Rathi, N., & Rastogi, R. (2007). Meaning in life and psychological well-being in pre-adolescents and adolescents. *Journal of the Indian Academy of Applied Psychology, 33*(1), 31-38.

Reiss, S. (2000). *Who am I? The 16 basic desires that motivate our actions and define our personalities.* New York, NY: Putnam.

Reker, G. T., & Cousins, J. B. (1979). Factor structure, construct validity and reliability of the Seeking of Noetic Goals scale (SONG) and Purpose in Life (PIL) tests. *Journal of Clinical Psychology, 35*(1), 85-91.

Reker, G. T., & Wong, P. T., (1988). Aging as an individual process: Toward a theory of personal meaning. In J. E. Birren & V. L. Bengston (Eds.) *Emergent Theories of Aging* (pp. 214-246). New York, NY, US: Springer Publishing.

Reker, G. T. (1994). Logotherapy and logotherapy: Challenges, opportunities, and some empirical findings. *The International Forum for Logotherapy, 17*(1), 47-55.

Reker, G. T. (1996). *Manual: Sources of Meaning Profile-Revised.* Peterborough, Ontario, Canada: Student Psychologists Press.

Reker, G. T. & Woo, L. C. (2011). Personal meaning orientations and psychosocial adaptation in older adults. *Sage Open,* 1-10.

Reker, G. T., & Wong, P. T. (2012). Personal meaning in life and psychosocial adaptation in the later years. In P. T. Wong (Eds.) *The Human Quest for Meaning* (2nd ed., pp. 443-456). New York, NY, US: Taylor and Francis Group.

Rempel, J. K., Holmes, J. G. & Zanna, M. P. (1985). Trust in close relationships. *Journal of Personality and Social Psychology, 49*(1), 95-112.

Rime, B. (2007). Interpersonal emotion regulation. In J. J. Gross (Ed.), *Handbook of Emotion Regulation* (pp. 466-485). Guilford Press.

Robinson, W. P. (1974). *Education, curiosity and questioning.* London: Southampton University & Eric.

Robinson, O. (2008). Developmental crisis in early adulthood: A composite qualitative analysis. (Unpublished doctoral dissertation). Birbeck College, London, UK.

Robinson, O. C., Demetre, J. D., and Litman, J. A. (2017). Adult life stage and crisis as predictors of curiosity and authenticity: Testing inferences from Erikson's lifespan theory. *International Journal of Behavioral Development, 4*(3), 426-431.

Rohani, C., Abedi, H., Sundberg, K. & Langius-Eklöf, A. (2015). Sense of coherence as a mediator of health-related quality of life dimensions in patients with breast cancer: A longitudinal study with prospective design. *Health Quality of Life Outcomes, 13*(1), 195-203.

Ros, M., Schwartz, S.H. & Surkiss, S. (1999). Basic individual values, work values, and the meaning of work. *Applied Psychology: An International Review, 48*(1), 49-71.

Ryan, R. M. & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development and well-being. *American Psychologist, 55*(1), 68-78.

Ryan, R. M., & Deci, E. L. (2001). On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annual Review of Psychology, 52*(1), 141-166.

Ryan, R. M. & Huta. V. (2009). Wellness as healthy functioning or wellness as happiness: The importance of eudaimonic thinking (response to the Kashdan et al. and Waterman discussion). *Journal of Positive Psychology, 4*(3), 202-204.

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.

Ryff, C. D. & Keyes, L. M. (1995). The structure of psychological well-being revisited. *Journal of Personality and Social Psychology, 69*(4), 719-727.

Ryff, C. D., Singer, B. H. & Love, G. D. (2004). Positive health: Connecting well-being with biology. *Philosophical Transactions of the Royal Society: Biological Sciences, 359*(1449), 1383-1394.

Ryff, C. D., & Singer, B. H. (2008). Know thyself and become what you are: A eudaimonic approach to psychological well-being. *Journal of Happiness Studies, 9*(1), 13-39.

Sacco, S. J., Park, C. L., Suresh, D. P. & Bliss, D. (2014). Living with heart failure: Psychosocial resources, meaning, gratitude and well-being. *Heart & Lung, 43*(3), 213-218.

Sanderson, C. A. & Karetsky, K. H. (2002). Intimacy goals and strategies of conflict resolution in dating relationships: A mediational analysis. *Journal of Social and Personal Relationships, 19*(3), 317-337.

Sanderson, C. A., Rahm, K. B. & Beigbeder, S. A. (2005). The link between the pursuit of intimacy goals and satisfaction in close same-sex friendships: An examination of the underlying processes. *Journal of Social and Personal Relationships, 22*(1), 75-98.

Schmitt, N. (1996). Uses and abuses of coefficient alpha. *Psychological Assessment, 8*(4), 350-353.

Schnell, T. (2009). The Sources of Meaning and Meaning in Life Questionnaire (SoME): Relations to demographics and well-being. *The Journal of Positive Psychology, 4*(6), 483-499.

Schnell, T. (2010). Existential Indifference: Another quality of meaning in life. *Journal of Humanistic Psychology, 50*(3), 351-373.

Schulenberg, S. E., Baczwaski, B. J., & Buchanan, E. M. (2014). Measuring search for meaning: A factor analysis of the Seeking of Noetic Goals test (SONG). *Journal of Happiness Studies, 15*(3), 693-715.

Senko, C., Hulleman, C. S. & Harackiewicz, J. M. (2011). Achievement goal theory at the crossroads: Old controversies, current challenges, and new directions. *Educational Psychologist, 46*(1), 26-47.

Shaver, P. R. & Mikulincer, M. (2007). Adult attachment strategies and the regulation of emotion. In J. J. Gross (Ed.), *Handbook of Emotion Regulation* (pp.446-466). Guilford Press.

Sheldon, K. M., & Hilpert, J. C. (2012). The balanced measure of psychological needs (BMPN) scale: An alternative domain general measure of need satisfaction. *Motivation and Emotion*, *36*(4), 439-451.

Shapiro, D. N., Chandler, J. & Mueller, P. A. (2013). Using Mechanical Turk to study clinical populations. *Clinical psychological science, 1*(2), 213-220.

Simon, L., Arendt, J., Greenberg, J., Pyszczynski, T. & Solomon, S. (1998). Terror management and meaning: Evidence that the opportunity to defend the worldview in response to mortality salience increases the meaningfulness of life in the mildly depressed. *Journal of Personality, 66*(3), 359-382.

Singer, J. A., Singer, B. F., & Berry, M. (2013). A meaning-based intervention for addiction: Using narrative therapy and mindfulness to treat alcohol abuse. In J. A. Hicks and C. Routledge (Eds.) *The Experience of Meaning In Life: Classical Perspectives, Emerging Themes and Controversies,* (pp. 379-391). New York, NY: Springer Science + Business Media.

Sinha, T., Bai, Z. & Cassell, J., (2017). A new theoretical framework for curiosity for learning in social contexts. *European Conference on Technology Enhanced Learning,* 254-269. Springer, Cham.

Skrabski, A., Kopp, M., Rózsa, S., Réthelyi, J. & Rahe, R. H. (2005). Life meaning: An important correlate of health in the Hungarian population. *International Journal of Behavioral Medicine, 12*(2), 78-85.

Spielberger, C. D. (1979). *State-trait personality inventory*. University of Southern Florida.

Spielberger, C. D. & Reheiser, E. C. (2009). Assessment of emotions: Anxiety, anger, depression and curiosity. *Applied Psychology: Health and well-being, 1*(3), 271-302.

Steiner, A., Raube, K., Stuck, A. E., Aronow, H. U., Draper, D., Rubenstein, L. Z. & Beck, J. C. (1996). Measuring psychosocial aspects of well-being in older community residents: Performance of four short scales. *The Gerontologist, 36*(1), 54-62.

Steger, M. F., & Frasier, P. (2005). Meaning in life: One link in the chain from religiousness to well-being. *Journal of Counseling Psychology, 52*(4), 574-582.

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.

Steger, M. F., Kashdan, T. B., Sullivan, B. A. & Lorentz, D. (2008). Understanding the search for meaning in life: Personality, cognitive style, and the dynamic between seeking and experiencing meaning. *Journal of Personality, 76*(2), 199-228

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.

Steger, M. F., Oishi, S., & Kesebir, S. (2011). Is a life without meaning satisfying? The moderating role of the search for meaning in satisfaction with life judgments. *The Journal of Positive Psychology, 6*(3), 173-180.

Steger, M. F., Dik, B. J. & Duffy, R. D. (2012). Measuring meaningful work: The work and meaning inventory (WAMI). *Journal of Career Assessment, 20*(3), 322-337.

Steger, M. F. (2013). Experiencing meaning in life: Optimal functioning at the nexus of well-being, psychopathology, and spirituality. In P. T. P. Wong (Eds.) *The human quest for meaning: Theories, research, and applications* (2nd ed., pp. 165-184). Routledge.

Stillman, T. F., Lambert, N. M., Fincham, F. D. & Baumeister, R. F. (2011). Meaning as magnetic force: Evidence that meaning in life promotes interpersonal appeal. *Social Psychological and Personality Science, 2*(1), 13-20.

Strack, K. M. & Schulenberg, S. E. (2009). Understanding empowerment, meaning, and perceived coercion in individuals with serious mental illness. *Journal of Counseling Psychology, 65*(10), 1137-1148.

Stone, D. N., Deci, E. L. & Ryan, R. M. (2009). Beyond talk: Creating autonomous motivation through self-determination theory. *Journal of General Management, 34*(3), 75-91.

Suominen, S., Helenius, H., Blomberg, H., Uutela, A., & Koskenvuo, M. (2001). Sense of coherence as a predictor of subjective state of health: Results of 4 years of follow-up of adults. *Journal of Psychosomatic Research, 50*(2), 77-86.

Świtaj, P., Grygiel, P., Chrostek, A., Nowak, I., Wciórka, J., & Anczewska, M., (2017). The relationship between internalized stigma and quality of life among people with mental illness: are self-esteem and sense of coherence sequential mediators? *Quality of Life Research, 26*(9), 2471-2478.

Thakur, K. & Basu, S. (2010). A probe of existential meaning in depression. *Journal of Projective Psychology, 17*(1), 56-62.

Thir, M. & & Batthyány, A. (2016). The state of empirical research on logotherapy and existential analysis. In A. Batthyány (Eds.*) Logotherapy and Existential Analysis: Proceedings of the Viktor Frankl Institute Vienna,* (pp. 53-74). Springer.

Thompson, S. C., & Janigian, A. S. (1988). Life schemes: A framework for understanding the search for meaning. *Journal of Social and Clinical Psychology, 7*(2-3), 260-280.

Trapnell, P. D. & Campbell, J. D. (1999). Private self-consciousness and the five-factor model of personality: Distinguishing rumination from reflection. *Journal of Personality and Social Psychology, 76*(2), 284-304.

Vacca, R., & Hoadley, C. (2016, April). Self-reflecting and mindfulness: Cultivating curiosity and decentering situated in everyday life. In *International Conference on Persuasive Technology* (pp. 87-98). Springer.

Van Cappellen, P., & Rime, B. (2013). Positive emotions and self-transcendence. In V. Saroglou (Ed.) *Religion, Personality and Social Behavior* (pp. 123-145). New York, NY: Psychology Press.

Ventegodt, S., Omar, H. A. & Merrick, J. (2011). Quality of life as medicine: Interventions that induce salutogenesis. A review of the literature. *Social Indicators Research,* 10(3), 415-433.

Von Stumm, S., Hell, B. & Chamorro-Premuzic, T. (2011). The hungry mind: Intellectual curiosity is the third pillar of academic performance. *Perspectives on Psychological Science, 6*(6), 574-588.

Vos, J., Craig, M. & Cooper, M. (2015). Existential therapies: A meta-analysis of their effects on psychological outcomes. *Journal of Consulting and Clinical Psychology, 83*(1), 115-128.

Waterman, A. S. (1990). Personal expressiveness: Philosophical and psychological foundations. *The Journal of Mind and Behavior, 11*(1), 47-74.

Watts, F. (2007). Emotion regulation and Religion. In J. J. Gross (Ed.), *Handbook of Emotion Regulation* (pp.504-523). Guilford Press.

Waytz, A., Herschfield, H. E. & Tamir, D. I. (2015). Mental stimulation and meaning in life. *Journal of Personality and Social Psychology, 108*(2), 336-355.

Wethington, E. (2000). Expecting stress: Americans and the "midlife crisis". *Motivation and Emotion, 24*(2), 85-103.

Wiggin, K. L., Reimann, M. & Jain, S. P. (2019). Curiosity tempts indulgence. *Journal of Consumer Research, 45*(6), 1194-1212.

Wong, P. T. P. (1998). *The Personal Meaning Profile* [Measurement instrument]. Retrieved from http://www.drpaulwong.com/documents/-scales/personal-meaning-profile.pdf

Woo, S. E., Keith, M. & Thornton, M. E. (2015). Amazon Mechanical Turk for industrial and organizational psychology: Advantages, challenges and practical recommendations. *Industrial and Organizational Psychology, 8*(2), 171-179.

Yalom, I. D. (1980). *Existential Psychotherapy*. New York, NY: Basic Books.

Zhang, H., Zhiqin, S. Chan, D. K. & Schlegel, R. (2019). Threats to belongingness and meaning in life: A test of the compensation among sources of meaning. *Motivation and Emotion, 43*(2), 242-254.

Zika, S., & Chamberlain, K. (1992). On the relation between meaning in life and psychological well-being. *British Journal of Psychology, 83*(1), 133-145.

Appendix A

The Interest- and Deprivation-Type Epistemic Curiosity Scale (EC-I & EC-D)

A number of statements that people use to describe themselves are given below. Read each statement and then select the appropriate response using the scale below to indicate how you generally feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer that seems to describe how you generally feel.

1 = Almost Never   2 = Sometimes   3 = Often   4 = Almost Always

1.   I enjoy exploring new ideas.

2.   Difficult conceptual problems can keep me awake all night thinking about solutions.

3.   I enjoy learning about subjects that are unfamiliar to me.

4.   I can spend hours on a single problem because I just can't rest without knowing the answer.

5.   I find it fascinating to learn new information.

6.   I feel frustrated if I can't figure out the solution to a problem, so I work even harder to solve it.

7.   When I learn something new, I would like to find out more about it.

8.   I brood for a long time in an attempt to solve some fundamental problem.

9.   I enjoy discussing abstract concepts.

10.   I work like a fiend at problems that I feel must be solved.

Subscales Scoring:
5-item Appetitive interest-type epistemic curiosity scale   1, 3, 5, 7, 9
5-item Deprivation-Type epistemic curiosity scale   2, 4, 6, 8, 10

Appendix B

Meaning in Life Questionnaire (MLQ)

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

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

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

To Score:

Presence subscale score = subtract the rating for item #9 from 8, then add to the ratings for items 1, 4, 5, and 6. Scores range between 5 and 35.

Search subscale score = add together the ratings for items 2, 3, 7, 8, and 10. Scores range between 5 and 35.

Appendix C

The Brief Personal Meaningful Profile (PMP-B)
© Paul T. P. Wong

This questionnaire is intended to identify what really matters in your life and measures people's perception of personal meaning in their lives. Generally, a meaningful life involves a sense of purpose and personal significance. However, people often differ in what they value most, and they have different ideas as to what would make life worth living. The following statements describe potential sources of a meaningful life. Please read each statement carefully and indicate to what extent each item characterizes your own life. You may respond by circling the appropriate number according to the following scale:

1	**2**	**3**	**4**	**5**	**6**	**7**
Not at all			**Moderately**			**A great deal**

For example, if going to parties does not contribute to your sense of personal meaning, you may circle 1 or 2. If taking part in volunteer work contributes quite a bit to the meaning in your life, you may circle 5 or 6.

It is important that you answer honestly on the basis of your own experience and beliefs.

1. I believe I can make a difference in the world
2. I have someone to share intimate feelings with
3. I strive to make this world a better place
4. I seek to do God's will
5. I like challenge
6. I take initiative
7. I have a number of good friends
8. I am trusted by others
9. I seek to glorify God
10. Life has treated me fairly
11. I accept my limitations
12. I have a mutually satisfying loving relationship
13. I am liked by others
14. I have found someone I love deeply
15. I accept what cannot be changed
16. I am persistent and resourceful in attaining my goals
17. I make a significant contribution to society
18. I believe that one can have a personal relationship with God
19. I am treated fairly by others
20. I have received my fair share of opportunities and rewards
21. I have learned to live with suffering and make the best of it

Scoring

Subscale	Score	Score	Score	Row Total
Achievement	(Q5)	(Q6)	(Q16)	
Relationship	(Q7)	(Q8)	(Q13)	
Religion	(Q4)	(Q9)	(Q18)	
Self-transcendence	(Q1)	(Q3)	(Q17)	
Self-acceptance	(Q11)	(Q15)	(Q21)	
Intimacy	(Q2)	(Q12)	(Q14)	
Fair treatment	(Q10)	(Q19)	(Q20)	

Appendix D

Demographics Questionnaire

Please answer a few questions about yourself:

1. What is your age in years?

2. What gender do you identify as?
   a. Male
   b. Female
   c. Non-binary
   d. Other

3. Which of the following ethnicity options best describes you?
   a. White (non-Hispanic, Latino or Spanish)
   b. Hispanic, Latino or Spanish
   c. Black or African American
   d. American Indian or Alaska Native
   e. Asian or Pacific Islander
   f. Other
   g. Prefer not to respond

4. What is the highest level of education you have attained?
   a. Some high school
   b. High school diploma/GED
   c. Some college/vocational school
   d. Completed Associate's degree/Vocational School
   e. Completed Bachelor's Degree
   f. Some Graduate School
   g. Completed Graduate Degree

5. Please enter your MTurk Worker ID:

Appendix E

CONSENT TO PARTICIPATE IN RESEARCH

You are invited to participate in a research study conducted by Charles Reither (principal investigator and graduate student in Clinical Psychology) as supervised by Dr. Ronan Bernas (faculty sponsor) from the Psychology department at Eastern Illinois University. Your participation in this study is entirely voluntary.

The purpose of this study is to examine the relationship between curiosity and meaning in life, specifically different motivations for curiosity and how they might foster different aspects of meaning in life.

If you agree to participate in this study, you will first be asked to complete a short demographic questionnaire that asks about age, sex, ethnic background and level of education. Following the demographics section, you will be asked to complete three questionnaires asking questions about different psychological constructs. It will take approximately 5-15 minutes of your time. There are no foreseeable risks to participating in this study beyond those typically involved in a psychological study. There are no direct benefits to participants as a result of participation in this study. This study will add to current knowledge about curiosity, meaning in life, and how these two can be promoted. Innovations regarding psychological treatments may be aided or guided by the results of this study.

You will receive a payment of $0.50 USD for your participation in this study through your Amazon Mechanical Turk account.

CONFIDENTIALITY
Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. Confidentiality will be maintained by not connecting your Mechanical Turk worker ID with the information you provide. A separate identification number will be assigned to each participant and the data will have all identifying information will be removed from the data prior to analysis. The data itself will be securely stored on the researchers' computers only.

PARTICIPATION AND WITHDRAWAL
Participation in this research study is voluntary and not a requirement or a condition for being the recipient of benefits or services from Eastern Illinois University or any other organization sponsoring the research project. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind or loss of benefits or services to which you are otherwise entitled.
If you withdraw from the study, you will not receive the $.50 incentive for participation. Please review the study tasks above before deciding to participate. However, there is no penalty for withdrawal from the study.

IDENTIFICATION OF INVESTIGATORS

If you have any questions or concerns about this research, please contact:
Charles Reither, (Principal Investigator, cwreither@eiu.edu)
Ronan Bernas, PhD (Faculty Sponsor; rsbernas@eiu.edu)

RIGHTS OF RESEARCH SUBJECTS
If you have any questions or concerns about the treatment of human participants in this study, you may call or write:

Institutional Review Board
Eastern Illinois University
600 Lincoln Ave.
Charleston, IL   61920
Telephone: (217) 581-8576
E-mail: eiuirb@www.eiu.edu

 You will be given the opportunity to discuss any questions about your rights as a research subject with a member of the IRB. The IRB is an independent committee composed of members of the University community, as well as lay members of the community not connected with EIU. The IRB has reviewed and approved this study.

 By proceeding with this study you are agreeing to the following terms:

"I voluntarily agree to participate in this study. I have read the above terms and I understand that I am free to withdraw my consent and discontinue my participation at any time."

You may print this document if you wish to do so.

To proceed, click the "Next" (>>) button below.