GROWTH, AUTHENTICITY, AND MEANING: THE EFFECTS OF EUDAIMONIC REFLECTIONS ON SELF-EXPANSIVENESS

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Abstract

Modern psychological perspectives on eudaimonia emphasize three core components: Personal growth, authenticity, and meaning and purpose in life. Both direct and indirect evidence suggests that eudaimonia (generally) and its three core components (specifically) should be associated with a greater tendency to expand the self. Experimental evidence supporting these claims, however, is lacking. Thus, we cannot be certain that the association between eudaimonia and self-expansiveness exists, let alone the causal direction of the relationship. The purpose of this project is to experimentally investigate the effects of eudaimonic experiences on individuals’ propensity to expand the self to include nature (i.e., connectedness to nature). In three studies, participants reflected upon an imagined future experience involving nature and then completed a measure of connectedness to nature as well as other measures of self-expansiveness. Across the studies, participants engaged in either eudaimonic, hedonic (fun), or mundane (planning) reflection about the experience. In Study 1, participants reflected upon meaning and purpose in life as a form of eudaimonic reflection. In Study 2, eudaimonic reflection took the form of reflecting upon authenticity. Finally, in Study 3, participants in the eudaimonic condition reflected upon personal growth. Overall, the results of these studies provide preliminary evidence that eudaimonic experiences (meaning and growth, in particular), can increase connectedness to nature. Together, these studies provide a more complete picture of the effects that eudaimonia, generally, has on self-expansiveness.

Keywords: Eudaimonia, Hedonia, Connectedness to Nature, Self-expansion
TABLE OF CONTENTS

LIST OF FIGURES .................................................................................................................. VI

LIST OF TABLES .................................................................................................................. VII

LIST OF ABBREVIATIONS .................................................................................................. VIII

CHAPTER 1: ......................................................................................................................... 1

Introduction........................................................................................................................... 1

Eudaimonia .......................................................................................................................... 4
  Categories of Analysis........................................................................................................ 6
  Personal Growth .................................................................................................................. 10
    Personal Growth and Self-expansiveness ....................................................................... 11
  Authenticity ....................................................................................................................... 13
    Authenticity and Self-expansiveness ............................................................................ 16
  Meaning and Purpose in Life ............................................................................................ 18
    Meaning and Purpose in Life and Self-expansiveness ................................................... 21
  Summary .......................................................................................................................... 22

Self-expansiveness ............................................................................................................ 23

Limitations of Past Research ............................................................................................. 28

CHAPTER 2: ......................................................................................................................... 31

Purpose ............................................................................................................................... 31

Hypotheses .......................................................................................................................... 35

CHAPTER 3: ......................................................................................................................... 38

Study 1 .................................................................................................................................. 38
  Method............................................................................................................................... 40
    Participants...................................................................................................................... 40
    Measures and Procedure ............................................................................................... 41
      Baseline Connectedness and Demographics ............................................................... 41
      Reflection Manipulation ............................................................................................... 41
    Connectedness to Nature ............................................................................................. 44
      Implicit Association Test (IAT) .................................................................................. 44
      The Moral Expansiveness Scale (MES) .................................................................... 46
    Data Analysis ............................................................................................................... 48
    Coding scheme .............................................................................................................. 48
  Results and Discussion ..................................................................................................... 50
    Connectedness to nature ............................................................................................. 50
    Exploratory measures ................................................................................................. 51
CHAPTER 4: ................................................................................................................. 55

Study 2 ......................................................................................................................... 55
Method ......................................................................................................................... 55
Participants .................................................................................................................. 55
Reflection Manipulation .............................................................................................. 56
Data Analysis ............................................................................................................... 56
Results and Discussion ............................................................................................... 57
Connectedness to nature ............................................................................................ 57
Exploratory measures ................................................................................................. 58

CHAPTER 5: .................................................................................................................. 60

Study 3 ......................................................................................................................... 60
Method ......................................................................................................................... 60
Participants .................................................................................................................. 60
Reflection Manipulation .............................................................................................. 61
Exploratory self-report items ....................................................................................... 61
Data Analysis ............................................................................................................... 62
Pre-existing differences ............................................................................................... 62
Outlier analysis ............................................................................................................ 62
Results and Discussion ............................................................................................... 62
Connectedness to nature ............................................................................................ 62
Exploratory Self-expansiveness measures .................................................................. 64
Correlational analyses ............................................................................................... 65

CHAPTER 6: .................................................................................................................. 67
Combined Analyses ..................................................................................................... 67

CHAPTER 7: .................................................................................................................. 72

General Discussion ..................................................................................................... 72
Limitations and future directions ................................................................................ 76
Authenticity .................................................................................................................. 76
Generalizability ........................................................................................................... 78
IAT ............................................................................................................................... 79
Moral Expansiveness ................................................................................................. 80
Small Effects .............................................................................................................. 82
Prosocial outcomes ................................................................................................. 82
Conclusion ................................................................................................................. 83

REFERENCES .............................................................................................................. 84
LIST OF FIGURES

Figure 1 The Conceptual Model of How Eudaimonia Affects Self-Expansiveness.......................... 35

Figure 2 The Image Accompanying Reflection Instructions .......................................................... 43

Figure 3 The Comparisons Tested in the Combined Analysis.......................................................... 69

Figure 4 The Empirical Model Depicting the Pattern of Results Across the Studies....................... 72
LIST OF TABLES

Table 1 Correlations Between Self-Expansiveness & Demographics in Study 1 ........................................ 50
Table 2 Means & Standard Errors for CNS Scores for Studies 1-3 .......................................................... 51
Table 3 Means & Standard Errors for IAT D Scores for Studies 1-3 ......................................................... 52
Table 4 Means & Standard Errors for MES\textsubscript{nature} Scores for Studies 1-3 ................................. 53
Table 5 Means & Standard Errors for MES\textsubscript{human} Scores for Studies 1-3 ................................. 53
Table 6 Correlations Between Self-Expansiveness & Demographics in Study 2 ........................................ 57
Table 7 Correlations Between Self-Expansiveness, Demographics, & Self-Reported Affect in Study 3 ... 63
Table 8 Correlations Between Self-Expansiveness & Demographics in Studies 1-3 ................................. 69
LIST OF ABBREVIATIONS

Self-Determination Theory (SDT)

Implicit Association Test (IAT)

Words Per Minute (WPM)

Inter-quartile Range (IQR)

Inclusion of Nature in Self (INS)

Connectedness to Nature Scale (CNS)

Moral Expansiveness Scale (MES)

Structural Equation Models (SEM)

Comparative Fit Index (CFI)

Standardized Root Mean Residual (SRMR)

Root Mean Square Error (RMSEA)

Studentized Deleted Residual (SDR)
CHAPTER 1:
Introduction

Often first attributed to the writings of Aristotle, eudaimonia has its roots in ancient philosophical traditions. From these roots emerged an emphasis on striving to develop the best in ourselves and achieve our true potentials by living in line with our true nature (Henderson & Knight, 2012; see Huta & Waterman, 2014, for a review). Though it is informative, a review of eudaimonia's philosophical history is beyond this paper's scope. What is more relevant is the modern psychological perspective on eudaimonia. The modern perspective holds at its core the assertion that living the ‘good life’, as it is often called, means living in line with one’s true self. In other words, flourishing—as has sometimes been used to refer to the global quality of eudaimonic wellbeing—occurs when living as one was intended to live and when fulfilling one’s unique purpose.

Psychologists have become particularly interested in eudaimonia over the last several years and have generated many theories related to eudaimonia (e.g., Self-Determination Theory [SDT], Ryan & Deci, 2001; Eudaimonic Identity Theory, Waterman, 1993, 2011; PERMA, Seligman, 2012; etc.). Each theory emphasizes a different set of elements, but they all focus on the idea of flourishing and living well (Huta & Waterman, 2014). However, although eudaimonia has varied treatment amongst the diverse psychological perspectives, the literature suggests at least three central elements commonly identified across the theories (see Huta & Waterman, 2014): Personal growth, authenticity, and a sense of purpose and meaning in life. Importantly, all three of these elements have implications for our self and its expansiveness. Thus, the purpose of this research is to investigate the self-expansive effects of eudaimonic experiences—positive
experiences characterized that feel worthwhile or meaningful, authentic, and involve a sense of or openness to personal growth.

By self-expansiveness, I mean the self’s innate capacity to broaden itself beyond a narrow and rigid view (see Aron et al., 2013, and Hughes et al., 2020, for discussions of how self-expansion has been treated in relationship literature). In essence, if there is a category in which the self is included as the primary referent and a category where “not-self” is the primary referent, then self-expansion occurs whenever the boundaries of the “self” category increase (expands) in size (c.f., Pappas & Friedman, 2007). Ultimately, self-expansiveness entails the ability to extend the boundaries of any given self-category to incorporate new elements. Therefore, it is inextricably tied to our ability to experience growth and develop new self-knowledge, the ability to include others in the self and to serve a greater good, as well as the ability to resist the pressures that would otherwise keep our selves restricted and fixed.

Again, personal growth, authenticity, and a sense of purpose and meaning in life seem closely tied to self-expansiveness. In brief, personal growth and self-discovery inherently involve the need for, and capacity of, our self-concepts to grow as we develop new personal resources (c.f., self-expansion in relationships, Aron & Aron, 1986; Aron et al., 2013; c.f., Broaden and Build theory of positive emotions, Fredrickson, 1998, 2004) and accommodate new information about ourselves. Thus, pertinent to the case of growth, there is the category of traits the self possesses (i.e., self-concept) and the much vaster category of traits the self does not possess. Here, self-expansiveness is the inclusion of additional traits in one’s self-concept—an admittedly simple form of self-expansion but an important one, nonetheless (Aron et al., 2013).

Authenticity often involves putting ourselves into roles and situations not dictated by society and often represents rebelling against—or perhaps more aptly put, “breaking out of”—
the molds for the self which are imposed by society and circumstance. At the very least, authenticity can only occur when the self does not allow itself to be unwillingly squeezed or reduced into some rigid role imposed by external pressures (Lenton et al., 2013) and instead operates according to its own standards (Ryff, 1989). Accordingly, authenticity may be the boldest form of self-expansion in which the self bursts outward despite the pressures acting upon it. Thus, germane to the case of authenticity, there is the category of acceptable self-roles and identities and the category of roles and identities the self should not (or cannot) have. Here, self-expansiveness is including additional roles—specifically, roles that express one's true self—into the desirable possibilities for the self.

Finally, a sense of purpose and meaning in life often means connecting to something greater than oneself. For many, this may mean serving some higher good and feeling as if one is part of some greater whole (c.f., caring about contributing to the broader context, Huta & Waterman, 2014). Consequently, individuals who experience a sense of meaning and purpose often come to treat the goal of this higher good as their own and also often come to include their relationship to the collective in their understanding of who they are. In the case of meaning and purpose, then, the self-expansion may often involve expanding the boundaries of one’s self-interest to include the interests of the greater good and expanding the boundaries of the self to include others (i.e., self-transcendence).

The connection between the core elements of eudaimonia and self-expansiveness presented thus far is largely circumstantial. Importantly, however, correlational evidence suggests that eudaimonic wellbeing may be associated with a willingness to expand the self (e.g., Hughes et al., 2020) and that eudaimonically motivated activities are more often associated with elevating experiences—which include feeling connected to a larger whole—than are hedonic
experiences (Huta & Ryan, 2010). Moreover, preliminary experimental evidence shows that eudaimonic reflection may result in one particular form of self-expansiveness: increased self-transcendence (Lengieza et al., 2021). Thus, the core elements of eudaimonia may very well be tied to some degree of self-expansiveness and, in fact, may even cause the self to expand. This particular association between eudaimonia and self-transcendence as a form of self-expansiveness is noteworthy because of the implications it has for society. In the study mentioned above, self-transcendence was subsequently associated with greater donations to charitable organizations (Lengieza et al., 2019). In other words, self-expansiveness, or at least self-transcendence, may facilitate prosocial behavior. Therefore, understanding the ways to facilitate self-expansiveness seems a worthwhile endeavor.

The purpose of the present proposal is to investigate the implications that eudaimonia, as an experience, has for self-expansiveness using an experimental paradigm. In doing so, this research provides a more comprehensive picture of eudaimonia as well as of its potential to contribute to the well-being of society. Moreover, it contributes to our understanding of the formation of eudaimonic wellbeing itself and may lay the groundwork for understanding potential feedforward processes whereby eudaimonic experiences facilitate future eudaimonic experiences; see Stavrova & Luhmann, 2016; c.f., Fredrickson’s Broaden and Build theory of positive emotions, 1998, 2004).

**Eudaimonia**

According to the modern perspective on eudaimonia, if an individual focuses on developing the best in themselves, achieving their true potentials, and living in line with their true nature, they will likely experience life as having meaning and purpose, which will lead to a sense of wellbeing (Henderson & Knight, 2012). Importantly, although it reflects a form of
wellbeing, eudaimonia goes beyond the simple experience of pleasure or the avoidance of pain—which is why eudaimonia is often posed as an alternative to the prevailing emphasis on hedonic wellbeing (Huta & Waterman, 2014; Henderson & Knight, 2012). Instead, eudaimonia is about pursuing what is personally deemed worthwhile. As noted above, eudaimonia has several conceptualizations set forward by researchers. However, the core components that appear in the majority of conceptualizations are personal growth, authenticity, and a sense of meaning and purpose in life (see Huta & Waterman, 2014), each of which are reviewed below.

Yet, it is important to note that there are some components of eudaimonia that other researchers routinely emphasize, and I do not. Namely, some researchers emphasize excellence as a core component of eudaimonia (e.g., Fowers, 2012; Fowers et al., 2010; see Huta & Waterman, 2014). However, I believe there are reasons not to include excellence as a core component of eudaimonia. To begin, some of the most authentic people do not seem to care at all about being excellent; readers can likely call to mind an example of someone who is happily themselves even when failing at a task. Additionally, excellence taken to the extreme is not necessarily healthy or helpful (e.g., perfectionism). Finally, it does not seem that one would need to be an excellent volunteer, for example, to find it fulfilling or meaningful. Also, the important elements of excellence seem to be captured by the importance of growth. Striving for excellence may be important (Henderson & Knight, 2012), but it seems that this would be because it reflects an orientation toward growth and development of the best in oneself. Though I argue that excellence is not a central element of eudaimonia, it is still likely that excellence is important to some degree. For example, if one is truly bad at something—especially to the point of frustration—it will be hard to feel that it was what one was meant to do or that it is part of one’s true self. Thus, some degree of competence—which seems to be the better term for excellence to
avoid elitist connotations (Henderson & Knight, 2012)—is undoubtedly necessary for an experience to contribute to eudaimonia (c.f., SDT; Ryan & Deci, 2000; Ryan & Deci, 2011; Ryan & Deci, 2001). Consequently, by eudaimonic experiences, I mean to refer to positive experiences—but not necessarily for solely hedonic reasons—that involve one or more of the following: A feeling that what one is doing and one’s life is either worthwhile, important, or significant (meaningful); a sense that what one is doing is consistent with and motivated by their true self (authentic); or a sense that what one is doing is working toward becoming a better version of themselves (growth).

**Categories of Analysis**

Regardless of the particular conceptualization of eudaimonia to which one subscribes, eudaimonia can be studied using more than one category of analysis (see Huta & Waterman, 2014): As a form of global functioning, as motivational orientations, as specific behaviors or activities, and as specific subjective experiences. Typically, eudaimonia is viewed as a form of wellbeing (i.e., global functioning) and, consequently, has primarily been treated as an outcome. However, this is obviously not the only way eudaimonia—and also hedonia—can be studied (Huta & Waterman, 2014).

As outlined extensively by Huta and Waterman (2014), when researchers study eudaimonic well-being as a form of global functioning, they primarily focus on global outcomes such as mental health, subjective well-being, and life satisfaction. Are people experiencing flourishing at a global level? Are they satisfied with their life choices? Do they have a general sense that life is meaningful or purposeful? What types of life activities contribute to these global outcomes? These are some of the questions that are asked when studying eudaimonia as global
functioning. They inherently place eudaimonia—and wellbeing more broadly—as the outcome of interest and seek to understand its causes.

When focusing on motivational orientations, researchers focus upon the reasons underlying given behaviors and lifestyles as the source of either eudaimonic or hedonic wellbeing (Huta & Waterman, 2014), paying particular attention to individuals’ values and goals. Did someone select experiences and situations with the purpose of seeking pleasure and avoiding pain? Or did they select it because they wanted to find fulfillment and purpose? Does this person generally value personal growth, or do they value monetary success? And do these different reasons (i.e., motivations) for a given behavior impact relevant outcomes? These are the types of questions that reflect a focus on motivational orientations. Here, the concern is not necessarily with individuals’ actual experiences but rather their general motivational orientation toward eudaimonia-consistent outcomes. The general idea is that individuals striving for outcomes consistent with eudaimonia should have different outcomes than those striving for more hedonic outcomes.

Researchers can also emphasize the behaviors and activities themselves as the source of eudaimonic or hedonic wellbeing (Huta & Waterman, 2014), focusing on the specific content of the activities in which an individual typically engages. How many typically hedonic activities, such as going to parties, does this person engage in? Does this person spend their time volunteering? Meditating? Here, the focus is often on trying to classify particular activities as generally hedonic or eudaimonic and using those general classifications as the predictor of outcomes (which are often measures of global wellbeing).

Finally, some researchers study eudaimonia and hedonia as subjective experiences (Huta & Waterman, 2014). Did this person feel happy? Did this person feel authentic? Did this person
connect their actions to some higher-order goal? Here, the focus is on what the individuals actually experience in the moment. Motivations are only relevant to the extent that they meaningfully impact the subjective experience of an activity. The surface features of specific activities are, likewise, only relevant if they result in different experiences for specific individuals. Finally, subjective experiences' impact on global functioning is often not as important relative to their effect in the moment.

While there is undoubtedly value in studying both eudaimonia and hedonia using all of these approaches, I believe there is considerable value in focusing on eudaimonia as a subjective experience. First, even if we temporarily assume that the only reason to study eudaimonia, in any manner, is for its impact on our global functioning, there is still great value in studying eudaimonia as a subjective experience. Namely, because our lives are lived day-to-day. We have countless individual experiences, each of which subtly shapes the trajectory of our lives. If our ultimate goal is to better understand how to live the good life, so to speak, then simply understanding eudaimonia as global functioning is not enough to understand how the day-to-day translates into global functioning. That is, we must specifically understand how all of our day-to-day experiences—and specifically which types of experiences—factor into global functioning (c.f., Bauer, 2016). Thus, studying specific types of experiences, eudaimonic experiences, is critical to understanding how to achieve the good life.

Second, even if we are, indeed, only interested in eudaimonic experiences to the extent that they facilitate optimal functioning and achievement of the good life, it is still important to consider specific subjective eudaimonic experiences. Namely, it is important because the likely feedforward process necessary to maintain increasing levels of eudaimonic wellbeing inherently involves specific experiences. It is entirely possible that each isolated eudaimonic experience
results in isolated outcomes that set the stage for future eudaimonic experiences (c.f., Waterman, 2011; e.g., Stavrova & Luhmann, 2016), creating a cyclical process. Thus, understanding the outcomes of eudaimonic experiences will only help to further our understanding of how individuals develop global eudaimonic wellbeing.

Third, it is currently unclear how each of the core elements of eudaimonia (i.e., Personal growth, authenticity, and a sense of purpose and meaning in life) fit together temporally to produce a holistically eudaimonic outcome. Do all three elements need to be experienced at the same time? Does one element lead to another, which leads to a next, in a linear fashion (e.g., Schlegel et al., 2009)? A logical starting point for questions like these seems to be focusing on subjective experiences that do not require the time and resources to study as the longitudinal studies necessary to study these processes at the levels of global functioning and motivational orientation would (e.g., Stavrova & Luhman, 2016). In effect, the value of studying eudaimonic experiences is, again, that it will only contribute to a more complete picture of eudaimonia as a whole.

Still, these three arguments for the value of studying eudaimonic experiences each assume that the only reason to study eudaimonia is to maximize individual wellbeing. Yet, perhaps we are not always focused on eudaimonia solely as an end itself. Perhaps we are sometimes interested in the ramifications that fostering eudaimonia has for other societally relevant outcomes. In essence, we may sometimes ask ourselves: “What happens when someone is flourishing?” Obviously, this means turning the focus from eudaimonia as an outcome to eudaimonia as a predictor. However, at the global level, we quickly run into issues of causality. Do people volunteer because they already feel both fulfilled and a sense of meaning and purpose in life? Or do they feel fulfilled and have a sense of meaning because they volunteer? In theory,
these questions can be answered when measuring eudaimonia as global wellbeing using longitudinal designs, but doing so would be more difficult than focusing on more acute experiences, which are far more malleable and conducive to experimental manipulation. Thus, it makes sense to begin studying if and how eudaimonia results in societally desirable outcomes by focusing on day-to-day experiences. This is the primary reason the present proposal focuses on eudaimonic experiences and how they relate to self-expansiveness.

**Personal Growth**

One of the core elements of eudaimonia is personal growth and self-discovery. Growth is an inherent part of human life; no one is born their perfect self, and therefore, we must continually grow in order to adjust to present circumstances and to become our best self. Thus, for individuals to function optimally—to flourish—they must grow as an individual, especially if they hope to fully live up to their potentials. In other words, we do not start life in a state of flourishing, but certain personally developmental processes may push us toward a state of flourishing (c.f., Bauer, 2016). Here, both a willingness or motivation to grow and perceptions of growth are important (Bauer, 2016).

Moreover, growth, at least in the context of eudaimonia, is more than simple change; it is change for the better. One often-invoked idea in discussions of growth is the notion of the development of one’s potentials and capacities (e.g., Keyes et al., 2002); cultivating one’s strengths and available resources to better serve one’s purpose in life, often referred to as self-actualization or self-realization (e.g., Waterman, 2011). In other words, personal growth is about becoming a better version of ourselves (Bauer, 2016). The best version of ourselves, however, is undeniably self-defined and idiosyncratic to each individual (c.f., Henderson & Knight, 2012).
Consequently, it is difficult to describe personal growth more specifically than mere positive change and becoming a better version of oneself.

A final consideration in discussing personal growth as an element of eudaimonia is the importance of self-discovery. Self-discovery, here, is used to describe the act of learning about oneself through critical self-examination and reflection (c.f., Bauer, 2016). Objective growth, per se, may not be the thing most important for eudaimonia but rather subjective perceptions of growth (e.g., Waterman et al., 2010); it matters whether we have the subjective sense that we have grown. Our sense of self, however, does not update on its own. The only way to gain this sense of growth, then, is through self-reflection in the service of self-discovery. To truly realize or know that we have grown, we must engage in critical self-examination to highlight how we have changed (Bauer, 2016). Thus, self-reflection aimed at learning about oneself—introspection—is an integral part of personal growth and, thus, is also a part of eudaimonia (see Lengieza et al., 2019).

**Personal Growth and Self-expansiveness**

According to self-expansion perspectives on close relationships, we have a fundamental need to expand the self, and this need is why we seek out relationships (see Aron et al., 2013; Aron & Nardone, 2011; Hughes et al., 2020). More importantly, the assertion furthered by these self-expansion models is that we are motivated to expand the self so that we feel best prepared to handle future challenges (Hughes et al., 2020; Aron et al., 2013). The explicit connection between self-expansion and a desire for greater self-efficacy seems to suggest that the desire to be our best selves—to experience personal growth—is a motivational reason for expanding the self. In fact, trait measures of personal growth (e.g., Ryff, 1989) correlate positively with the
desire for self-expansion (e.g., Hughes et al., 2020). Individuals who value and experience a greater degree of growth are more likely to feel a desire to expand the self.

The connection between personal growth and self-expansiveness may seem somewhat tautological. However, there is also direct evidence that motivations to develop the best in oneself are correlated with self-transcendence (Otway & Carnelly, 2013), supporting the proposition that personal growth results in self-expansiveness more broadly. That is, the extent to which individuals are motivated to become the best versions of themselves, the more they expand their boundaries beyond the self. Additionally, one key personality marker of an orientation toward personal growth is openness to experience (Ryff, 1989), which has been associated with self-transcendent constructs such as connectedness to nature in several studies (e.g., Brick & Lewis, 2014; Di Fabio & Bucci, 2016; Forstmann & Sagioglou, 2017; Lee et al., 2015; Nisbet et al., 2009; Nour et al. 2017; Richardson & Sheffield, 2015; Tam, 2013; Zhang et al., 2014; see Lengieza & Swim, 2021b, for a review).

As noted above, self-discovery is a crucial prerequisite for perceptions of personal growth. Consequently, to the extent that self-discovery is promoted by self-examination and self-reflection, then associations between states associated with careful examination of the self and self-expansiveness can inform our understanding of the association between personal growth and self-expansiveness. Self-discovery and introspection—attention directed to one’s inner experience and other private aspects of the self (Govern & Marsch, 2001)—seem to go hand in hand. One likely cannot discover things about themselves without introspection (Bauer, 2016; Morin, 2006; Richardson & Sheffield, 2015; c.f., Beaumont, 2009). Thus, it is promising that states of introspection (e.g., “private self-awareness,” Mayer et al., 2009; “reflective self-
attention,” Richardson & Sheffield, 2015) are routinely associated with self-expansive constructs such as connectedness to nature.

Finally, self-discovery may directly influence self-expansiveness. Specifically, we may not be as self-expansive when we do not feel we know ourselves (e.g., Hughes et al., 2020). That is, when our self-concept lacks clarity, we find it difficult to expand our sense of self to include new information (Hughes et al., 2020). In fact, research has shown that individuals induced to experience less self-concept clarity are both less motivated to expand their sense of self and also less likely to incorporate the traits of potential relationship partners into their sense of self (Emery et al., 2015). Further, those who tend to form their identity on the basis of deep self-exploration—as opposed to on the basis of the expectations and norms of others—exhibit higher levels of self-transcendence (Beaumont, 2009). Together, these findings all point toward a common conclusion: Personal growth and self-discovery may lead to increased self-expansiveness.

**Authenticity**

Ultimately, eudaimonia is a theory about the self and authenticity. Daimon is sometimes translated as one’s true self (Waterman, 2011; Henderson & Knight, 2012; Huta & Waterman, 2014), hence the emphasis on acting in line with one’s true self found in both modern and historical perspectives of eudaimonia. Accordingly, authenticity may be a particularly core part of eudaimonic experiences. In fact, it seems closely tied to the other two elements of eudaimonia (i.e., meaning and purpose & growth and self-discovery). To start, self-discovery is largely motivated by a desire to know our true selves and is posited to help us orient toward behaviors that we will experience as authentic; that is, it helps us know what is or is not consistent with
who we are (Waterman, 2011). In other words, one cannot fully experience authenticity without having a clear sense of who they are (Jongman-Sereno & Leary, 2019; see Vess, 2019).

Authenticity is also associated with meaning and purpose. For some, experiencing a sense of purpose in life very well may be tied to authenticity. That is, when something is experienced as unequivocally aligned with our true self, it is easy to conclude that it is either what we were always meant to do or that it is the only thing we could ever imagine doing. Theorists have even gone so far as to assert that authenticity is the “hub of meaning” (Schlegel et al., 2016, p. 205). For example, across five studies, the accessibility of the true-self-concept was associated with people’s judgments of meaning in life, even when accessibility was experimentally manipulated rather than measured (Schlegel et al., 2009; see Schlegel et al., 2016). In essence, where self-discovery and personal growth may support authenticity, authenticity might support meaning and purpose in life. Thus, it is undoubtable that authenticity is a central element of eudaimonia.

Like eudaimonia itself, authenticity has also gone by several terms, at least within the frameworks used to study eudaimonia (see Huta & Waterman, 2014). Some researchers have discussed authenticity using the notion of personal expressiveness, where an emphasis is placed on feelings that one is being who they truly are and what they were meant to do (e.g., Waterman, 2011). Other researchers have used the term autonomy (e.g., Ryan & Deci, 2000; Ryan & Deci, 2011; Ryan & Deci, 2001; or, more generally, work on SDT) in ways that evoke the ideas of authenticity. Formally, autonomy has been defined within the framework of SDT as experiencing an internal locus of causality, in other words, experiencing motivations and behavior as emanating internally from within the self as opposed to externally. However, in practice, the proponents of SDT have discussed autonomy and authenticity as closely related (e.g., Ryan & Deci, 2000; c.f., Jongman-Sereno & Leary, 2019). Consequently, for the purposes of this
discussion, I treat authenticity and autonomy somewhat synonymously to refer to the idea of experiencing behavior as consistent with the internal force of the self.

Regardless of the name by which it goes, at its heart, authenticity is feeling like one is acting in ways that are consistent with one’s sense of self. At the other end of the authenticity spectrum lies experiencing one’s behavior or activity as wholly inconsistent with the true self. This can be brought about by several circumstances. Most notably, if an individual feels that they are acting or being a particular way only because of some external pressure (e.g., pressure from loved ones, pressure from the situation, etc.), they will experience a low degree of authenticity. Thus, one might view authenticity as closely related to experiencing internal forces as the sole reason for one’s past and present behavior (e.g., “I am acting this way because it is who I am”). In-authenticity, on the other hand, may be viewed as closely related to experiencing external forces as the sole reason for one’s past and present behavior (e.g., “I am acting this way because I am forced to”; c.f., Ryan & Deci, 2000).

However, it may be more accurate to say that in-authenticity is simply experiencing internal forces as absent from the reasons for one’s past and present behavior (“I am definitely acting this way for a reason other than who I am”). Indeed, we can feel authentic, even when experiencing external pressures (see Lenton et al., 2016), so long as we feel that the direction in which we are being pressured is consistent with our sense of self. Additionally, it is easy to imagine that feeling as though one does not know themselves—i.e., having some form of identity

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1 Lenton et al., (2016) found that acute instances of accepting internal influence was associated with increased acute feelings of authentic living. However, this association was reported within a model controlling 75 other terms in the model, many of which accounted for authenticity-related phenomena (e.g., autonomy, private and public self-awareness, importance of being one’s true self as well as trait measures of accepting external influence and authentic living). Thus, it is incredibly hard to interpret what the term associated with accepting external influence meant after removing the variance shared with all the other terms in the model. Thus, I have chosen not to cite the findings of this work, however, it has many valuable points in its introduction.
crisis—might also result in feeling a lack of authenticity (c.f., Vess, 2019). Thus, inauthenticity may be borne out of a high degree of inconsistent external pressures put on the self or an unclear sense of who we are or why we acted (c.f., Jongman-Sereno & Leary, 2019).

**Authenticity and Self-expansiveness**

Though the connection between authenticity and self-expansiveness may not seem as readily apparent—at least in comparison to the connection with the other two elements of eudaimonia discussed here—there is evidence that points to authenticity having self-expansive outcomes. The most direct evidence for an association between authenticity and self-expansiveness comes from a correlational study investigating self-expansion in close relationships (Carswell et al., 2021). In the third study, there was a positive correlation between autonomy-need-fulfillment and self-expansion both within and outside the relationship (Carswell et al., 2021). This suggests the possibility that if one feels a lack of authenticity—a sense that their behavior is not emanating from within—then they might not be as willing or able to expand their self (Carswell et al., 2021). Additionally, the more autonomous an individual feels, the more likely they are to integrate identity characteristics into their sense of self as opposed to trying to distance themselves from them (Weinstein et al., 2011, Study 1 & 2). Most importantly, these findings were supported when using an experimental priming procedure, demonstrating that the experience of authenticity may cause some form of self-expansion (Weinstein et al., 2011, Study 3-5).

Additional indirect evidence supports the possibility of authenticity leading to self-expansiveness. To the extent that one important source of inauthenticity is a perceived abundance of inconsistent external pressures operating on the self, then associations between

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2 It is worth noting that the authors suggest a causal relationship where self-expansion causes autonomy need-fulfilment, however, the correlational nature of the evidence means that we cannot rule out the inverse.
constructs associated with a greater degree of external pressures and self-expansiveness can inform our understanding of the possible relationship between authenticity and self-expansiveness. One such construct is public self-awareness—a heightened focus on how one appears to others (Govern & Marsh, 2001), which is believed to result in increased perceptions and influence of external pressures on the self (e.g., stronger influence of norms as opposed to personal standards). This is not to say that one cannot experience authenticity when aware of external pressures or influences; they surely can (e.g., English & Chen, 2011; Ryan & Deci, 2001). However, empirical research seems to support the antagonistic relationship between external pressures and authenticity.

On average, there tends to be a negative relationship between perceptions of external pressures and authentic experiences (e.g., Lenton et al., 2013). Moreover, research shows that authentic experiences are characterized by less public self-awareness in comparison to inauthentic experiences (Lenton et al., 2013; Slabu et al., 2014). Thus, findings associated with public self-awareness can inform our understanding of the link between authenticity and self-expansiveness. As it turns out, states associated with a heightened concern for others’ perceptions of oneself are negatively associated with self-expansiveness. For example, public self-awareness is negatively correlated with self-expansive phenomena such as connectedness to nature (Lengieza & Swim, 2021a; Mayer et al., 2009; Frantz et al., 2005; see Lengieza & Swim, 2021b, for a review). Thus, these findings are consistent with the possibility that authenticity might result in greater self-expansiveness.

Additionally, other states associated with authenticity are positively associated with self-expansiveness, offering additional indirect support for the association between authenticity and self-expansiveness. For example, trait mindfulness is positively correlated with trait authenticity
(e.g., Lakey et al., 2008) and is robustly associated with self-expansive constructs such as connectedness to nature (Howell et al., 2011; Richardson & Sheffield, 2015; Unsworth et al., 2016; see Schutte & Malouff, 2018). In essence, at the very least, authenticity is compatible with other states, which themselves are conducive to expanding the self. This further suggests a possible link between the experience of authenticity and self-expansiveness; if authenticity was negatively associated with states that facilitate self-expansiveness, it would challenge the prediction that authenticity might result in self-expansion. Moreover, as noted above, authenticity may require individuals to have a clearer sense of who they are (i.e., an absence of self-alienation; Vess, 2019); in other words, self-concept clarity and authenticity should be positively correlated (c.f., Diehl & Hay, 2011). Thus, the fact that self-concept uncertainty was associated with lower self-expansion (Emery et al., 2015), as cited in the section on personal growth, suggests that inauthenticity (in this case borne out of uncertainty about one’s self) may inhibit self-expansion. Again, as with personal growth, all signs point toward a similar conclusion: Authenticity may result in greater self-expansiveness.

Meaning and Purpose in Life

Although eudaimonia is largely about authenticity, it is also about the life worth living (Henderson & Knight, 2012). One of the most common notions evoked in discussions of eudaimonia is the concept of the good life (Huta & Waterman, 2014). Contrary to its use in popular culture, in this case, “the good life” does not necessarily refer to the life lived in luxury and wealth, but instead, the worthwhile one. The life worth living will undoubtedly differ from person to person, heavily influenced by his or her value system. However, modern eudaimonic theorists all largely agree that the life worth living for any individual is the one experienced as having personal meaning and purpose.
Meaning, in this context, refers to perceptions of one’s life and behaviors as having some important (i.e., meaningful) impact on the world or, phrased more colloquially, making a difference (i.e., one’s actions are not meaningless). Purpose refers to the sense that one’s life and behaviors are what one was ‘meant’ to do (i.e., one is fulfilling one’s purpose). The latter may evoke notions of determinism or destiny and may seem to presuppose a belief in some higher power. This, however, would be an incorrect assumption. One need not believe that some higher power determined their life in order to feel that they are doing something that they are uniquely situated to do, and they certainly do not need to hold such beliefs to feel that what they are doing is significant or meaningful. Perhaps one of the most quintessential examples of someone finding their purpose is the individual who finds themself desiring to do a job that few others wish to do. For whatever reason, this occupation is one which they uniquely find interesting—and one others do not—and that makes it feel like their purpose.

At the very least, meaning and purpose involve a sense that one’s life has an intentional direction, as opposed to feeling that one’s life is haphazard and at the whims of chance (Ryff, 1989) and that what one is doing is in some way worthwhile and significant (Haugan et al., 2021; Steger, 2016). Ultimately, developing and maintaining a sense of meaning and purpose in life requires individuals to think about the long-term perspective as well as to be concerned about, and also contribute to, the broader context (Huta & Waterman, 2014). Thus, meaning and purpose often involve a sense of serving some higher good and being part of a collective.

It may be worth noting that the focus on meaning and purpose is where the contrast between eudaimonia and hedonia seems to be most salient. One answer to “Which life is the one worth living?” is the hedonic one: The life filled with pleasure. However, according to most eudaimonic theorists, the answer is, instead: The life filled with meaning and purpose. This is not
to reject pleasure entirely. But rather to assert that pleasure alone does not mean life is experienced as worthwhile. Indeed, sometimes, eudaimonia and hedonia appear simultaneously (Waterman et al., 2008), for example, when one spends time with loved ones. However, meaning and pleasure do not always co-occur (see Henderson & Knight, 2012, for a brief review).

One can experience a great deal of pleasure and still feel that their actions were meaningless in the broader context, which can easily contribute to a sense that what one is doing is not worthwhile. This is, in a way, at the root of the adage, “Money does not buy happiness.”; one can have all the resources in the world to buy them all the hedonic pleasures they desire, and still, they will find something missing, or so the saying implies. Or, to take another example, one might consider the regret one might feel after a hedonically charged evening spent drinking with friends or even as far as to consider the hedonic qualities of drugs in the absence of meaning. Additionally, one can experience a great deal of meaning without maximizing pleasure. One poignant example is engaging in historical tourism to visit concentration camps (e.g., Nawijn et al., 2016), an experience that is undoubtedly meaningful to many but should be characterized by no hedonic pleasure (for more examples of non-cooccurrence of hedonia and eudaimonia, see Henderson & Knight, 2012).

Yet, it is important to recognize that not all people will perceive the same life or activity as meaningful. For some, the life spent building a business empire is meaningful. For others, spending time with family is undesirable and, therefore, not worthwhile. Thus, instead of prescribing a set of specific ways of being without regard for individual values, psychological eudaimonic perspectives (should) emphasize a more idiosyncratically flexible approach. In essence, from the eudaimonic perspective, the best gauge for whether one is living the life worth living is whether they feel their life is meaningful.
It may be worth noting that some theorists argue that both meaning and pleasure are necessary for a good life (e.g., Bauer, 2016). However, I argue that it is still worth separating the two types of positive experiences. Undoubtedly, one must experience life as positive to flourish, but pleasure is not the only type of positive experience. Again, individuals who visit concentration camps can find the experience positive—in the sense that it is an experience that they value and, if given the chance, one they would experience again—without experiencing any form of hedonic pleasure.

**Meaning and Purpose in Life and Self-expansiveness**

As noted above, experiencing a sense of meaning and purpose in life is often discussed in relation to connecting to some higher purpose (Huta & Waterman, 2014), which, in many ways, is an inherently self-expansive notion. Importantly, there is some empirical evidence that meaning and purpose may be associated with self-expansiveness. The most convincing evidence comes from a meta-analysis of studies investigating 65+ year-olds, indicating a strong positive correlation between meaning in life and self-transcendence (Haugan et al., 2021). Importantly, this effect may not be isolated to older individuals, as studies using undergraduate samples have also reported positive correlations between the presence of meaning in life and self-transcendence (e.g., Beaumont, 2009; Capaldi et al., 2017; Hinds & Sparks, 2009; Howell et al., 2011; Nisbet et al., 2011). Thus, there is correlational support for an association between meaning and expansiveness.

There is also some evidence of a potential causal relationship between a sense of meaning and purpose and self-expansiveness. A longitudinal study has also revealed that meaning in life is bi-directionally associated with relational, social, and collective connectedness (Stavrova & Luhmann, 2016). In other words, relationships—which are a fundamental source of self-
expansion (e.g., Aron et al., 2013)—led to a greater sense of meaning in life which, in turn, led to a greater number of relationships (Stavrova & Luhmann, 2016). Though this evidence is especially indirect in its support for the association between meaning and self-expansiveness, it does an exceptional job illustrating the value of focusing on the outcomes of eudaimonic elements instead of solely focusing on the antecedents. Further, experimental manipulations of reflecting on meaning in life have been indirectly associated with increased self-transcendence (Lengieza et al., 2019), which further suggests the possibility of experiencing meaning in life leading to self-expansive outcomes. Thus, once again, the signs point in a similar direction: Meaning and purpose may contribute to increased self-expansiveness.

Summary

There is evidence that eudaimonia, in general, might be associated with self-expansiveness (e.g., Hughes et al., 2020; Huta & Ryan, 2010) and also that each of its three core components may contribute to this association. Personal growth is positively correlated with self-expansiveness (e.g., Hughes et al., 2020), as is the desire to develop the best in oneself (e.g., Otway & Carnelly, 2013). Having a clear sense of who we are is associated with expanding the self (e.g., Emery et al., 2015) and psychological experiences which should facilitate self-discovery (e.g., deep self-exploration and reflection) show positive associations with self-transcendence (e.g., Beaumont, 2009; Mayer et al., 2009; Richardson & Sheffield, 2015). Likewise, authenticity is positively associated with self-expansion in the form of incorporating additional information into one’s sense of self (e.g., Carswell et al., 2021; Weinstein et al., 2011) and psychological experiences which should inhibit authenticity (e.g., increased perceptions of external pressures acting on the self) are associated with lower levels of self-transcendence (Lengieza & Swim, 2021a; Mayer et al., 2009). Finally, meaning and purpose in life is associated
with higher levels of self-transcendence (e.g., Beaumont, 2009; Haugan et al., 2021; Capaldi et al., 2017; Hinds & Sparks, 2009; Howell et al., 2011; Nisbet et al., 2011) and reflecting on meaning and purpose in life may lead to self-transcendence (Lengieza et al., 2021). Thus, my assertion is that one outcome of eudaimonic experiences is self-expansiveness.

**Self-expansiveness**

Self-expansiveness, as defined above, refers to any given self-category broadening to include additional, previously unincluded aspects. The most obvious example—and also one of the earliest conceptions of self-expansiveness—is the expansion of the self-concept; individuals can, and often do, incorporate new traits and attributes into their sense of self, including the traits of other individuals (see Aron et al., 2013; Aron & Nardone, 2011). However, there are other ways in which the self can expand. Take goals, for example. There is the category of self-goals and the goals of others. Self-expansiveness, in this case, is including other individuals’ goals as your own goals (e.g., relationships or other collective goals; c.f., Crocker & Cannevello, 2015). Scopes of concern also provide another example. In this case, there is the category of self-interest and the category of other-interest. Self-expansiveness, here, is including the interests of others in the same category as—or at least closer to—the interests of the self.

Just as it is informative to consider what self-expansiveness looks like in the affirmative, it is also informative to consider what it is not. Self-expansiveness has, at its opposite, a state wherein the self is narrow and rigidly defined in concern, category, and quality; a state of self-restrictiveness or self-centeredness. Within this state, the boundaries of the self are fixed and unlikely to expand. Thus, in the example of self-concepts, self-restrictiveness represents defining the self in terms of a narrow set of attributes that only belong to the self. In the case of goals, the self-goals category may be strictly defined by goals that are owned solely by the self or even by a
limited range of self-goals. In the example of scope of concern, the category of concerns relevant to the self may be strictly defined as a limited number of self-interested concerns. Thus, there is a continuum of self-expansiveness with a narrow and restricted self at one end and an inclusive and expansive self at the other end. Importantly, somewhere in the middle is a self that transitions from strictly independent of others to one that begins to include elements that are connected to others.

It is worth acknowledging that a handful of examples of self-expansiveness have been discussed thus far (e.g., self-concepts, roles, goals, scope of concern, etc.). The variety of forms of self-expansion stems from the fact that the self is a complex and multifaceted construct. It contains multiple self-aspects (identities) and includes a variety of traits and qualities (attributes; see McConnell, 2011). Ultimately, our self-concept is a network of often-overlapping self-aspects, each of which contains an array of attributes, including goals, identities, roles, aspirations and ideals, close others, etc. (McConnell, 2011; Oyserman et al., 2011). Self-expansion can occur at any level and along any one of these many dimensions of the self (c.f., Pappas & Friedman, 2007). For example, at a high level, the superordinate self-concept can expand to include a greater number of self-aspects/identities (c.f., self-complexity; Linville, 1987). But at a lower level, any given specific self-aspect can expand to include a greater number of attributes (c.f., Aron et al., 2013). Thus, as noted earlier in the introduction, we can expand the self to include new roles, goals, traits, interests, etc. The self can even go as far as including other people (Aron et al., 1992) and other beings (Schutlz, 2002).

Often, researchers only focus on the expansion of one category of self-attributes (e.g., including traits of a significant other in one’s sense of self; e.g., Emery et al., 2015; see Pappas & Friedman, 2007, for a similar discussion). Consequently, much of the evidence provided in this
introduction relies on a collection of findings focusing on disparate forms of self-expansion. Ultimately, however, the working assumption in this proposal is that expanding the self in one way may facilitate receptivity to expansion in another. Much like a creature molting and experiencing subsequent vulnerability, perhaps any time the self ‘molts’ it will be more receptive to further expansion. This is largely consistent with perspectives on self-expansion within close relationship research, which suggest that self-expansion involves both an expansion phase and an integration phase where the integrity of the self is resolidified (Hughes et al., 2020), implying that there is a period of malleability between the two phases.

Given that the self has many dimensions, it should be unsurprising that there are a number of constructs that focus on expanding the self in some fashion. The most basic form of self-expansion involves the incorporation of new information and traits into the self-concept, which is how the notion first appeared in the context of close relationships (i.e., Aron & Aron, 1986). Research has shown that when we enter relationships, we include a greater number of our relationship partner’s attributes in our sense of self (Aron et al., 1991; Mashek et al., 2003; see Aron et al., 2004), as well as a greater number of attributes included in our sense of self, generally (Aron et al., 1995). Relationships, however, are not the only way that other individuals’ traits become included in our sense of self. For example, some research has shown that perspective-taking can lead individuals to endorse relevant traits as more self-descriptive (Laurent & Myers, 2011; Goldstein & Cialdini, 2007)—that is, as more a part of their self.

Another self-expansive construct that has been investigated empirically is moral expansiveness. Moral expansiveness is concerned with the moral concern afforded to different entities (Crimston et al., 2016; Laham, 2008). However, it is often discussed in terms of the extent to which individuals include others within the same moral circle as those with which one
is most concerned (e.g., Crimston et al., 2016), which is arguably the same moral circle as the self. Thus, moral expansiveness involves extending the boundaries of concern from focusing solely on the self to including others. Research has shown that our moral circles may expand to include others when we consider the similarities with those others (e.g., Bastian et al., 2012) and when we adopt a more inclusion-oriented mindset (e.g., Laham, 2008) as well as when we take the perspective of others (Crimston et al., 2016). Importantly, this form of self-expansiveness is associated with increased prosocial behavior (e.g., donating organs; Crimston et al., 2016), further pointing to the value of studying predictors of self-expansiveness as a means of gaining the benefits of self-expansiveness.

In one of its highest forms, self-expansiveness is self-transcendence—defined as decreased salience of the self, accompanied by a softening of the boundaries between self and others, which often involves a sense of oneness with others and one’s surroundings (Lengieza et al., 2021; see also Yaden et al., 2017). Put into terms more familiar to the study of self-concepts and self-expansion, self-transcendence reflects an expansion of the boundaries of the self-concept to include others. Self-centeredness, on the other hand, reflects a form of self-restrictiveness where the boundaries between self and other are rigidly defined and largely impermeable (see also Dambrun & Ricard, 2011, for similar discussions of self-centeredness).

Though self-transcendence comes in many forms, one particularly well-studied form of self-expansiveness is connectedness to nature which has also been treated as a form of self-transcendence (Lengieza et al., 2021). In general, connectedness to nature is defined as the psychological joining of nature and the self (i.e., including nature in the self; Schultz, 2002), which manifests as a sense of oneness with nature (Mayer & Frantz, 2004; Lengieza & Swim, 2021b). Thus, connectedness to nature is an example of expanding the boundaries of the self to
include nature. Research has consistently shown that connectedness to nature is positively associated with pro-environmental outcomes (see Whitburn et al., 2020) and also may be associated with more general prosocial behavior (Lengieza et al., 2019). Connectedness to nature has also been linked to higher levels of psychological (Mayer et al., 2009) and social wellbeing (Howell et al., 2011). Thus, I have chosen to primarily focus on connectedness to nature as a particular form of self-expansiveness because of its potential association with a host of societally relevant outcomes.

There are a variety of antecedents of connectedness to nature (See Lengieza & Swim, 2021b). Importantly, however, some evidence—some of which has already been reviewed in preceding sections—specifically connects the elements of eudaimonia to connectedness to nature as a form of self-expansiveness. Several studies have indicated a positive association between connectedness to nature and meaning and purpose (Capaldi et al., 2017; Hinds & Sparks, 2009; Howell et al., 2011; Nisbet et al., 2011). Additionally, states associated with the experience of authenticity, such as decreased public self-awareness (Lenton et al., 2013) and mindfulness (e.g., Lakey et al., 2008), are similarly associated with connectedness to nature (e.g., Lengieza & Swim, 2021a; Mayer et al., 2009; Frantz et al., 2005; and Schutte & Malouff, 2018; Howell et al., 2011; Richardson & Sheffield, 2015; Unsworth et al., 2016, respectively). Most importantly, a recent meta-analysis focusing on the association between eudaimonic wellbeing and connectedness to nature not only found that, on the whole, eudaimonic wellbeing is associated with connectedness to nature but also that personal growth, authenticity, and purpose and meaning in life were three of the most strongly associated facets of eudaimonia with connectedness to nature (Pritchard et al., 2020). Thus, there is fairly strong evidence to expect
connectedness to nature, specifically, and eudaimonia to be related in some fashion. However, the causal direction of the relationship is certainly less than clear.

**Limitations of Past Research**

Though the evidence seems to point in the direction of eudaimonic experiences potentially leading to self-expansiveness, the causal direction of the association is particularly unclear. On the one hand, and contrary to the preferred view here, it seems possible that one must first experience self-expansion in order to experience eudaimonia. Put in terms of connectedness to nature, feeling connected to nature might be a source of meaning and purpose in life; may function as a relationship with nature, therefore causing us to grow; or may allow us to feel authentic because it is a biologically ingrained state (c.f., biophilia, see Kahn, 1997). It also may be the case that certain types of people are likely to expand the self and are also likely to experience eudaimonia (i.e., the classic third variable problem).

However, based on the extant evidence, it is also possible that eudaimonic experiences may cause the self to expand. Individuals may need to experience some degree of flourishing before they are receptive to expansions of the self, an idea reminiscent of Maslow’s Hierarchy of Needs (Maslow, 1943). It is easy to imagine that someone who is grappling with a feeling of meaninglessness or purposelessness in life might have a hard time expanding the self to include other people, let alone nature. Someone who is experiencing an identity crisis and does not know who they are might not be willing to risk expanding the self (e.g., Emery et al., 2015). Someone who feels that they are being pressured to be something that they are not might not feel the freedom necessary to expand the self to include additional elements such as the natural world (c.f., Hodgins & Knee, 2002).
On the whole, the proposition that eudaimonia might be a prerequisite for self-expansion is generally consistent with the way in which openness—in this case, discussed as both the propensity to process experiences in an unbiased manner as well as a willingness to incorporate new elements into self-structures, the latter tying it to self-expansiveness—is discussed in relation to SDT (Hodgins & Knee, 2002). Specifically, the view on openness implies that it is facilitated by inner confidence and resilience to threat (Hodgins & Knee, 2002). In essence, it suggests that a state of threat—or extrapolating more broadly, a state of un-wellbeing—inhibits willingness to incorporate new elements into the self. To the extent that this is the case, experiencing states which promote a state of wellbeing might free the self to expand, as it might be naturally inclined to do (c.f., Aron et al., 2013; Baldwin & Landau, 2014). Indeed, reduced defensiveness may be part of the reason authenticity is associated with integrating more information into the self (Weinstein et al., 2011). Thus, a case can be made for eudaimonic experiences causing the self to expand. Still, there is obviously a need for experimental investigations, which is the purpose of this proposal.

There has been only one study of which the author is aware that has attempted such an experimental manipulation. In this study, we sought to test the potential causal process through which eudaimonic reflection—compared to hedonic and mundane reflections—on recent travel experiences influences self-transcendence and subsequent prosocial behavior (Lengieza et al., 2021). The researchers hypothesized that eudaimonic reflections focused on meaning and purpose in life would result in eudaimonic affect (see Lengieza et al., 2021), which would, in turn, influence self-transcendence—treated as a latent construct reflected by both connectedness to nature and to humanity—which would predict donation behavior. The researchers also hypothesized that eudaimonic reflections would directly affect self-transcendence.
Based on the data, the proposed serial mediation was upheld. Individuals randomly assigned to reflect on meaning and purpose, compared to mundane reflection, experienced greater eudaimonic affect, which was positively associated with self-transcendence, which, itself, was positively associated with donations. Ultimately these associations formed a significant indirect pathway both to self-transcendence (i.e., an internal indirect path) and to donations. Individuals who reflected on pleasure and fun, however, did not show such an effect. On the whole, these results are promising. Unfortunately, the data did not reveal a total effect of the reflections on self-transcendence (Lengieza et al., 2021). Thus, the purpose of the present research is to experimentally test the effects of the core elements of eudaimonia on self-expansiveness represented by connectedness to nature in hopes of better supporting causal claims.
CHAPTER 2:

Purpose

The purpose of this program of research is to experimentally investigate the effect that eudaimonic experiences have on self-expansiveness using an experimental paradigm in hopes of providing a more comprehensive picture of eudaimonia and its potential to contribute to societally desirable outcomes. Thus, I conducted three studies—all collected over the Fall and Spring semesters of the 2021-2022 academic year—to test the effects of eudaimonic experiences on self-expansiveness. To advance our understanding of eudaimonia, each study focused on a different one of the core components of eudaimonia relative to mundane and hedonic reflection. Study 1 focused on the effects of reflecting meaning and purpose. Study 2 focused on the effects of reflecting on authenticity. Study 3 focused on the effects of reflecting on growth and self-discovery. All three studies examine the effect of eudemonic reflection within the context of experiences in nature.

To be more specific, the purpose of Study 1 was to produce the direct effect implied by the findings of Lengieza et al. (2021b)—that is, to further investigate the association between a sense of meaning and purpose in life and self-expansiveness using an experimental paradigm. However, even if Study 1 provides evidence that reflecting upon meaning and purpose results in self-expansiveness, there is further need to demonstrate that it is eudaimonic reflection, generally, that impacts self-expansiveness, and not simply reflection upon meaning and purpose, specifically. Consequently, the purpose of Study 2 and 3 was to investigate the effects of reflecting upon the other elements of eudaimonia on self-expansiveness to provide a more complete picture of the effects of eudaimonia as an experience.
Focusing on each of the three elements of eudaimonia, specifically, has both theoretical and practical value. Theoretically, it is valuable because it is inherently incomplete to focus on only a single element of eudaimonia. If we are to make the claim that *eudaimonia* results in self-expansiveness, the best evidence to support that claim is showing that the three core elements of eudaimonia result in self-expansiveness, rather than showing only one component of eudaimonia impacts self-expansiveness.

It is also practically valuable for reasons similar to those discussed in regard to the importance of a nuanced understanding of interventions aimed at promoting connectedness to nature (see Lengieza & Swim, 2021b). Namely, in this case, if we want to put eudaimonic reflection into practice, it is helpful to know which element of eudaimonia should be the most impactful. For example, if this research finds that only reflecting upon meaning and not authenticity impacts self-expansiveness, it would strongly indicate that having individuals reflect on authenticity would be an ineffective means of encouraging self-expansion (a rather obvious conclusion, indeed).

These three studies also inform other aspects of our understanding of eudaimonia. As noted above, while there is value in studying eudaimonia using all categories of analysis, there is also specific value in focusing on eudaimonia as a subjective experience. Studying specific types of eudaimonic experiences is critical to understanding how day-to-day experiences translate into the good life at a global level. For example, focusing on eudaimonic experiences as a *predictor* of outcomes will help inform potential feedforward processes that may serve to maintain increasing levels of eudaimonic wellbeing. Again, it is possible that each eudaimonic experience results in outcomes that set the stage for future eudaimonic experiences (c.f., Waterman, 2011; e.g., Stavrova & Luhmann, 2016), creating a cyclical process. In this case, it may be that
eudaimonic experiences lead to self-expansiveness, which then fosters the ingredients for future eudaimonic experiences. However, first, one must be confident that eudaimonic experiences actively facilitate self-expansiveness before dedicating resources to uncovering these types of cyclical relations. Thus, understanding the specific outcomes of eudaimonic experiences will set the stage for investigating potential feedforward processes.

Even further, this research has value beyond the confines of eudaimonic theories. Here I am not focused on eudaimonia solely as an end itself. Instead, I am interested in the possibility that eudaimonia may contribute to other societally relevant outcomes. This is the primary reason that the present proposal focuses on eudaimonic experiences and how they relate to self-expansiveness. By understanding the ways in which theories of eudaimonic wellbeing can illuminate our understanding of self-expansiveness, we may gain insights into the determinants of desirable outcomes such as increased societal (e.g., Crimston et al., 2016) and planetary (e.g., Whitburn et al., 2020) citizenship.

The primary focus of these studies is explicit connectedness to nature. The reason explicit connectedness is the primary outcome of interest is that it best represents self-expansiveness. First, it explicitly invokes the self and also definitionally involves the self expanding to include nature (Schultz, 2002; Lengieza & Swim, 2021b). Also, connectedness to nature originated as an extension of self-expansion research in close relationships (see Schultz, 2002) and, therefore, has strong roots in the early self-expansion research (e.g., Aron et al., 1992). Thus, predictions about the effect of eudaimonia on self-expansiveness apply most closely to connectedness to nature.

However, I do consider other potentially self-expansive outcomes as well: Implicit connectedness to nature and moral expansiveness. The self can expand in several ways (e.g., expanding to include other entities vis-à-vis connectedness to nature or expanding to include a
greater number of traits, etc.), and connectedness is just one form of self-expansion. It is, therefore, worthwhile to consider whether other potentially expansive outcomes result from eudaimonic experiences as well. Thus, I also included an implicit measure of connectedness to nature (i.e., the Implicit Association Test [IAT]; Greenwald et al., 2003) as well as a measure of moral expansiveness (Crimston et al., 2016) as exploratory measures of self-expansiveness.

The IAT-nature (Schultz et al., 2004) assesses the cognitive association between “nature” and “self” relative to the association between “nature” and “other”. If the self expands to include nature, one might expect the cognitive representation of the self to expand to include the concept of nature as well. Accordingly, if the cognitive representation of the self expands to include nature, then there may be a detectably stronger association between self and nature than “self” and “other” (see Aron et al., 2004, for a similar discussion). IAT-nature scores are generally associated with explicit connectedness scores (e.g., r = .25 to .37; Bruni & Schultz, 2010; Schultz & Tabanico, 2007; Schultz et al., 2004; Wang et al., 2016) and show sensitivity to the same types of contexts that influence explicit connectedness to nature (e.g., Zoos, Schultz & Tabanico, 2007). Thus, there is general reason to believe that predictions for explicit connectedness to nature should generally track, at least to some degree, for implicit connectedness. Even still, this is a somewhat novel use of implicit measures in the context of self-expansion and is largely exploratory.

Another potential form of self-expansiveness is moral expansiveness (Crimston et al., 2016). As noted earlier in the introduction, moral expansiveness is discussed in a way that evokes the notion of a self-category (i.e., the category of “most concern”) expanding to include other entities. Moral expansiveness is correlated with self-transcendent constructs, such as connectedness to nature, suggesting that it may involve the self and might reflect the self
expanding to include the concerns of others. Thus, one might expect that if the self expands to include other entities (e.g., nature), it might expand to include the concerns of those entities as well (e.g., greater concern for nature and others). Discussions of moral expansiveness, however, often do not go so far as to explicitly invoke the notion of the self. Thus, the proposition that moral expansiveness is a form of self-expansion is particularly novel and, therefore, exploratory.

Hypotheses

Across all three studies, the expectation is that eudaimonic reflection—as a means of inducing subjective eudaimonic experiences—will result in greater self-expansiveness than mundane reflection (the control). However, eudaimonia reflects a form of positive experience more broadly. Therefore, I include hedonic reflection as an additional contrast to help isolate the effects of reflecting upon positive experiences, generally, from the effect of reflecting upon specific types (i.e., eudaimonic) of experiences. Figure 1 presents the conceptual model.

Figure 1

The Conceptual Model of How Eudaimonia Affects Self-expansiveness

Note. These predictions are relative to the absence of such experiences (i.e., relative to mundane reflection condition).
Relative to predictions in comparison to mundane reflection, predictions regarding the comparison of eudaimonic reflection to hedonic reflection are less certain. Although there is evidence that hedonic experiences might promote self-expansiveness, there is also evidence to suggest that hedonia might not be associated with self-expansiveness. On the one hand, and in support of a positive association between hedonia and self-expansiveness, evidence of positive associations between positive affect and connectedness to nature (see Capaldi et al., 2014), studies showing that positive affect is associated with including others in the self (Waugh & Fredrickson, 2006), as well as the general principles of the Broaden and Build theory of positive emotions (Fredrickson, 1998, 2004), all suggest that positive experiences may lead to increased self-expansiveness.

On the other hand, there is reason to suspect that hedonia may not lead to self-expansiveness. Compared to eudaimonically motivated activities, hedonically motivated activities are less predictive of outcomes such as elevating experiences, which include feeling connected to a larger whole (Huta & Ryan, 2010). Additionally, some scholars have made the distinction between hedonia and eudaimonia based on hedonia’s association with self-centeredness (see Steger, 2016). Indeed, self-centered values, but not self-transcendent values (Dambrun, 2017), are more associated with forms of happiness more similar to hedonia (Dambrun et al., 2012; Dambrun, 2017). Further, hedonic affect, such as joy, is characterized by a focus on the self rather than a focus on others (Stellar et al., 2017), suggesting, at the very least, that hedonia may be associated with self-centeredness. Finally, when controlling for eudaimonic affect, there was no longer a relationship between hedonic affect and self-transcendence in the previously mentioned experimental study (Lengieza et al., 2021).
Thus, based on the above, a case could be made that eudaimonic reflection should result in higher levels of self-expansiveness than hedonic reflection, but one could also make a case for hypothesizing similar effects between the two types of reflection. Either way, however, empirically demonstrating such effects would have value. If the former is true, then it would contribute to the understanding of eudaimonia and hedonia as distinct forms of positive experiences (see Henderson & Knight, 2012; Huta & Waterman, 2014). If the latter turns out to be true, it would still be consistent with the Broaden and Build theory of positive emotions (Fredrickson, 1998, 2004; Waugh & Fredrickson, 2006) and might inform our understanding of the beneficial effects of positive experiences more generally. Consequently, this research will not only inform theories of eudaimonia but will also enrich our understanding of self-expansiveness more generally.
Study 1 builds off the study conducted by Lengieza et al. (2021), which tested the causal relationship between meaning and purpose on self-expansiveness. As noted above, only an indirect effect, and not a total effect, from meaning and purpose to self-expansiveness was established. Thus, Study 1 was conducted to better confirm that eudaimonic experiences are causally related to self-expansiveness. This study then laid the groundwork to test whether the other specific elements of eudaimonia have the same causal relationship, as tested in Studies 2 and 3.

Although Lengieza and colleagues’ (2021) study investigating the causal relationship between meaning and purpose on self-expansiveness only provided evidence of an indirect association, there are several reasons that they may not have found a total effect of eudaimonic reflection despite the presence of an indirect effect. An especially relevant reason for this indirect–total inconsistency, however, is that the manipulation may not have been targeted enough to produce a sufficiently large total effect. In the study, the researchers used a broad manipulation, allowing participants to reflect upon any travel experience they had in the recent past. There are a wide variety of travel experiences an individual can have, including some that are more nature-based (e.g., wildlife tourism; Kuenzi & McNeely, 2008) and some that are more culture-based (e.g., historical tourism; Csapo, 2012). Thus, the content of the experience upon which participants were reflecting may have included only human-focused experiences or only nature-focused experiences for some individuals.

This is a particularly important observation in light of the considerable research that has demonstrated that when studying the self, it is critically important to consider what content is
mentally activated in any given moment (McConnell, 2011); if a mental concept associated with
the self is not activated, it will not exert an influence or be influenced. Thus, for those
participants who happened to only focus on cultural experiences in their reflections, it would be
unlikely that nature would become included in their sense of self because the concept of nature
likely would not be activated. For participants who only focused on nature experiences, the
opposite would be true. In essence, for most participants, there is a high probability that only one
form of self-transcendence increased. Consequently, combining the two measures of self-
transcendence—one which may have increased and another which may have remained the
same—may have effectively halved the size of the effect, so to speak, making it harder to detect
a total effect on self-transcendence.

The logical solution to this limitation is to utilize both a more targeted intervention as
well as a more targeted measure of self-transcendence. Thus, for this set of studies, I used a
more targeted manipulation that required participants to focus directly on a natural experience.
Additionally, to maximize our ability to detect changes in self-expansiveness—connectedness to
nature, specifically—resulting from our manipulation, we included a baseline measure of
connectedness to nature at the beginning of the study. I also removed the focus on travel and past
experiences as well as to allow us to draw from a larger population and generalize to a greater
array of contexts (i.e., beyond the context of travel). Additionally, instead of using a
retrospective manipulation, I adopted an imagined-experience manipulation as a way of keeping
the contextual elements of the reflection as similar as possible across participants without forcing

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3 Above, I state that “Ultimately, however, the working assumption in this proposal is that expanding the self in one
way may facilitate receptivity to expansion in another,” thus, my most recent assertion that only one form of self-
transcendence may have increased might come off as inconsistent with that view. However, to clarify, the assertion
is that the self will be malleable and receptive to other forms of expansion when experiencing any kind of
expansion, not that it will expand in every conceivable way when experiencing some form of expansion.
participants to follow a series of potentially confusing and autonomy-reducing guidelines. I also included a brief period for participants to think about the prompt before they were expected to write to give participants adequate time to reflect upon their experience without changing our ability to assess data quality (i.e., based on words per minute [wpm]), explained below.

**Method**

**Participants**

In the Fall of 2021, I recruited 487 undergraduate participants with the intent of retaining a final sample of 412 based on a 15% exclusion rate and power analyses using G*Power (Faul et al., 2007) assuming a moderately small effect size. A total of 50 participants were excluded for selecting one or more of the following on a set of exit items in the debriefing: (1) “I didn’t give the survey much attention” or “I only gave the survey half my attention”, (2) “I didn’t take the survey seriously” or “I only took the survey slightly seriously”, or (3) “I rushed a lot”. An additional 2 participants were excluded for straight-lining on all items, including reverse-coded items on the connectedness to nature scale. An additional 39 participants were excluded for taking too long on the survey (i.e., > 1.5x the interquartile range [IQR] above the third quartile; > 29.39 min in this sample), but no individuals fell below the cut-off for taking too little time on the survey (i.e., < 1/3 median time to complete the survey). Finally, one participant was excluded for low effort on the reflection task (i.e., they wrote fewer than 1/3 the median wpm for participants in a given condition). The final sample, which was comprised of 395 participants, was primarily white (77%) and primarily female (80%) and tended to lean toward liberal ($M = - .34$; on a -3 [Liberal] to 3 [Conservative] scale) with a mean age of 18.67 years ($SD = 1.03$). Participants began the study already fairly connected to nature ($M = 128.39$, $SD = 51.06$).

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4 This individual wrote only 6.59 wpm, whereas the median wpm for their condition was 25.20 wpm.
Measures and Procedure

Participants were recruited to the study via the psychology student subject pool, where they were informed that the study was interested in the imagined experiences of Penn State Students and that they would have to complete a writing task. The information presented on the study page appeared as follows:

NOTE: Please note that you will have to complete a 5-minute writing task. If you do not want to write, please do not attempt to complete this survey. This survey must be taken on a computer.

You are being recruited to take part in a research study being conducted by researchers from Penn State University. We are interested in the types of experiences Penn State students can imagine and how they categorize things.

During this survey, you will write about an imagined experience for five minutes—you will also be asked to answer several questions about your attitudes on certain topics and will complete two categorization tasks.

You will also provide some background information about yourself.

Baseline Connectedness and Demographics. Participants first answered a series of demographic questions. Embedded within these questions was a version of the Inclusion of Nature in the Self-scale (INS; Schultz, 2002; Lengieza & Swim, 2021a). This scale consisted of two circles, one labeled self, the other nature, and a sliding knob below the circles. Participants were asked to indicate how much nature was a part of their sense of self by moving the circles to more or less overlap. Scores ranged from 0 (maximum non-overlap) to 250 (maximum overlap).

Reflection Manipulation. Participants were then informed of the upcoming writing task:

On the next page, you will be asked to think and write about an imagined experience. Please write your thoughts in response to the prompt as they come to you. There is no need to be overly concerned about spelling or grammar. What is important is that you respond as honestly and thoughtfully as possible, the richer your description the better.

Before the text boxes appear, there will be a period for you to collect your thoughts (at least 30 seconds).

When the text boxes appear, you will be required to write for a minimum of 5 minutes before you can proceed, although you can write for longer if you need.
After reading this information, participants were randomly assigned to one of the three conditions (meaning, fun, & control). They were brought to a page that contained condition-specific instructions prior to the actual writing task. The page contained text and an image of a natural scene (see Figure 2) without any text boxes. The text read:

*Imagine that, sometime in the next week, when the weather is nice, you are going to be spending part of the day outside, somewhere similar to the picture displayed below.*

*On the next page, you will be asked to imagine and write about *how this experience would need to be planned. What would you do first? What about after that? Etc.*/< how this experience would allow you to have fun. For example, what would you do first, what would be fun about it? What about after that, what would be fun about it? Etc.*/<how this experience would contribute to a sense of meaning or a sense of purpose in your life. For example, what would you do first, what would be meaningful about it? What about after that, what would be meaningful about it? Etc.>*

*You will then be asked to write about *how nature would influence the planning of the experience. For example, what part of nature would most influence the planning of the experience? Why?*/< how nature would play an important role in the fun of this experience. For example, what part of nature would most contribute to the fun of the experience? Why?*/< how nature would play an important role in the meaning that came from this experience. For example, what part of nature would most contribute to the meaningfulness of the experience? Why?*>*

*<image>*

*Feel free to take some time now to collect your thoughts,*

*After the "--->" button appears, you may proceed to the next page when you are ready.*

*<timer counting down from 30 seconds>*

Participants were not able to advance until 30 seconds had elapsed. The purpose of this was to explicitly separate the time it takes for participants to gather their thoughts from the time it takes them to write down their thoughts.⁵ After the thinking period had elapsed, participants were able

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⁵ Though I am using WPM to exclude low-quality responses, it is technically possible that participants who did not write many WPM spent part of the time *thinking* during which I *assume* they were writing. By building in a period of time to think that is constant across all participants, this should lessen that concern.
Imagine that, sometime in the next week, you are going to be spending part of the day outside somewhere similar to the picture displayed below.

(scroll down for text boxes)

Try to imagine \(\text{how this experience would be planned.}\)/ \(\text{how this experience would allow you to have fun.}\)/\(\text{how this experience would create a sense of meaning in your life.}\)

First, write about \(\text{how this experience would need to be planned.}\) What would you do first? What about after that? Etc. \(\text{how this experience would allow you to have fun.}\) For example, what would you do first, what would be fun about it? What about after that, what would be

Now, write about \(\text{how nature would influence the planning of the experience.}\) For example, what part of nature would most influence the planning of the experience? Why? \(\text{how nature would play an important role in the fun of this experience.}\) For example, what part of nature would most contribute to the fun of the experience? Why? \(\text{how nature would play an important role in the meaning that came from this experience.}\) For example, what part of nature would most contribute to the meaningfulness of the experience? Why?

You should write for at least 5 minutes, but it is okay if you write for a little longer.
Participants were able to take as long as they wished on the task. However, they were not able to advance to the next page until the 5 minutes had elapsed.

*Connectedness to Nature.* After completing the reflections, participants were presented with the 14-item Connectedness to Nature Scale (CNS; Mayer & Frantz, 2004). Participants responded to items on the scale (e.g., “I feel a sense of oneness with the natural world around me”, “I feel disconnected from nature”) using a 7-point scale from “Strongly Disagree” (-3) to “Strongly Agree”. Since the particular interest of this study was self-expansiveness, I included an additional 15th item, “Nature is a part of my sense of self”, which was always presented as the final item in the scale to limit its influence on the other items on the scale in the event that it had some unintended effect. The addition of this item did not affect the scale’s reliability. However, two reverse-coded items were flagged as seriously hindering reliability and were dropped (i.e., “My personal welfare is independent of the welfare of the natural world.”, and “When I think of my place on Earth, I consider myself to be a top member of a hierarchy that exists in nature.”)

The final scale demonstrated strong reliability (alpha = .87).

*Exploratory measures of expansiveness.* In addition to the explicit measure of connectedness to nature, we included both the single category IAT-nature (Karpinski & Steinman, 2006) and an adaptation of the moral expansiveness scale (Crimston et al., 2016).

*Implicit Association Test (IAT).* The protocol for the single category IAT followed the procedure used by Karpinski and Steinman (2006), with a few minor adjustments, and was implemented using (iatgen [https://github.com/iatgen/iatgen]; Carpenter et al., in press). Namely, participants were required to correct incorrect responses and no time window was enforced.

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6 These items were flagged in Study 2 & 3, as well, and were also dropped. The final scales demonstrated strong reliability in all studies.
Following Karpinski and Steinman (2006), participants were presented with a series of trials in which a target word appeared on the screen and were required to accurately categorize that target into the appropriate category using an assigned key press. In some trials, the target was a ‘nature’ word (e.g., “Plants”, “Animals”, “Trees”, “Flowers”, “Creatures”). In others the target was either a ‘self’ word (e.g., “me”, “myself”, “I”, “self”, “mine”) or an ‘other’ word (e.g., “they”, “them”, “other”, “their”). There were several blocks of trials. In some blocks, self-words and nature were assigned to the same key. For example, in such blocks, participants would respond to “me” and “trees” both with the ’i’ key and would respond to ‘them’ with the ‘e’ key. On other blocks, other words and nature words were assigned to the same key. In all blocks, participants were instructed to:

Instructions: Place your left and right index fingers on the E and I keys. At the top of the screen are 2 categories. In the task, words and/or images appear in the middle of the screen.

When the word/image belongs to the category on the left, press the E key as fast as you can. When it belongs to the category on the right, press the I key as fast as you can. If you make an error, a red X will appear. Correct errors by hitting the correct key.

Please try to go as fast as you can while making as few errors as possible.

When you are ready to practice, please press the [Space] bar to begin.

In all trials, participants were required to hit the correct key before advancing to the next trial. If they hit the wrong key, a red X would appear on the screen and persist until participants corrected the error.

There was a total of five blocks. A practice block where participants practiced the key mapping for ‘self’ and ‘other’ words (20 trials). No nature words were shown in this block. The mapping of self and nature did not change for the entire task. After the basic practice, participants completed an additional practice block that introduced the initial mapping for the nature words (24 trials). They then completed an identical block of test trials (45 trials). After the test trials, the mapping for the nature words changed to the other key. Participants were then
alerted of this change and given the opportunity to practice the new mapping (24 trials) before being presented with another test block (45 trials). The order and mapping were fully counterbalanced across participants.

Based on the logic underlying the IAT (see Greenwald et al., 2003), to the extent that participants cognitively associate self and nature, they should be faster when responding to self–nature (SN) blocks than when responding to other–nature (ON) blocks. Thus, subtracting ON response times from SN response times (i.e., SN – ON) would reflect the degree to which participants associated self with nature, with higher numbers indicating a greater self–nature association. Following Karpinski and Steinman (2006), I scored the IAT using the D scoring approach and divided participants' response time difference score by the standard deviation of all of their correct response times combined. However, since I required participants to correct their responses, I did not add an error penalty to incorrect responses and instead used the time it took participants to respond correctly (see Greenwald et al., 2003). I also excluded responses over 10,000 ms since I did not use an enforced time window (see Greenwald et al., 2003). IAT scores from participants who had an error rate > 20% were excluded (Karpinski & Steinman, 2006).

**The Moral Expansiveness Scale (MES).** An adapted drag-and-drop version of the MES (Crimston et al., 2016) was used as an additional item to potentially capture self-expansiveness. For this version of the MES, participants placed targets (e.g., Family Friend, Cows, the Grand Canyon) into four primary categories: Inner Circle (4) of moral concern, Outer Circle (3) of moral concern, Fringes (2) of moral concern, and Outside (1) moral concern. Participants were also given three in-between categories to allow for items that sat at the edge of each category. These in-between categories were scored as a half-point between the two respective adjacent
categories. That is, if a participant placed Cows in the category between the Fringes of moral concern and Outside moral concern, it was scored as 1.5. For clarity, scores ranged from 1 to 4.

In the process of preparing the MES for analyses as a latent variable, it became evident that treating all items (i.e., human targets and nature targets) as a single factor resulted in a poorly fitting model (CFI < .65). Additionally, across all reasonable permutations of the models, several items demonstrated factor loadings ≤ .100 (i.e., family member, close friend, spouse, murderer, and terrorist). I tested a model with a nested two-factor structure—with and without those items—where the human targets and nature targets each first loaded on their own respective factors, which were then both loaded onto a single MES factor. In no case was the model able to be identified.  

Thus, I elected to (a) analyze the nature targets and human targets separately and (b) drop the poor loading items from the human targets. Adopting two separate models, consistent with Rottman et al. (2021), dramatically improved the fit for both models (e.g., CFI > .89).

Exit items. After completing the final dependent measures, participants were asked to indicate whether they experienced glitches in the survey. They were also asked to indicate whether or not they were distracted during the survey (“I didn’t give the survey much attention”, “I only gave the survey half my attention”, “I gave the survey most of my attention”, or “I gave the survey my full attention”), whether they took the survey seriously (“I didn’t take the survey seriously”, “I only took the survey slightly seriously”, “I took the survey seriously”, or “I took the survey very seriously”), and whether they rushed (“I rushed a lot”, “I rushed a little”, “I didn’t rush very much”, or “I didn’t rush at all”). Participants were told the following before

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7 The inability to treat nature targets and human targets as indicators of a single underlying factor was found for the remaining two studies as well.
answering these questions: “The following items are designed to ensure our data is reliable and meets quality standards. Your honesty is appreciated and won’t impact your credit!”

Data Analysis

Coding scheme. All analyses were conducted using R version 4.0.4. To test for the effects of reflection on self-expansiveness, I regressed CNS, MES, and IAT scores onto orthogonal contrast codes comparing the Meaning (1) and Fun (-1) conditions to each other, and both experimental conditions (1) to mundane reflection (-2) while controlling for baselines INS scores. I also probed comparisons between each condition and mundane reflection using dummy codes comparing meaning to mundane reflection (Meaning = 1, Fun = 0, Control = 0) and comparing fun to mundane reflection (Meaning = 0, Fun = 1, Control = 0).

Latent Variables. CNS and MES were treated as latent variables using lavaan (Rosseel, 2012) and were internally standardized (i.e., std.lv = T). Structural Equation Models (SEM) were tested using robust maximum-likelihood estimation with a Satorra-Bentler correction (MLM in lavaan), and three indices were used to assess the fit of our models: The comparative fit index (CFI; values below .90 suggest poor fit; Bentler & Bonett, 1980; Hu & Bentler, 1999), standardized root mean residual (SRMR; values less than or equal to .08 indicate good fit; Bentler & Bonett, 1980), and root mean square error (RMSEA; values higher than .10 warrant model rejection, values near .05 suggest good fit; Browne & Cudeck, 1992; Hu & Bentler, 1999).

Pre-existing differences. Prior to conducting analyses, I checked for differences in the representation of gender, ethnicity (logistic regressions), and political orientation (linear regression) between conditions. These analyses used dummy codes comparing to mundane reflection and were followed up with a comparison between meaning and fun where the signs for
the dummy codes were in opposite directions. There were no differences in political orientation between the conditions \((ps > .738)\), ethnicity \((p = .163)\), or gender \((p = .140)\).

**Outlier analysis.** Prior to the final analyses, I conducted outlier analyses using basic regression models predicting outcomes from the reflection contrasts and baseline INS (i.e., \(\text{lm()}\) in R), using the ‘\text{olsrr}’ package in R (Hebbali, 2020). Individuals were considered outliers if they had extremely high studentized deleted residual (SDR), which exceeded the critical value determined by the formal test of whether or not the case is, indeed an outlier (see Kutner et al., 2005). Individuals flagged as such were inspected for further issues and excluded from analyses if warranted. For our primary analysis with connectedness to nature as the dependent variable, one individual was flagged as having a high SDR \((t = -4.20)\) value well above the critical value \((|t| > 3.69)\). Further inspection of this participant indicated that they put in fairly low effort on the reflection task \((\text{wpm} = 11.56)\) and, more problematically, took only 0.80 seconds per item (total of 12 seconds) on the CNS, whereas the median was 5.53 seconds per item (total of 1 minute and 23 seconds). Thus, this individual seemed to warrant exclusion from analyses and was dropped for all analyses. Repeating this test after excluding the outlier did not indicate any further problematic outliers for CNS scores.

Additionally, one individual was flagged as having a high SDR \((t = 5.09)\) value well above the critical value \((|t| > 3.69)\) for IAT scores. Further inspection of this participant indicated that they took an extremely long time to complete the first dependent measure in the survey (i.e., CNS; 9.88 minutes to complete 15 items) and exhibited a relatively high error rate for the IAT (i.e., error rate = .16; median error rate = .07). Thus, this individual clearly warranted exclusion from all analyses for variables measured after the CNS because at least 9 minutes elapsed between the manipulation and the remaining dependent measures. Further, this individual spent
Table 1

Correlations Between Self-Expansiveness and Demographics in Study 1

<table>
<thead>
<tr>
<th>Variable</th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
<th>8.</th>
<th>9.</th>
</tr>
</thead>
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<td>CNS</td>
<td>–</td>
<td>.44***</td>
<td>.36***</td>
<td>.09†</td>
<td>.04</td>
<td>-10†</td>
<td>.03</td>
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<td>INS</td>
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<td>.01</td>
<td>-13*</td>
<td>.15**</td>
<td>.09†</td>
<td></td>
</tr>
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<td>.06</td>
<td>-09†</td>
<td>-02</td>
<td>.18***</td>
<td>.13*</td>
<td></td>
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<tr>
<td>MESHumans</td>
<td>–</td>
<td>-01</td>
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<td>.08</td>
<td>.04</td>
<td>.05</td>
<td></td>
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</tr>
<tr>
<td>IAT</td>
<td>–</td>
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<td>-02</td>
<td>.07</td>
<td>.06</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
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<td>–</td>
<td>-18***</td>
<td>-21***</td>
<td>.13*</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td>–</td>
<td>-08</td>
<td>.03</td>
<td></td>
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<td></td>
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<tr>
<td>Ideology</td>
<td>–</td>
<td>.04</td>
<td></td>
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<tr>
<td>Age</td>
<td>–</td>
<td>–</td>
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<td></td>
</tr>
</tbody>
</table>

Note. Gender was coded as Male = 1; Female = 0. Ethnicity was coded as White = 1; Other = 0. * p < .05; ** p < .01; *** p < .001.

two minutes on the CNS page before interacting with the scale (i.e., before their first click on the page was registered), raising further suspicion about this participant. Therefore, they were also dropped for all analyses (although their inclusion or exclusion in the CNS analyses did not result in any substantive changes). Repeating this test after excluding the outlier did not indicate any further problematic outliers for IAT scores. No outliers were detected for MES.

Results and Discussion

Correlations between all variables from Study 1 can be found in Table 1.

Connectedness to nature

The SEM predicting connectedness to nature as a latent variable from type of reflection (i.e., the contrasts comparing meaning to fun and comparing meaning and fun to the control), when controlling for baseline connectedness to nature, fit well, $X^2(101) = 143.29$, CFI = 0.97, SRMR= .037, RMSEA= .037, 90%CI = [.021, .050], indicating that the latent construct was captured well by the measurement model. The model revealed that individuals who reflected on meaning and purpose ($M = 0.20$, $SE = 0.08$), experienced greater connectedness to nature than
Table 2

*Means And Standard Errors for CNS Scores for Studies 1-3*

<table>
<thead>
<tr>
<th>Study</th>
<th>Condition</th>
<th>Eudaimonic</th>
<th>Hedonic</th>
<th>Mundane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study 1</td>
<td></td>
<td>M = 0.20, SE = 0.08&lt;sup&gt;a&lt;/sup&gt;</td>
<td>M = -0.12, SE = 0.08&lt;sup&gt;b&lt;/sup&gt;</td>
<td>M = -0.08, SE = 0.08&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Study 2</td>
<td></td>
<td>M = -0.08, SE = 0.07&lt;sup&gt;a&lt;/sup&gt;</td>
<td>M = 0.19, SE = 0.07&lt;sup&gt;b&lt;/sup&gt;</td>
<td>M = -0.11, SE = 0.07&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Study 3</td>
<td></td>
<td>M = 0.16, SE = 0.07&lt;sup&gt;a&lt;/sup&gt;</td>
<td>M = 0.00, SE = 0.07&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>M = -0.16, SE = 0.08&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Note. Within rows, means with different subscripts differ significantly.

individuals who reflected on fun (M = -0.12, SE = 0.08), b = 0.16, p = .014, 95%CI = [0.03, 0.29]. However, both experimental conditions, combined, were not different from mundane reflection (M = -0.08, SE = 0.08), b = 0.04, p = .324, 95%CI = [-0.04, 0.11].

The 2-1-1 contrast comparing the mundane reflection versus positive experiences is not an adequate test of the effects of the two experimental conditions’ effects, individually, relative to mundane reflection<sup>8</sup>. Accordingly, I also ran an SEM using dummy codes comparing meaning and fun to mundane reflection, individually. The model indicated that reflecting on meaning resulted in greater connectedness compared to mundane reflection, b = 0.27, p = .037, 95%CI = [0.02, 0.53], whereas reflecting on fun did not, b = -0.05, p = .712, 95%CI = [-0.31, 0.21]. The means and SEs for the CNS for Study 1, as well as for Studies 2 and 3, are reported in Table 2.

**Exploratory measures**

I completed an analogous set of regressions for IAT D (see Table 3 for means for all studies) scores and an analogous set of SEM models for each type of MES score (see Table 4 & 5 for means for all studies) to test the effects of reflection on other possible indicators of self-expansiveness.

---

<sup>8</sup> Since a full set of contrast codes and a full set of dummy codes account for the same amount of variance, the fit statistic for the SEM models—which primarily represents how well represented the latent variable is—is the same for the contrast coded SEM and the complementary dummy coded SEM.
Table 3

Means And Standard Errors for IAT D Scores for Studies 1-3

<table>
<thead>
<tr>
<th>Study</th>
<th>Condition</th>
<th>Eudaimonic</th>
<th></th>
<th>Hedonic</th>
<th></th>
<th>Mundane</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>M = -0.21, SE = 0.04</td>
<td></td>
<td>M = -0.14, SE = 0.04</td>
<td></td>
<td>M = 0.06, SE = 0.04</td>
<td></td>
</tr>
<tr>
<td>Study 1</td>
<td>M = -0.12, SE = 0.04</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Study 2</td>
<td>M = -0.12, SE = 0.03</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Study 3</td>
<td>M = -0.12, SE = 0.03</td>
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</tbody>
</table>

Note. Within rows, means with different subscripts differ significantly.

Surprisingly, the contrast-coded regression predicting IAT scores from the type of reflection (again, using the orthogonal contrast) when controlling for INS—as a baseline measure of self-expansiveness generally—contradicted the results of the CNS analyses. Specifically, it revealed no difference in IAT scores between those who reflected on meaning ($M = -0.21, SE = 0.04$) and those who reflected on fun ($M = -0.14, SE = 0.04$), $t(386) = -1.24, p = .217, \eta^2_p = .004$. However, both experimental conditions combined resulted in significantly lower IAT scores than mundane reflection ($M = -0.06, SE = 0.04$), $t(386) = -2.66, p = .008, \eta^2_p = .018$. In a second regression, the complementary dummy-coded analysis indicated that while reflecting on fun did not differ significantly from mundane reflection, $t(386) = -1.68, p = .094, \eta^2_p = .007$, reflecting on meaning resulted in significantly lower IAT scores than mundane reflection, $t(386) = -2.91, p = .004, \eta^2_p = .022$. Thus, while reflecting upon meaning seems to have increased explicit connectedness to nature, it seems to have decreased implicit connectedness to nature. Frankly, this finding is quite puzzling, and I will refrain from interpreting it until the general discussion.

The contrast-coded SEM model predicting $MES_{nature}$ scores from type of reflection when controlling baseline INS, demonstrated borderline fit, $X^2(87) = 403.83, CFI = .891, SRMR=$
.043, RMSEA= 0.122, 90%CI = [.111, .135]
9, and indicated that there were no differences
between the conditions on MES\textsubscript{nature} scores. Specifically, reflecting on meaning (\(M = -0.01, SE = 0.08\)) resulted in similar levels of moral expansiveness for nature targets compared to reflecting on fun (\(M = 0.07, SE = 0.09\), \(b = -0.04, p = .523, 95\%CI = [-0.17, 0.09]\). Additionally, both reflections, combined, did not differ from mundane reflection (\(M = -0.05, SE = 0.09\), \(b = 0.03, p = .444, 95\%CI = [-0.04, 0.10]\). The complementary dummy coded SEM indicated that neither reflecting on meaning, \(b = 0.04, p = .758, 95\%CI = [-0.22, 0.30]\), nor reflecting on fun, \(b = 0.12, p = .309, 95\%CI = [-0.12, 0.36]\), differed from mundane reflection individually.

Similarly, the contrast-coded SEM predicting MES\textsubscript{human} scores from type of reflection when controlling baseline INS, demonstrated borderline fit, \(X^2(87) = 314.51, CFI = .89, SRMR= .049, RMSEA= .100, 90\%CI = [.112, .088]\), and indicated that there were no differences between

### Table 4

**Means and Standard Errors for MES\textsubscript{nature} scores for Studies 1-3**

<table>
<thead>
<tr>
<th>Study</th>
<th>Condition</th>
<th>Eudaimonic</th>
<th>Hedonic</th>
<th>Mundane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study 1</td>
<td></td>
<td>(M = -0.01, SE = 0.08)\textsuperscript{a}</td>
<td>(M = 0.07, SE = 0.09)\textsuperscript{a}</td>
<td>(M = 0.05, SE = 0.09)\textsuperscript{a}</td>
</tr>
<tr>
<td>Study 2</td>
<td></td>
<td>(M = -0.06, SE = 0.08)\textsuperscript{a}</td>
<td>(M = -0.04, SE = 0.08)\textsuperscript{a}</td>
<td>(M = 0.01, SE = 0.08)\textsuperscript{a}</td>
</tr>
<tr>
<td>Study 3</td>
<td></td>
<td>(M = 0.26, SE = 0.08)\textsuperscript{a}</td>
<td>(M = -0.15, SE = 0.08)\textsuperscript{a}</td>
<td>(M = -0.11, SE = 0.08)\textsuperscript{a}</td>
</tr>
</tbody>
</table>

\textsuperscript{Note. Within rows, means with different subscripts differ significantly.}

9 The CFI was close to the cut off and the SRMR indicated that the model did, in fact, meet fit standards.
conditions on MEShuman scores. Specifically, it indicated that reflecting on meaning ($M = -0.02$, $SE = 0.09$) resulted in similar levels of moral expansiveness for human targets compared to reflecting on fun ($M = 0.07$, $SE = 0.09$), $b = -0.05$, $p = .498$, 95%CI = [-0.18, 0.09]. Additionally, both reflections, combined, did not differ from mundane reflection ($M = -0.05$, $SE = 0.09$), $b = 0.03$, $p = .47$, 95%CI = [-0.05, 0.1]. The complementary dummy coded SEM indicated that neither reflecting on meaning, $b = 0.03$, $p = .790$, 95%CI = [-0.22, 0.29], nor reflecting on fun, $b = 0.13$, $p = .324$, 95%CI = [-0.12, 0.37], differed from mundane reflection individually.

Thus, the self-expansive effect of reflecting on meaning may have been isolated to connectedness to nature. However, participants completed the MES after completing the IAT, which is both a time-intensive and somewhat laborious task. Thus, by the time participants completed the MES, the effect of the reflection may have degraded. In the two following experiments, MES was placed before the IAT to address this concern.
CHAPTER 4:

Study 2

Method

Study 2 employed the same methodology and analytic procedure as Study 1, except for replacing the meaning reflection with a reflection on authenticity. In addition to changing the manipulation, I switched the order of the MES and the IAT, as noted in the previous section.

Participants

Given the effect sizes found in Study 1 and the exclusion rate, I decided to increase the recruited sample size. Consequently, in the Fall of 2021, I recruited 585 undergraduate participants. A total of 71 participants were excluded for selecting one or more of the following on exit items in the debriefing: (1) “I didn’t give the survey much attention” or “I only gave the survey half my attention”, (2) “I didn’t take the survey seriously” or “I only took the survey slightly seriously”, or (3) “I rushed a lot”. No participants were excluded for straight-lining on all items, including reverse coded items on the connectedness to nature scale. An additional 39 participants were excluded for taking too long on the survey (i.e., > 1.5x IQR above the third quartile, > 29.50 min in this sample), and no individuals fell below the cut-off for taking too little time on the survey (i.e., < 1/3 median time to complete the survey). Finally, 14 participants were excluded for low effort on the reflection task (i.e., they wrote fewer than 1/3 the median wpm for participants in a given condition).\(^\text{10}\) The final sample, which was comprised of 460 participants, was primarily white (75%) and primarily female (78%) and tended to lean toward liberal (\(M = -\text{.31}\)) with a mean age of 18.80 years (\(SD = 2.10\)). Participants in this sample appeared to begin the study already fairly connected to nature (\(M = 129.41, SD = 49.96\))

\(^{10}\) All individuals wrote fewer than 9.5 words per minute, equating to a total of only 48 words over the course of five full minutes.
Measures and Procedure

The procedure for this study was virtually identical to that used in Study 1 except for changing the eudaimonic manipulation and switching of the order of the MES and IAT.

Reflection Manipulation. The reflection on meaning and purpose was replaced with a reflection on authenticity. Specifically, the stems to the three prompts read “…how this experience would give you the opportunity to be your true self.”; “…how this experience would contribute to feeling like you were being your true and authentic self. For example, what would you do first, what would be authentic about it? What about after that, what would be authentic about it? Etc.”; and “how nature would play an important role in the feeling of being your true self that would come from this experience. For example, what part of nature would most contribute to the personal authenticity of the experience? Why?”

Data Analysis

The same analytic procedure used in Study 1 was used for study 2.

Pre-existing differences. Prior to conducting analyses, I checked for differences in the representation of gender, ethnicity (logistic regressions), and political orientation (linear regression) between conditions. There were no differences in ethnicity between the conditions (ps > .428). However, the meaning condition had more conservative participants than mundane reflection (p = .011) and had more men than mundane reflection (p = .022). Thus, all analyses controlled for these pre-existing differences between groups by including them in the models.

Outlier analysis. For the primary analysis with connectedness to nature as the dependent variable, two individuals were flagged as having high SDR values (t = -4.19 & -4.59) well above the critical value (|t| > 3.69). Further inspection of these participants indicated that they both actively resisted the manipulation (i.e., wrote more about how they wouldn’t want to have the
Table 6

Correlations Between Self-Expansiveness and Demographics in Study 2

<table>
<thead>
<tr>
<th>Variable</th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
<th>8.</th>
<th>9.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNS</td>
<td>-</td>
<td>.40***</td>
<td>.38***</td>
<td>.13**</td>
<td>.07</td>
<td>-.08†</td>
<td>.00</td>
<td>.20***</td>
<td>.05</td>
</tr>
<tr>
<td>INS</td>
<td>-</td>
<td>.22***</td>
<td>.03</td>
<td>.04</td>
<td>-.04</td>
<td>-.05</td>
<td>.10*</td>
<td>.09†</td>
<td></td>
</tr>
<tr>
<td>MES_Nature</td>
<td>-</td>
<td>.49***</td>
<td>.09†</td>
<td>-.19***</td>
<td>.11*</td>
<td>.10*</td>
<td>-.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MES_Humans</td>
<td>-</td>
<td>-.01</td>
<td>-.09†</td>
<td>.03</td>
<td>.08†</td>
<td>.03</td>
<td>-.07</td>
<td>-.06</td>
<td></td>
</tr>
<tr>
<td>IAT</td>
<td>-</td>
<td>-</td>
<td>-.01</td>
<td>-.09†</td>
<td>.03</td>
<td>.08†</td>
<td>-.07</td>
<td>-.06</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-.01</td>
<td>-.15**</td>
<td>.12*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-.17***</td>
<td>-.11*</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Age</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-.03</td>
<td></td>
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</tbody>
</table>

Note. Gender was coded as Male = 1; Female = 0. Ethnicity was coded as White = 1; Other = 0. * p < .05; ** p < .01; *** p < .001.

experience). Thus, both individuals seemed to warrant exclusion and were dropped for all analyses. Repeating this test after excluding the outliers did not indicate any further problematic outliers for CNS scores. No outliers were detected for MES or IAT scores.

Results and Discussion

See Table 6 for correlations.

Connectedness to nature

The contrast-coded SEM predicting connectedness to nature as a latent variable from type of reflection, when controlling for baseline connectedness to nature, fit well, $X^2(125) = 244.89$, CFI = .927, SRMR=.042, RMSEA=.049, 90%CI = [.040, .058]. Contrary to predictions, the analysis indicated that individuals who reflected on authenticity ($M = -0.08, SE = 0.07$), experienced lower connectedness to nature than individuals who reflected on fun ($M = -0.19, SE = 0.07$), $b = -0.14, p = .026, 95\%CI = [-0.26, -0.02]$. However, both experimental conditions, combined, were not different from mundane reflection ($M = -0.11, SE = 0.07$), $b = 0.05, p = .121, 95\%CI = [-0.01, 0.12]$. The analysis using dummy codes comparing authenticity and fun to mundane reflection, individually, indicated that reflecting on authenticity resulted in equivalent
levels of connectedness compared to mundane reflection, $b = 0.03$, $p = .838$, 95%CI = [-0.23, 0.28], whereas reflecting on fun resulted in greater connectedness than mundane reflection, $b = 0.30$, $p = .010$, 95%CI = [0.07, 0.53].

**Exploratory measures**

The contrast-coded regression predicting IAT scores from type of reflection when controlling for baseline INS—as a baseline measure of self-expansiveness—revealed that reflecting on authenticity ($M = -0.12$, $SE = 0.04$) resulted in higher implicit connectedness than reflecting on fun ($M = -0.23$, $SE = 0.04$), $t(441) = 2.24$, $p = .025$, $\eta^2_p = .011$. However, both experimental conditions combined resulted in significantly lower IAT scores than mundane reflection ($M = -0.07$, $SE = 0.04$), $t(441) = -2.38$, $p = .018$, $\eta^2_p = .013$. The complementary dummy-coded regression indicated that while reflecting on fun resulted in lower implicit connectedness than mundane reflection, $t(441) = -3.19$, $p = .001$, $\eta^2_p = .023$, reflecting on authenticity resulted in statistically equivalent IAT scores compared to mundane reflection, $t(441) = -0.94$, $p = .345$, $\eta^2_p = .002$. Thus, while reflecting upon fun seems to have increased explicit connectedness to nature, in this sample, it seems to have decreased implicit connectedness to nature. Once again, I will refrain from interpreting this effect until the general discussion.

The contrast-coded SEM model predicting MES$_{nature}$ scores from type of reflection when controlling baseline INS, demonstrated borderline fit, $X^2(109) = 689.55$, CFI = 0.86, SRMR = 0.045, RMSEA = 0.132, 90%CI = [0.12, 0.14] and indicated no significant differences between conditions. Reflecting on authenticity ($M = -0.06$, $SE = 0.08$) resulted in similar levels of moral expansiveness for nature targets compared to reflecting on fun ($M = -0.04$, $SE = 0.08$), $b = -0.05$, $p = .382$, 95%CI = [-0.17, 0.06]. Additionally, both reflections, combined, did not differ from
mundane reflection ($M = 0.01, SE = 0.08$), $b = -0.01, p = .836, 95\%CI = [-0.08, 0.06]$. The complementary dummy coded SEM model indicated that neither reflecting on authenticity, $b = -0.07, p = .548, 95\%CI = [-0.31, 0.16]$, nor reflecting on fun, $b = 0.03, p = .806, 95\%CI = [-0.2, 0.26]$, differed from mundane reflection, individually.

The contrast-coded SEM model predicting $\text{MES}_{\text{human}}$ scores from type of reflection when controlling baseline INS also demonstrated borderline fit, $X^2(109) = 460.63$, CFI = .87, SRMR= .053, RMSEA= .098, $90\%CI = [.089, .108]$. In contrast to $\text{MES}_{\text{nature}}$ scores, the model indicated that reflecting on authenticity ($M = -0.13, SE = 0.08$) resulted in lower levels of moral expansiveness for human targets compared to reflecting on fun ($M = 0.12, SE = 0.08$), $b = -0.12, p = .045, 95\%CI = [-0.25, -0.001]$. However, both reflections, combined, did not differ from mundane reflection ($M = 0.02, SE = 0.08$), $b = -0.01, p = .82, 95\%CI = [-0.07, 0.06]$. The complementary dummy coded model indicated that neither reflecting on authenticity, $b = -0.15, p = .207, 95\%CI = [-0.38, 0.08]$, nor reflecting on fun, $b = 0.10, p = .405, 95\%CI = [-0.14, 0.34]$, differed from mundane reflection individually. Thus, in this case, the positive effect of reflecting on fun found in this study was not isolated to connectedness to nature alone and extended to moral expansion for human targets.
CHAPTER 5:  
Study 3

Method

Study 3 employed the same methodology, and analytic procedure as Study 2, except for replacing the authenticity reflection with a reflection on growth.

Participants

In the Spring of 2022, I recruited 585 undergraduate participants. A total of 64 participants were excluded for selecting one or more of the following on exit items in the debriefing: (1) “I didn’t give the survey much attention” or “I only gave the survey half my attention”, (2) “I didn’t take the survey seriously” or “I only took the survey slightly seriously”, or (3) “I rushed a lot”. One participant was excluded for straight-lining on all items, including reverse-coded items on the connectedness to nature scale. An additional 49 participants were excluded for taking too long on the survey (i.e., > 1.5x IQR above the third quartile; > 30.80 minutes for this sample), and no individuals fell below the cut-off for taking too little time on the survey (i.e., < 1/3 median time to complete the survey). Finally, five participants were excluded for low effort on the reflection task (i.e., they wrote fewer than 1/3 the median wpm for participants in a given condition). The final sample, which was comprised of 462 participants, was primarily white (76%) and primarily female (78%) and tended to lean toward liberal ($M = 0.30$) with a mean age of 19.40 years ($SD = 2.93$). Participants in this sample appeared to begin the study already fairly connected to nature ($M = 130.38, SD = 50.48$).

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11 All individuals wrote fewer than 8.9 wpm, a total of only 45 words over the course of five full minutes.
**Measures and Procedure**

The procedure for this study was identical to that used in Study 2, with the addition of a few exploratory items added at the end of the survey to further investigate the unexpected (non)effect found for authenticity.

**Reflection Manipulation.** In this study, the reflection on authenticity was replaced with a reflection on personal growth. The three stems to the prompts read as follows: “...how this experience would allow you to grow as an individual.”; “...how this experience would allow you to grow as a person. For example, what would you do first, in what ways might you grow as an individual? What about after that? How would it help you grow? Etc.”; and “...how would nature play an important role in the growth that would come from this experience. For example, what part of nature would most contribute to the personal growth from the experience? Why?”

**Exploratory self-report items.** To better understand the unexpected effect produced by authenticity, I included several exploratory measures as exit items at the end of the survey, all rated from “Strongly Disagree” (-3) to “Strongly Agree” (3). Three of the items (i.e., “My reflection made me feel more authentic”, “My reflection gave me a greater sense of meaning and purpose”, and “My reflection made me feel more capable of personal growth”) were aimed at assessing the extent to which participants experienced the three components of eudaimonia. Two of the items were aimed at capturing hedonia (i.e., “My reflection made me feel good” and “My reflection made me feel happy”).

These items also conveniently doubled as a manipulation check. Eudaimonic reflection resulted in greater meaning ($p = .033$), marginally greater perceptions of growth ($p = .059$), as well as resulted in participants feeling better ($p < .001$) and happier ($p < .001$), but not more authentic ($p = .637$), than mundane reflection. Hedonic reflection resulted in greater authenticity
(p = .037) and made participants feel better (p = .006) and happier (p = .003) than mundane reflection but did not increase growth (p = .510) or meaning (p = .192). Thus, the general indication is that the manipulation had the intended effect. Yet, the eudaimonic reflection and hedonic reflection did not differ significantly on any of these items (ps > .102), which is unsurprising given the overlap between eudaimonia and hedonia and the measurement error that comes with using single items.

**Data Analysis**

The same analytic procedure was used in Study 1 and 2 were used for study 3.

*Pre-existing differences.* Prior to conducting analyses, I checked for differences between conditions on gender, ethnicity (logistic regressions), and political orientation (linear regression) using dummy codes comparing to mundane reflection and following up with a comparison between meaning and fun where the signs for the dummy codes were in opposite directions. There were no differences in ideology (ps > .419), ethnicity, (ps > .147), or gender (ps > .776).

*Outlier analysis.* No outliers were detected for CNS, MES, or IAT scores.

**Results and Discussion**

See Table 7 for correlations among measures used in Study 3.

**Connectedness to nature**

The contrast-coded SEM predicting connectedness to nature as a latent variable from type of reflection, when controlling for baseline connectedness to nature fit well, $X^2(101) = 221.59$, CFI = .928, SRMR=.045, RMSEA=.055, 90%CI = [.046, .065]. The model indicated that individuals who reflected on growth ($M = 0.16, SE = 0.07$), experienced similar levels of connectedness to nature compared to individuals who reflected on fun ($M = 0.00, SE = 0.07$), $b = 0.08, p = .202, 95\%CI = [-0.04, 0.21]$. However, both experimental conditions, combined,
Table 7

Correlations Between Self-Expansiveness, Demographics, And Self-Reported Affect in Study 3

<table>
<thead>
<tr>
<th>Variable</th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
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<th>13.</th>
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Note. Gender was coded as Male = 1; Female = 0. Ethnicity was coded as White = 1; Other = 0. * p < .05; ** p < .01; *** p < .001
resulted in greater connectedness than mundane reflection ($M = -0.16, SE = 0.08), b = 0.08, p = .017, 95%CI = [0.01, 0.15]. The analysis using dummy codes comparing growth and fun to mundane reflection, individually, indicated that reflecting on growth resulted in higher levels of connectedness compared to mundane reflection, $b = 0.33, p = .007, 95%CI = [0.09, 0.56]$, whereas reflecting on fun resulted in equivalent levels of connectedness compared to mundane reflection, $b = 0.16, p = .174, 95%CI = [-0.07, 0.40]$. 

**Exploratory Self-expansiveness measures**

The contrast-coded regression predicting IAT scores from type of reflection when controlling for baseline INS—as a baseline measure of self-expansiveness revealed that reflecting on growth ($M = -0.12, SE = 0.03$) resulted in similar levels of implicit connectedness as those reflecting on fun ($M = -0.15, SE = 0.03), t(451) = 0.44, p = .663, \eta^2_p = 0$. Additionally, in this study, both experimental conditions combined resulted in similar IAT scores as mundane reflection ($M = -0.15, SE = 0.04), t(451) = 0.33, p = .742, \eta^2_p = \cdot$. The complementary dummy-coded regression indicated that neither reflecting on fun, $t(451) = 0.07, p = .942, \eta^2_p = 0$, nor reflecting on growth, $t(451) = 0.50, p = .617, \eta^2_p = .001$, resulted in different implicit connectedness than mundane reflection.

The contrast-coded SEM model predicting MES\textsubscript{nature} scores from type of reflection when controlling baseline INS fit well, $X^2(87) = 446.05, CFI = .89, SRMR= .039, RMSEA= .121, 90\%CI = [.110, .133]$, and indicated that reflecting on growth ($M = 0.26, SE = 0.08$) resulted in higher levels of moral expansiveness for nature targets compared to reflecting on fun ($M = -0.15, SE = 0.08), b = -0.05, b = 0.21, p = 0, 95%CI = [0.09, 0.32]$. Additionally, both reflections, combined, did not differ significantly from mundane reflection ($M = -0.11, SE = 0.08), b = 0.06, p = .091, 95%CI = [-0.01, 0.12]$. The complementary dummy coded SEM model indicated that
while reflecting on growth, $b = 0.38$, $p = .002$, 95%CI = [0.14, 0.61], resulted in greater moral expansiveness for nature targets than mundane reflection, reflecting on fun, $b = -0.03$, $p = .768$, 95%CI = [-0.26, 0.19], did not differ from mundane reflection, individually.

The contrast-coded SEM model predicting $\text{MES}_{\text{human}}$ scores from type of reflection when controlling baseline INS fit well, $X^2(87) = 278.25$, CFI = .917, SRMR=.046, RMSEA=.085, 90%CI = [.74, .87], and indicated that reflecting on growth ($M = 0.09$, $SE = 0.08$) resulted in higher levels of moral expansiveness for human targets compared to reflecting on fun ($M = -0.15$, $SE = 0.08$), $b = 0.12$, $p = .048$, 95%CI = [.001, 0.24]. However, both reflections, combined, did not differ from mundane reflection ($M = 0.06$, $SE = 0.08$), $b = -0.03$, $p = .354$, 95%CI = [-0.1, 0.03]. The complementary dummy coded model indicated that reflecting on growth did not result in different levels of moral expansiveness for human targets, $b = 0.03$, $p = .833$, 95%CI = [-0.21, 0.26], while reflecting on fun may have resulted in lower levels of moral expansiveness for human targets than mundane reflection, $b = -0.21$, $p = .065$, 95%CI = [-0.44, 0.01]. Thus, in this case, the positive effect of reflecting on growth was not isolated to connectedness to nature alone and extended to, at the very least, moral expansiveness for nature targets but perhaps not human targets.

Correlational analyses

Study 2 revealed an unexpected non-effect of authenticity. Consequently, several self-report items reflecting eudaimonia and hedonia were included in this study as a way of (a) exploring the unexpected effect of authenticity and (b) potentially offering additional support for the association between meaning and growth and connectedness to nature. The SEM predicting the latent variable of connectedness from baseline INS and the three self-reported eudaimonic variables simultaneously, fit well, $X^2(113) = 262.09$, CFI = .913, SRMR=.049, RMSEA=.059,
90%CI = [0.050, 0.068], and indicated that both growth, \( b = 0.15, p = .047, 95\%CI = [0.001, 0.29] \), and meaning, \( b = 0.18, p = .03, 95\%CI = [0.02, 0.34] \), positively predicted connectedness to nature, while authenticity did not, \( b = 0.01, p = .901, 95\%CI = [-0.12, 0.14] \). Thus, this is generally consistent with the effects reported thus far; meaning (Study 1) and growth (Study 3) both seem to have a positive effect on connectedness while authenticity does not (Study 2).

Additionally, one may wonder how these eudaimonic items compare to the hedonic items. Thus, I also conducted another SEM model where authenticity, growth, and meaning were treated as indicators of a eudaimonic latent variable and where “good” and “happy” were treated as indicators of a hedonic latent variable. The latent variables—which were allowed to correlate—served as predictors of connectedness along with baseline INS. The model fit well, \( \chi^2(149) = 311.794, CFI = .939, SRMR = 0.055, RMSEA = 0.054, 90\%CI = [0.046, 0.063] \). Both eudaimonia, \( b = 0.25, p = .001, 95\%CI = [0.1, 0.39] \), and hedonia, \( b = 0.31, p = 0, 95\%CI = [0.16, 0.45] \), positively predicted connectedness to nature. Thus, it seems that both eudaimonia and hedonia have significant but unique effects on connectedness.
CHAPTER 6:

Combined Analyses

The evidence thus far seems to suggest that eudaimonic experiences may lead to the self-expanding to include nature. Notably, the evidence is strongest for the two most central elements of eudaimonia (i.e., the ones that appear in all major psychological conceptualizations of eudaimonia, see Huta and Waterman, 2014), meaning and growth. The evidence (i.e., Study 2, CNS; correlational evidence in Study 3) also suggests that positive experiences, in general (i.e., including hedonia), might also potentially lead to some forms of self-expansiveness, consistent with Broaden and Build (Fredrickson, 1998, 2004) and self-expansion in relationships (Aron et al., 2013).

What remains less clear, based on the analyses so far, is how eudaimonic experiences compare to hedonic experiences. In some analyses (e.g., Study 1, CNS), eudaimonic experiences resulted in greater self-expansiveness than hedonic experiences, whereas in others, they resulted in similar levels of self-expansiveness to hedonic experiences (Study 3, CNS). Further, in some cases, while eudaimonia did not differ from hedonia, it did differ from mundane reflection, whereas hedonia did not (e.g., Study 3, CNS). These inconsistencies suggest that eudaimonia and hedonia may have different effects, yet ones that may have simply not been able to be captured with the individual sample sizes. Finally, the correlational analyses in Study 3 indicated that both eudaimonia and hedonia have distinct and dissociable effects. Thus, the pattern of results across the three studies (see Table 2) suggests that there may be a meaningful difference between eudaimonic and hedonic reflection, whereby eudaimonia results in stronger connectedness to nature than hedonia.
Consequently, because all three studies largely used the same methodology with the manipulation for hedonic and mundane reflection being identical across studies, I combined data from all three samples in a single regression to increase power and provide a more stable estimate for mundane realism and hedonia. The hope was that this increased power and more stable estimation would aid my ability to address the lingering questions of whether meaning and growth are, in fact, different from hedonic reflection and whether hedonic reflection is, in fact, different from mundane reflection. Note, I only conducted these analyses for connectedness to nature because it was the only dependent variable that was treated identically across the three samples. Another question is whether eudaimonic and hedonic reflection might differ depending upon individuals’ baseline self-expansiveness. Because such interactive effects are much easier to detect with larger samples, I also used these combined analyses to explore for an interaction between baseline INS scores and type of reflection.

Below I report the first order effects of type of reflection on connectedness when controlling for available demographic variables (i.e., ideology, ethnicity, gender, and age) as well as sample (i.e., whether participants were from Study 1, 2, or 3) to account for extraneous differences between the samples, followed by the second order effects from adding in the interaction between baseline INS and type of reflection. However, both Study 2 and the correlational analyses from Study 3 seem to indicate that the potentially self-expansive effects of eudaimonia might be confined to meaning and growth (i.e., not present for authenticity). Therefore, for the following analyses, I was most interested in the comparison between meaning and growth, combined, compared to fun, as there was little reason to believe that authenticity had any self-expansive effect.
Accordingly, I used an exploratory set of orthogonal contrasts (illustrated in Figure 3) with the primary contrast of interest comparing meaning and growth to fun, \((\text{meaning} = 1, \text{growth} = 1, \text{fun} = -2, \text{auth} = 0, \text{control} = 0)\). The set of contrasts also included a contrast comparing meaning to growth, \((\text{meaning} = 1, \text{growth} = -1, \text{fun} = 0, \text{auth} = 0, \text{control} = 0)\), authenticity to mundane reflection \((\text{meaning} = 0, \text{growth} = 0, \text{fun} = 0, \text{auth} = 1, \text{control} = -1)\), and comparing the reflections that turned out to be self-expansive to the ones that did not \((\text{meaning} = 2, \text{growth} = 2, \text{fun} = 2, \text{auth} = -3, \text{control} = -3)\). The last three contrast were included out of necessity to complete the orthogonality and were not of much interest on their own. I also report the correlations between the primary outcome variables of interest, as well as demographics, based on the combined samples in Table 8.

**Results & Discussion**

The first-order contrast-coded SEM model—based on the combined data from all three samples and controlling for baseline INS as well as ideology, ethnicity, gender, and age and sample—fit well, \(X^2(197) = 604.48\), CFI = 0.92, SRMR= 0.042, RMSEA= 0.042, 90%CI =
Table 8

Correlations between self-expansiveness and demographics in Studies 1-3

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Note. Gender was coded as Male = 1; Female = 0. Ethnicity was coded as White = 1; Other = 0. *p < .05; **p < .01; ***p < .001.

[0.038, 0.046] (first-order means are reported in Figure 3). The model revealed there was a significant main effect of reflecting on meaning/growth versus fun, \( b = 0.11, p = .017, 95\%\text{CI} = [0.02, 0.20] \), whereby reflecting on meaning/growth resulted in greater connectedness than fun.

Meaning and growth, however, resulted in equivalent levels of connectedness, \( b = 0.03, p = .725, 95\%\text{CI} = [-0.13, 0.19] \). Additionally, reflecting on authenticity did not differ from mundane reflection, \( b = -0.01, p = .841, 95\%\text{CI} = [-0.12, 0.10] \). Lastly, all three self-expansive reflections, combined, resulted in greater connectedness than mundane reflection and authentic reflection combined, \( b = 0.055, p < .001, 95\%\text{CI} = [0.03, 0.08] \). Unfortunately, the comparison between hedonia and mundane reflection is missing from this set of contrasts. Thus, I also tested the comparison between hedonia and mundane reflection in a second complementary analysis, which indicated that hedonic reflection resulted in greater connectedness than mundane reflection, \( b = 0.15, p = .030, 95\%\text{CI} = [0.01, 0.29] \). This complementary analysis also corroborated the effects from Study 1 and Study 3, showing that both meaning and growth, individually, resulted in
greater connectedness than mundane reflection \((ps < .006)\). Thus, meaning and growth were greater than fun which was greater than authenticity and mundane.

The addition of the interaction terms between baseline INS and each of the contrasts reflecting the type of reflection, did not substantively alter the fit of the model, \(X^2(245) = 659.33,\) CFI = 0.920, SRMR = 0.037, RMSEA = 0.037, 90\%CI = [0.034, 0.041], and revealed a significant interaction between INS and the meaning/growth vs. fun contrast, \(b = -0.01, p = .027,\) 95\%CI = [-0.14, -0.01]. Accordingly, I followed up with a floodlight analysis to determine the point at which the difference between meaning/growth and fun became significant. The analyses revealed that reflecting on meaning/growth resulted in higher connectedness than reflecting on fun at 0.18 SD or lower on the baseline INS but resulted in similar levels of connectedness for all higher levels of INS. In other words, hedonia and eudaimonia (meaning and growth) were only different for individuals who were not already connected to nature.
CHAPTER 7:

General Discussion

This set of studies aimed to better understand the association between eudaimonic experiences and self-expansiveness, in particular, connectedness to nature. In general, the evidence suggests that eudaimonia—at least with respect to the two most central features of eudaimonia, meaning and growth—can cause the self to expand to include nature (see Figure 4). In Study 1, this was shown in direct comparison to both mundane reflection and the hedonic reflection. In Study 3, this was shown in comparison only to mundane reflection. Additionally, in Study 3, self-reported meaning and growth—but not authenticity—each independently predicted connectedness to nature, and all three as indicators of the latent construct of eudaimonia predicted a unique portion of variance relative to the latent construct of hedonia. Further, in the combined analysis, reflection on either meaning or growth resulted in greater connectedness than both mundane reflection and hedonic reflection. Lastly, in Study 3, the self-expansive effects of

Figure 4

The Empirical Model Depicting the Pattern of Results Across the Studies

Note. Dashed lines represent non-significant effects. Paths with ++ indicate stronger effects than paths with +.
reflecting on growth seemed to extend to moral expansiveness for natural entities. Although this effect was not found for Study 1, it seems possible that having to complete the time- and effort intensive IAT prior to completing the MES may have dampened the effects. Together, these findings suggest that eudaimonic experiences can expand the self to include the natural environment, consistent with past research (Lengieza et al., 2021).

Interestingly, in contrast to meaning and growth, authenticity seemed not to have a self-expansive effect (as depicted in Figure 4). In Study 2, authenticity was statistically equivalent to mundane reflection. Further, the combined analysis—which aggregated the mundane reflection condition across all three studies—similarly indicated that authenticity and mundane reflection were statistically equivalent. Further, the correlational analyses in Study 3 suggest that self-reported authenticity has no association with connectedness to nature when controlling for meaning and growth. Thus, while there is evidence that meaning and growth contribute to expanding the self to include nature, the evidence also suggests that the third component of eudaimonia, authenticity, might not result in self-expansion. Further elaboration on the non-effect of authenticity appears in the limitations and future directions section.

Despite the non-effect of authenticity, the findings of the present research may contribute to our understanding of the formation of eudaimonic wellbeing itself. Specifically, it is possible that there is a feedforward process whereby eudaimonic experiences facilitate future eudaimonic experiences (e.g., Stavrova & Luhmann, 2016; c.f., Fredrickson, 2004). Here, eudaimonic experiences caused greater connectedness. In turn, greater connectedness may serve as a foundation from which future eudaimonic experiences may spring (see Pritchard et al., 2020, for the meta-analytic association between eudaimonic wellbeing and connectedness), thus creating
further opportunities for increased connectedness. The present studies do little to test these possibilities directly, but they do lay the groundwork for beginning such investigations.

In addition to revealing the self-expansive effects of eudaimonia, these studies also revealed that hedonia might have a self-expansive effect—albeit weaker—as well, consistent with research suggesting that positive affect predicts connectedness to nature (Capaldi et al., 2014). The most clear-cut evidence of this comes from the combined analyses, which suggest that, when combining the hedonic conditions across all three studies and comparing them to mundane reflection across all three studies, hedonic reflection does, indeed, result in greater connectedness to nature than does mundane reflection. The correlational analyses in Study 3 also support the self-expansive effect of hedonia vis-à-vis connectedness to nature. Even when controlling for eudaimonia, hedonia had a significant positive association with connectedness to nature.

However, the individual analyses do highlight that this effect may be somewhat elusive. Only in Study 2 was there a significant difference between the mundane and hedonic reflection on connectedness to nature. Moreover, in Study 3, hedonia had a negative effect on moral expansiveness for human targets relative to mundane reflection, further suggesting that the self-expansive effects of hedonia might be somewhat tenuous or at least highly variable. Thus, hedonia may have a positive effect on self-expansiveness. Yet the effect may be somewhat tenuous given variability in means across studies for hedonic reflection and the inability to consistently detected its effects each study, warranting further investigation into the nuances and boundary conditions of the association.

Although the effect of hedonia may be tenuous, the combined analyses suggests that this may be in part due to the characteristics of the reflector. That is, the reason hedonia might have a
somewhat tenuous effect is that it works differently for different people. For individuals who are already relatively connected to nature (> .18 SD), there might not be much difference between the self-expansive effects of eudaimonia and hedonia. However, for individuals who are not already connected to nature, or are not generally inclined toward greater expansiveness, hedonia seems to have a weaker effect than eudaimonia. This, however, raises the question of whether focusing on the parts of nature that are fun remains purely hedonic for someone who has a connection to nature, or if this reflection becomes eudaimonic for such an individual.

Overall, these findings are interesting to consider in light of the assertions of the Broaden and Build (Fredrickson, 1998, 2004). On the one hand, the contrasts in the combined analysis comparing the combined effects of meaning, growth, and fun to the combined effects of authenticity and mundane reflection seems to suggest that positive experiences, in general, do have a ‘broadening’ effect on the self. However, the findings from both the combined analysis and from each study individually highlight that there may be nuance in the broadening capacity of some forms of positive affect, at least regarding the self and nature. According to Broaden and Build, one might expect any reflection on positive experiences, including reflecting on fun, to consistently predict self-expansion. However, here, in some cases, fun resulted in greater self-expansion—greater connectedness to nature—than mundane reflection, whereas it was statistically equivalent to mundane reflection in other cases. Further, the analyses indicated that different types of positive affective experiences have dissociable effects (e.g., the correlational analyses in Study 3). Thus, it seems that a blanket prediction about all positive affect may not adequately capture reality.
Limitations and Future Directions

Authenticity

As noted above, authenticity seems not to have a self-expansive effect. However, before forming a final conclusion on the self-expansive properties of authenticity, future research investigating the nuances of authenticity as it relates to eudaimonia might be valuable. For example, our manipulation primarily had participants focus on being their “true self.” This, however, may not be the manifestation of authenticity that is necessary to bring out eudaimonic experiences. For example, Waterman (2011) discusses authenticity in terms of “personal expressiveness.” Symbolically, the opportunity to express oneself seems to be a more expansive orientation than focusing on being your true self—which, admittedly, seems inherently self-centered. Similarly, autonomy (Ryan & Deci, 2001) is discussed in a way that is more consistent with freedom from undue external pressures to do something inconsistent with oneself. Once again, freedom from pressure seems to be more symbolically expansive than directing attention to a relatively concrete sense of your true self. Thus, if the manipulation of authenticity were instead “how this experience would allow you to express yourself” or “how this experience would give you freedom from pressure to be someone you are not”, it may increase expansiveness relative to “how it would allow you to be your true self”.

Such research not only has the potential to further clarify how eudaimonia impacts self-expansiveness but also has the potential to inform our understanding of eudaimonia in general. If we find that reflecting on self-expressive or autonomous experiences results in greater eudaimonic experiences (e.g., eudaimonic affect, self-reported ratings of eudaimonia) and self-expansive outcomes (e.g., connectedness to nature), in comparison to reflecting on true-self
experiences, then it may suggest that greater precision in defining the components of eudaimonia is necessary.

However, it is also possible that authenticity—in any form—serves a specific non-expansive function, and evidence of a non-effect across several operationalizations of authenticity would provide strong support for this view. To the extent that eudaimonia is a cyclical and iterative process, although focusing on growth and meaning or purpose might open one up to self-expansion, authenticity might serve to solidify that expansion. There is likely an ebb and flow between self-expansion and self-crystallization. Although growth is undoubtedly positive and necessary for flourishing, at some point, one must return to a more stable self-state to truly function well. To return to the notion of a shellfish molting, the being (the self) first experiences a need to grow (c.f., search for meaning; e.g., Frankl, 1985; Steger et al., 2006; see Steger et al., 2008), it then sheds its hardened exterior (c.f., softens the concrete boundaries of the self) giving it the ability to grow and expand (c.f., growth and self-expansion). But eventually, the crustacean needs to return from its vulnerable state back to its hardened state, otherwise, it risks unwanted changes to its physical self. Thus, over time, the outer shell of the crustacean re-solidifies (c.f., the realization of the authentic self) and the being experiences increased health and functioning (c.f., the presence of meaning; e.g., Steger et al., 2006)—of course, until it needs to grow again. Thus, this paints a metaphorical picture of a process of eudaimonic self-expansion, (1) initiated by a search for meaning, (2) which necessitates growth and receptivity to expansion, which may be followed by (3) a period of re-solidification where the new self hardens into the authentic self, which (4) results in a feeling that life is worthwhile and filled with meaning and purpose (i.e., presence of meaning). This, while rather speculative,
is an insight that may arise from further investigations into the self-expansive effects of authenticity—and the other elements of eudaimonia.

**Generalizability**

As is the trade-off with any convenience sample relying on college students, there are some limitations to the potential generalizability of the effects uncovered in this set of studies. First, the age range of participants was quite narrow. Participants in all three studies were all young adults in a very specific time period in their lives (i.e., college). It is possible that if one sampled from a broader range of ages, they might find different effects. However, the differences in those effects are somewhat hard to predict.

On the one hand, older adults may have had more time to accrue a solid understanding of what is and is not eudaimonically important to them (e.g., meaningful), which could lead to an exaggeration of the difference between eudaimonia and hedonia because older adults would potentially have more to reflect on in the eudaimonic reflections. Framed from the opposite angle, what is hedonic and what is eudaimonic for college-aged students might be more similar than at a later point in life.

On the other hand, however, almost by the same logic, if college students have not had as much time to accrue eudaimonic experiences, they may have a greater need to fulfill the need for eudaimonic experiences (e.g., search for meaning; Frankl, 1985; see Steger et al., 2008) which would potentially make eudaimonic reflection more impactful in this group (e.g., because they may be more sensitive to it). Further still, on the third—and exclusively proverbial—hand, college students are at a transitionary time point in their life that is filled with change and meaning-making, which, once again, may prime them to be more receptive to eudaimonic ideas. The variety of possibilities highlights that research investigating these processes across the
lifespan is both valuable and necessary to understand how eudaimonic experiences affect the expansiveness of the self.

In addition to age, the samples contained more women than men. Fortunately, the influence of gender on connectedness is, at best, small (e.g., trivial correlations here; see Lengieza & Swim, 2021b, for a review), and it seems unlikely that gender overly influenced the results of these studies (see footnote). Still, it is possible that the disproportionate number of women in these studies may have influenced the findings. Therefore, future research should investigate these processes in more representative samples with a balanced gender distribution.

**IAT**

The IAT produced somewhat counterintuitive results in several of the present studies. Specifically, in some cases, the type of reflection that produced self-expansive effects on explicit connectedness to nature simultaneously resulted in lower scores on the IAT. Unfortunately, there is little that seems to explain this effect beyond that the IAT did not capture what was intended. While IAT scores and their explicit analogs are not necessarily always expected to correlate strongly (see Fazio & Olson, 2003), the correlations between the IAT and all other measures of self-expansiveness (INS, CNS, MES\textsubscript{nature}, & MES\textsubscript{human}) were trivial (i.e., \(|r| < .10\) for the combined data), suggesting, at the very least, that the IAT-nature potentially captured a different facet of the self than the explicit measures of self-expansiveness might have been. However, given the typical association found between the IAT-nature and explicit measures of connectedness to nature (e.g., between \(r = .25\) and \(.37\); Bruni & Schultz, 2010; Schultz & Tabanico, 2007; Schultz et al., 2004; Wang et al., 2016), the markedly low correlations found

\footnote{A combined analysis exploring for interactions between gender and the type of reflection revealed no significant interactions.}
in this set of studies suggests that the IAT might not have captured what it had typically captured in previous research.

Beyond differences in what construct was being captured by the IAT versus explicit measures, one possibility is that changes in the cognitive representations of the self network (see McConnel, 2011) vis-à-vis self-expansion might take time to crystalize enough to result in better performance on the IAT. That is, even though the self might have started to expand, it may not have resulted in the stable association between self and nature necessary to create faster self–nature response times on the IAT. In fact, it seems possible the self expanding to include nature might ironically create a disruption to the self-network that would actually result in slower responses to categorize nature into self. Indeed, in Study 1, an exploration into the unexpected effect of the IAT revealed that participants who engaged in eudaimonic reflection produced a notably slower response time to categorize nature into self than the control, and they produced slightly slower response times to categorize nature into other. Such a pattern suggests that these individuals may have had a harder time distinguishing to which category nature belonged: self or other? This would be consistent with a “disruption” explanation. Still, this is rather speculative and requires further investigation, likely in a set of studies specifically aimed at uncovering how explicit or conscious self-expansion relates to implicit or unconscious self-expansion.

Moral Expansiveness

The measure of moral expansiveness only showed a clear influence of eudaimonia in Study 3. At present, the non-effects in Study 1 might be attributable to the IAT coming first in the procedure. And, in Study 2, the non-effects seem best explained by authenticity potentially not having a self-expansive effect. Still, it is possible that these explanations do not actually explain reality and that the self-expansive effects of eudaimonia only apply to connectedness to
nature. It is also possible that certain facets of self-expansiveness, such as expanding the scope of moral concern, may be somewhat more resistant to change than others. However, such claims are likely premature until future research more carefully investigates these effects on measures of self-expansiveness.

Methodologically, the baseline measure of self-expansiveness was deliberately selected to most closely resemble the primary dependent variable of interest, connectedness to nature. Thus, it might not have been closely associated enough with moral expansiveness to adequately increase the ability to detect changes in moral expansiveness. Consequently, future research may want to consider using a baseline measure that better represents moral expansiveness or even consider a repeated measure design. Additionally, the MES did not fit particularly well in any model. Thus, we should be cautious about making any long-standing conclusions based on this set of analyses. Methodologically, it is also worth reiterating that I altered the way that MES was measured. I used a drag-and-drop procedure to streamline the survey and make it more engaging for participants. However, the procedure may have unintentionally made the task more onerous or confusing for some, or even all, participants. Any follow-up studies should consider using a more traditional implementation of the scale as well as using additional measures of moral expansiveness.

Finally, in addition to these methodological considerations, there is still the further possibility that moral expansiveness, at least as measured by the MES, does not reflect self-expansiveness. Specifically, there are no explicit references to the self in the MES scale. If one used a more pointed measure that assessed the extent to which participants felt others were deserving of the same level of moral concern that they felt for themselves, for example, we might find different effects. In other words, using a more deliberate measure of moral self-expansion
might have made it easier to detect effects. Such measurement precision might be especially important in the context of this research because, as noted below, these effects are quite small, and any added noise in the data is liable to mask the effects. Thus, future research should both carefully measure moral expansiveness and carefully consider whether it reflects an expansion of the self.

Small Effects

Finally, it is worth acknowledging that the effects uncovered here are undoubtedly small. However, the primary purpose of this research was to serve as basic research demonstrating that such effects can, indeed, occur under ideal circumstances. Here, that a simple 5-minute reflection was able to create a detectable effect on measures of self-expansiveness, regardless of how small, is important because it suggests that eudaimonic experiences do cause the self to expand. And they further imply that repeated eudaimonic experiences may continue to cause the self to expand in an iterative manner. Still, if five minutes of reflection on a hypothetical experience causes the self to expand, then one may wonder just how large an effect might occur following a seriously significant eudaimonic experience, such as the experience of serving soup to a grateful homeless person, watching a sunset with your loved ones, or traveling to one of the many wonders of the world? Attempting to study such effects in-situ, perhaps with a pre-post design, would be an interesting and valuable line of future research.

Prosocial outcomes

One of the implications of this research raised in the introduction is that it may potentially contribute to our understanding of how individual wellbeing might contribute to societal wellbeing through pro-collective outcomes (i.e., prosocial or pro-environmental behavior). Here, there is promising evidence that eudaimonic experiences can lead increased
connectedness to nature. *This*, more generally, suggests that eudaimonic experiences may lead to outcomes that, in theory, should ultimately contribute to pro-collective (i.e., prosocial and pro-environmental outcomes; see Lengieza et al., 2019). Now, with preliminary causal evidence that eudaimonic experiences can lead to connectedness, a valuable next step in this line of research will be to investigate whether the effect of eudaimonia on connectedness—and other self-expansive constructs—spills into other, more concrete pro-collective outcomes (e.g., charitable behavior, pro-environmental behavior, etc.).

**Conclusion**

Life is filled with positive experiences, many of which can be characterized as eudaimonic. Based upon the present research, it appears that such experiences have the potential to cause the self to expand to include nature, but ostensibly others as well. Importantly, this may be most true for eudaimonic experiences that heavily feature personal meaning and growth, in particular. Moreover, these effects seem to go above and beyond the fact that eudaimonia reflects a form of positive experiences (i.e., hedonia has a weaker and distinct effect). Thus, the preliminary evidence provided by this set of studies suggests that the self-expansive power of eudaimonic experiences might be a force that can be harnessed for the betterment of society by making us more connected to the world around us.
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