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Onward and Upward: Strategies to Boost Need Satisfaction in Emerging Adulthood

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APPROVAL OF THE DISSERTATION COMMITTEE

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ABSTRACT

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By Susan Mangan

Claremont Graduate University: 2020

Emerging adults (18-30 years old) may be vulnerable to reduced well-being and psychological need satisfaction, which refer to a meta-theory of self-determination theory which reflects the degree to which individuals feel skilled (competence), connected to others (relatedness) and in control of their own decisions (autonomy) (Deci & Ryan, 2011). Increasing psychological need satisfaction represents one promising strategy for increasing well-being (Mackenzie, Karaoylas, & Starzyk, 2018). To date no positive psychology interventions have been created specifically to foster need satisfaction; however, four interventions have examined need satisfaction as an outcome. In this study, these four positive psychology interventions were tested to determine which ones most increased well-being, overall need satisfaction, and each individual dimension of need satisfaction. Additionally, this study sought to extend previous research to emerging adult populations by testing whether the impact of interventions on well-being is mediated by need satisfaction, and whether balanced need satisfaction (i.e., feeling similar levels of autonomy, competence, and relatedness vs. feeling highly satisfied with some needs but less satisfied with others) contributes to well-being for emerging adults. In a pretest-posttest experimental design, 335 emerging adults were randomized to one of four experimental conditions (random acts of kindness, character strengths, self-affirmations, or best possible selves) or a control condition for a period of two weeks. Results indicated that participants completing acts of kindness and self-affirmation activities showed the largest increases in need satisfaction and well-being. The results of this study failed to replicate previous studies, indicating that positive psychology interventions may not have the potential to increase well-

being indirectly by increasing need satisfaction directly. Additionally, this study failed to replicate the importance of balanced need satisfaction score on well-being. Thus, the results of this study do not support that balanced need satisfaction scores significantly add to well-being in emerging adults. This study represents the first step in designing positive psychology interventions for cultivating need satisfaction among emerging adult populations. Limitations and future directions are discussed.

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CHAPTER 1

INTRODUCTION AND LITERATURE REVIEW

Young adults today have more time to decide who they are and what they want out of life, but this increased flexibility can be both a blessing and a curse (Padilla-Walker & Nelson, 2017). More and more, individuals in the third decade of life experience frequent lifestyle changes, such as increased residential mobility, career changes, and changes in romantic partners (Arnett, 2007). As identity development shifts from being a cornerstone of adolescent development to being a cornerstone of young adulthood, these individuals are presented with both more opportunities to find the lifestyle that suits them best, and with more opportunities to become stuck, or stagnate, as the myriad of choices overwhelms their decision-making (Padilla-Walker & Nelson, 2017; Schwartz, 2004). In short, the third decade of life is an important developmental period. It is during this time that individuals take steps that either help set them on the right path for life-long healthy development, or not. The process of finding the adult roles that best suit them is not always easy and may be one reason why young adults are more likely to have a lower sense of well-being, compared to middle-aged or older adults (Mackenzie et al., 2018). To combat this, many young Americans today seek ways of improving themselves; they are particularly eager to identify way finding – and maintaining – a sense of well-being (Sin & Lyubomirsky, 2009).

One way to improve well-being is to increase psychological need satisfaction, which reflects the degree to which individuals feel skilled (competence), connected to others (relatedness) and in control of their own decisions (autonomous; Deci & Ryan, 2011). While these three needs are often measured together to yield a psychological need satisfaction score, gains in well-being are even higher for those who balance the satisfaction of these three needs (Sheldon & Niemic, 2006). In other words, individuals who opt to put relationships on hold in

order to dedicate all their time and energy on excelling at work (feeling highly competent and highly autonomous but not particularly related) are likely to feel less well-being than individuals who balance relationships with work (feeling competent, autonomous, and related). This highlights the importance of measuring each psychological need individually, as opposed to simply looking at an overall score.

While these three needs are associated with well-being across the lifespan, emerging adults, who are typically between 18 and 30 years old, may be particularly likely to struggle to meet them (Arnett, Kloep, Hendry, & Tanner, 2011). Emerging adults find themselves in an in-between life phase where they are legally responsible for themselves in a way that adolescents are not, and yet they are still "finding themselves" and have not settled into traditional markers of adulthood such as established careers, long-term partnerships, financial independence, or parenthood. For some, confronting seemingly endless lifestyle options can be exhilarating. For others this period can be overwhelming (Arnett, 2007), and it can contribute to a diminished sense of control (Twenge, Zhang, & Im, 2004). One way to help struggling emerging adults is to provide easily accessible activities they can use to fulfill these three needs and improve their sense of well-being.

Emerging Adulthood

Emerging adulthood begins with the end of adolescence and ends with the full assumption of adult roles (Arnett, 2007). Adolescence typically concludes when young people are legally recognized as adults, at 18 years of age. The full assumption of adult roles roughly begins when young people become financially independent, marry, have children, or live on their own (Arnett, 2007). Due to an increasing delay between becoming a legal adult and fulfilling normative adult roles, most young people in industrialized countries between 18-30 years of age

qualify as emerging adults. Compared to individuals in earlier generations, young people between 18-30 yeats of age today go through puberty earlier and assume adult roles, such as marriage and parenthood, later (Padilla-Walker & Nelson, 2017; Smith, Christoffersen, Davidson, & Herzog, 2011). During this prolonged moratorium of semi-dependence on parents, individuals report feeling not quite like adolescents and not quite like adults (Arnett, 2007). Emerging adults reflect on who they are and on what they want to accomplish in their lives; they spend time exploring professional paths and lifestyle options (Côté, 2006). Emerging adults are presented with an unusually high number of life transitions and decisions with long-term consequences (Arnett, 2007). While some emerging adults handle these significant transitions well, contributing to a higher sense of overall well-being in life, other emerging adults struggle, contributing to a lower sense of overall well-being (Padilla-Walker & Nelson, 2017).

Emerging adulthood is widely acknowledged as a new and valid phase of life. However, some researchers do not recognize emerging adulthood as a distinct phase of life. Some, for instance, see emerging adulthood instead as an extended adolescence (e.g. Côté, 2014). Others have argued that emerging adulthood is a luxury, only afforded to young people who can afford the prolonged period of self-discovery (Tanner & Arnett, 2016). Around the world, many young people are forced to assume adult roles much earlier than 30. They go directly from school to work and family life, and they forgo the prolonged period of education and role exploration we recognize as emerging adulthood (Tanner & Arnett, 2016). Still others have argued that adding this new stage contributes further to a stage theory of development (Kloep & Hendry, 2011).

Despite this, it is important to consider emerging adulthood as a distinct phase of life for several reasons. First, although it is true that this term only applies to individuals in certain societies – specifically wealthier, industrialized nations – these societies are prevalent, and the

individuals within them numerous. While it is important to keep in mind those who this definition leaves out, emerging adulthood has become widespread enough to warrant significant research attention (Arnett et al., 2011). Second, although there are many similarities between emerging adulthood and adolescence, there are also important distinctions. For example, unlike adolescents, emerging adults are legally adults. Many report feeling, in some ways, like adolescents, and are still engaged in the adolescent task of identity development. However, society views them as adults, at least in most regards. Emerging adults can drive, they can vote, and they can serve in the military. Despite this, until 21 emerging adults cannot legally drink alcohol and until 25 most cannot legally rent cars. Society's ambivalence regarding the status of emerging adults is evident in the conflicting rights and responsibilities it assigns them. Add to that the pressure to make decisions with long-term consequences about work and relationships, and it is not surprising to find that many emerging adults report feeling overwhelmed (Arnett, 2007). Adults over 30, in contrast, are more likely to have clear goals for the future (Sheldon & Lyubomirsky, 2006), be financially independent (Schoeni & Ross, 2004), and benefit from more experience with adulthood.

Another argument in favor of recognizing emerging adulthood as a distinct phase of life is that adolescence, a phase of life that *has* gained wide acceptance, is also not experienced by all young people. Adolescence is typically defined as the period of time between childhood and adulthood, historically between 12-18 years of age (Jaworska & MacQueen, 2015). It too is a luxury of the middle and upper classes. Young women who get pregnant at 16 and drop out of school to work full-time and support their babies are considered adults—not adolescents--because they no longer experience the freedom from obligation defined by adolescence (Settersten, 2011). Because they are fulfilling adult roles, they are considered adults. In essence,

by becoming pregnant and dropping out of school to work, they forego their adolescence. In other cultures, youth may miss out on adolescence when they are encouraged to marry and assume adult roles immediately upon physical maturity. Both adolescence and emerging adulthood apply only to some young people, and as the world becomes increasingly industrialized, more young people are likely to experience an emerging adulthood. Furthermore, while emerging adulthood may seem relevant to only this period in modern history, scholars as far back as Erikson (1968) acknowledge that development is bound to change any time advancements (such as technology) reshape our society and culture. In the early 1900's it was much more typical for children as young as 12 to begin working full time jobs. Accordingly, children and adolescents had different developmental markers and different developmental tasks, than they do today. Our consideration of what is developmentally appropriate has always, and will likely continue, to shift with cultural norms. Modern theories, such as developmental contextualism (Lerner, 1989) and life span theories (Baltes, Lindenberger, & Staudinger, 2007), suggest that development extends across the lifespan. While this may be true, on average adulthood currently takes place over four decades of time - from 18-65. This is an extremely large period of time without much distinction. Though sometimes scholars use the terms middle age or mid-life to refer to individuals between 30 and 50, these terms, and their respective age brackets, are not consistent across the literature (Syed, 2015). Emerging adulthood as a concept is meant to help developmental scholars focus on the third decade of life, which has important distinctions from other decades. Understanding the developmental differences in emerging adulthood will help guide researcher's understanding of what positive development looks like at this time. It will help researchers prescribe practical tools for well-being that suit this specific population best.

There are many factors that make emerging adulthood unique. For instance, researchers note that emerging adulthood is marked by a high number of important life changes and important life decisions, all made at the very beginning of one's adult life (Arnett, 2007). As a result, it is seen as both a potentially challenging time of transition, as well as, paradoxically, the perfect time for positive intervention (Padilla-Walker & Nelson, 2017). For example, individuals who struggle during this transition suffer a decreased sense of self-worth and competence. They often report feeling stuck and unable to decide among the many choices available to them (Schwartz, 2004). This is underscored by the reality that 18 to 30-year-olds seek more mental health counseling than 18-30-year-olds in earlier generations (Michael et al., 2006). In fact, 31% of college students report that, within the past year, they have "felt so depressed, it was difficult to function" and 49% felt "overwhelming anxiety" (American College Health Association, 2008). Alarmingly, suicide is the second leading cause of death among emerging adults. It is only the third leading cause of death among adolescents, and it is the sixth leading cause of death among older adults. Annually, there are 12.7 suicides per 100,000 emerging adults (National Institute of Mental Health, 2017; Zarate, 2010). These struggling emerging adults may be in a period of arrested development, wherein they purposefully stall their lives to avoid taking on responsibilities they do not feel they have the competence, autonomy, or social support to handle (Cote, 2000).

While some emerging adults struggle, others thrive in this transitional time of great flexibility. For these flourishing emerging adults, the freedom of choice is a gift. This phase provides time to try out different jobs, relationships, and places to live, and it enables indivdiuals to wait to commit to adult roles until they have found roles that allow them to feel satisfied. Compared to other twenty-somethings, flourishing emerging adults adjust more easily to the

uncertainty of adulthood. They develop positive attitudes, beliefs, personal values, and world beliefs (Barry, Nelson, Davarya, & Urry, 2010). In so doing, they are more likely to interact with the world in a positive way. For instance, flourishing emerging adults are more likely to engage positively with social media and act prosocially (Padilla-Walker & Nelson, 2017). They are also more likely to have strong, healthy social relationships accompanied by affection, good companionship, and strong emotional support (Padilla-Walker & Nelson 2017). Emerging adults who flourish are poised to grow and develop in ways that positively impact the rest of their lives, including feeling a sense of overall well-being in life (Padilla-Walker & Nelson, 2017).

Well-Being and Need Satisfaction

Conceptions of well-being vary among psychologists. Some argue it means hedonic health or feeling that life is full of happiness (Kahneman, Diener, & Schwarz, 1999), while others argue it means eudaimonic health, or feeling that life is full of meaning (Ryff & Singer, 2000). Still others argue it means both. Some, for example, believe that hedonia and eudaimonia are so similar that it makes more empirical sense to think of them as one complete construct (Disabato, Goodman, Kashdan, Short, & Jarden, 2015). Additional scholars argue that the two components work in conjunction, where eudaimonic well-being serves as a facilitator for hedonic well-being (Ryan & Deci, 2001). While the two types of well-being certainly work in tandem, it is important to note that aspects of life captured by eudaimonic well-being, such as autonomy, competence, relatedness (Deci & Ryan, 2000) are not in and of themselves the same as hedonic well-being. The definition of hedonic well-being is more than the typical association with hedonism as a feeling of pure pleasure. Psychologists have built on this and now typically define hedonic well-being as a combination of feeling satisfied in life and experiencing more positive (vs. negative) emotions (Diener, Emmons, Larsen, & Griffin, 1985). Eudaimonia, in

contrast, typically involves an element of living one's life meaningfully and developing positively (Disabato et al., 2015). These are two important – but distinct – sides of the same coin. While the definition of well-being, including the relationship between hedonic and eudaimonic well-being, is debated by researchers, some recent research points to eudaimonic pathways as important predictors of hedonic well-being for emerging adults (Mackenzie et al., 2018). It is important to note, though, that the relationship between hedonic and eudaimonic well-being in emerging adulthood has only just begun to be examined. However, given recent research (Mackenzie et al.), this study recognizes eudaimonic well-being as an important potential pathway to hedonic well-being for emerging adults, and recognizes hedonic well-being as its ultimate well-being outcome.

One well-known pathway to eudaimonic well-being is Psychological Need Satisfaction. Psychological need satisfaction, which represents a sub-theory of the larger Self-Determination Theory, identifies three human needs afforded (or not) by the contexts in which individuals develop (Ryan & Deci, 2001). Each need is equally important to satisfy (Deci & Ryan, 2000). The first need, autonomy, refers to how in control of their own decisions an individual feels. The second need, competence, refers to how capable a person feels. The third need, relatedness, refers to how much a person feels they belong to another person or community (Ryan & Deci, 2001). When these three needs are fulfilled, indicating a high level of psychological need satisfaction, individuals generally report high levels of well-being compared to individuals whose needs are not met (Deci & Ryan, 2000).

In addition to having all three psychological needs met, research indicates that having a balance in these psychological needs leads to even higher rates of well-being (Sheldon & Niemiec, 2006). Overall need satisfaction versus balanced need satisfaction can be difficult to

conceptualize but is important to understand. To elaborate, imagine if, for instance, overall need satisfaction was measured on a scale of 3-9, and each individual need was on a scale of 1-3. So that the maximum score would be a (3) on autonomy, (3) on competence, and (3) on relatedness, for a maximum score of 9. In this case, we might expect two people with a score of six would experience about the same levels of well-being. However, this may not be the case (Sheldon & Niemiec, 2006). A person high in autonomy (3), moderate in competence (2), and low in social relatedness (1), suffers from an imbalance of these three basic needs. In contrast, a person who has a balance of autonomy (2), competence (2) and social relatedness (2), is likely to experience higher levels of well-being. Being high in one area does not compensate for being low in another. In other words, individuals who satisfy all three needs to a similar extent are likely to experience a greater sense of well-being than individuals who satisfy one or two of their needs at the expense of the other need or needs (Sheldon & Niemiec, 2006). The mechanisms behind the importance of balanced need satisfaction are not yet understood (Sheldon & Niemiec, 2006). It may be that when individuals put most of their energy into only one or two of their three most fundamental needs, they are adversely affected by the relative neglect in their other basic psychological need. Thus, it is vitally important to investigate not only overall need satisfaction scores, but also the satisfaction of each individual need.

To investigate the impact of balanced psychological need satisfaction, researchers empirically tested whether individuals with the same overall need satisfaction score – but with unbalanced numbers in each of the three needs – experienced more or less well-being compared to individuals with similar scores across the three needs. Across four studies with emerging adult populations, researchers found that having relatively equal psychological needs scores contributed to well-being, above the overall score of psychological need satisfaction (Sheldon &

Niemiec, 2006). These results were tested using multiple measures of need satisfaction and well-being, as well as using multiple study methodologies including daily diaries and observer-reports (Sheldon & Niemiec, 2006). For instance, in Study 1, college students completed multiple measures of well-being. Researchers investigated whether well-being correlated with an overall well-being score as well as, separately, if a balance in need satisfaction correlated with well-being; both were positively correlated. In Study 2, researchers once again examined the influence of need satisfaction on well-being in a longitudinal design. Over the course of a semester, college students responded to measures of well-being and need satisfaction. Results once again confirmed that higher levels of need satisfaction predicted higher levels of well-being over time, but that a balance of psychological needs predicted positive changes in well-being over and above overall need satisfaction scores (Sheldon & Niemiec, 2006). In Study 3, researchers sought to investigate if there was a dynamic, day-to-day relationship between a balance in need satisfaction and well-being. Participants reported in daily diaries on their level of need satisfaction over a 24-hour period on eight separate occasions across the span of one college semester (three months). Results indicated that daily balanced scores of need satisfaction predicted daily fluctuations in well-being, indicating that interventions that influence how balanced an individual's need satisfaction is may be an effective way to increase overall well-being, even in the short-term. Lastly, in Study 4, researchers extended their findings by adding methodologies that explored the impact of balanced need satisfaction outside of self-reported well-being. In this final study, in addition to having participants fill out self-report measures, parents of college students also completed questionnaires related to the oppositional-defiant behaviors their children displayed. It was expected that oppositional-defiant behaviors would be negatively correlated to a balance in need satisfaction; indeed, this is what was found. This added

information on how a balance in need satisfaction may influence not only self-reported well-being, but also negative behaviors associated with reduced well-being (Sheldon & Niemiec, 2006). These four studies together indicate the importance of satisfying overall psychological need satisfaction as well as having a balance of each need: competence, autonomy, and social relatedness. In the past decade, multiple other studies have replicated this effect in different contexts, including predicting well-being in collegiate volleyball players (Mack, Wilson, Oster, Kowalski, Crocker, & Sylvester, 2011) and children and adolescence with varying levels of anxiety and depression (Emery, Toste, & Health, 2015).

Well-Being and Need Satisfaction in Emerging Adulthood

On average, individuals whose psychological needs are met, and balanced, are likely to experience more well-being. However, not all adults start out with the same levels of well-being. Recent studies indicate that emerging adults are more likely to experience low levels of well-being, compared to middle-aged or older adults (Mackenzie, et al. 2018). In a recent survey, researchers tested several eudaimonic pathways, including mindfulness and psychological need satisfaction. They found that emerging adults had lower levels of both hedonic and eudaimonic well-being, compared to middle-aged and older adults (Mackenzie et al., 2018). However, these effects of age were directly mediated by only one eudaimonic pathway – psychological need satisfaction. High levels of basic psychological need satisfaction directly predicted levels of hedonic well-being. Other eudaimonic pathways, such as mindfulness, predicted well-being only when mediated by psychological need satisfaction (Mackenzie et. al., 2018). In short, satisfying needs consistently leads to greater gains in well-being, compared to both experimental groups using alternate eudaimonic pathways, such as mindfulness, and control groups (Nelson, Fuller,

Choi, & Lyubomirsky, 2014; Nelson et al., 2015). Studies consistently conclude that the clearest path to well-being among emerging adults is through psychological need satisfaction.

Additionally, although all people need autonomy, competence, and relatedness to thrive, emerging adults, compared to older and younger individuals, may be at particularly high risk of not meeting these psychological needs. This is primarily because emerging adults' lives are characterized by unusually high levels of transition and stress, which may influence how need-supportive their environments are. For instance, emerging adults' lives are typically full of change, including transitions at home, work, and in intimate relationships (Arnett, 2007). Emerging adults transition from high school to college, which includes modifying existing familial relationships and friendships, learning to craft a new social environment, and finding adaptive strategies to feel competent and autonomous in both school and life skills (Brooks & DuBois, 1995; Pratt et al., 2000). Just a few years later, many again transition from some form of tertiary education into working life, and once working, the transitions typically do not end. Emerging adults tend to try-out multiple careers, and each of these transitions is likely to be stressful (Arnett, 2007). At the same time, most emerging adults try out different living arrangements (living alone, living with roommates, living with a significant other) and different romantic relationships. These major life transitions qualify as stressful life events, which can leave individuals feelings tense and depressed (Ge, Conger, & Elder, 2001; Karlsen, Dybdahl, & Vitterso, 2006). The high level of change and stress inherent in the lives of most emerging adults complicates psychological need satisfaction.

Research suggests these transitions may hinder emerging adults' well-being because they hinder their need fulfillment. For instance, the frequent lifestyle changes during this period may influence how close emerging adults feel to others. Most emerging adults no longer live at home

but have not yet settled into committed, long-term relationships (Arnett, 2007). Moving around and living with different people likely leads some to feel less connected than they did as adolescents, when they were securely embedded within their families of origin; and less connected than they are likely to as older adults, when they will are embedded in their own families. Because of the frequent moves, many emerging adults find themselves living apart from significant others, and this too can contribute to loneliness and decreased positive affect (Waterman, Wesche, Leavitt, Jones, & Lefkowitz, 2017).

Not only does the transient lifestyle characteristic of emerging adulthood hinder relatedness, but it also hinders autonomy. Compared to individuals with secure relationships, emerging adults who have poor relationships with friends, adults, and significant others report feeling less autonomous (Taub, 1995). Unfortunately, many emerging adults struggle to feel completely autonomous because- by definition- they are not. Emerging adults are at least semi-dependent on their parents, other family members, and caregivers for financial and emotional support (Cullaty, 2011).

Finally, the transitional nature of emerging adulthood also takes a toll on competence. Shifting careers and lifestyle options often leaves emerging adults doubting their own efficacy and ability to succeed, which directly impacts how competent they feel (Ryan, 1995). In each of these ways, emerging adulthood can be a particularly trying time for individuals to find themselves in an environment that consistently supports their well-being more generally and their need for autonomy, competence, and social relatedness more specifically.

Positive Psychology Interventions for Need Satisfaction

Recently, positive psychologists have recognized the need for strategies that help individuals increase well-being through a variety of pathways, including through psychological

need satisfaction (Layous, Nelson, & Lyubomirsky, 2013). These empirically-tested strategies, known as Positive Psychology Interventions, are volitional activities or exercises designed to foster positive emotions, cognitions, behaviors and other favorable outcomes (Sin & Lyubomirksy, 2009). Though these activities may take many forms, positive interventions often include writing and reflection activities and may include group activities, reading assignments, and mental imagery (Vella-Brodrick, 2013).

The Broaden-and-Build model of positive emotions helps explain the mechanism through which positive interventions can contribute to well-being. According to this theory, positive emotions such as hope, gratitude, optimism, and love can broaden an individual's way of thinking, so that new ideas, new connections, and new interests form (Fredrickson, 2004). Positive emotions work differently than negative emotions (Fredrickson, 2001). In fight-or-flight responses, for instance, negative emotions push people to narrow their field of focus (Fredrickson & Joiner, 2002). Positive emotions, on the other hand, open our minds and allow us to think more creatively. For example, students were asked to complete a puzzle that required them to think flexibly and creatively. Researchers found that participants in the positive emotion condition used significantly better problem-solving strategies to complete the puzzle than participants in the neutral emotion group (Kok & Fredrickson, 2013). This indicates that experiencing positive emotions opens our minds to new strategies we can use to solve problems; as individuals acquire new skills to master the environment around them, their level of competency grows. Positive emotions also increase an individual's desire to affiliate with other people (Fredrickson, 2001), potentially increasing an individual's social relatedness.

To date, four positive psychology interventions have tested psychological need satisfaction with emerging adults. Effect sizes for overall need satisfaction ranged from .27 - .64,

and intervention durations vary from two to six weeks (Layous et al., 2013; Linley, Nielsen, Gillett, & Biswas-Diener, 2010; Nelson et al., 2014; Nelson et al., 2015). However, researchers do not yet have a clear idea of how and why these interventions increase need satisfaction, and researchers have only investigated individual psychological needs in one of the four interventions. In this study, participants completed the Best Possible Selves intervention four times over a four-week period. In each session, participants wrote about their ideal lives in the future, then wrote about short-term goals they could set that would help them bridge the gap between their lives now and their idealized future selves (Layous et al., 2013). Researchers found that while overall need satisfaction did, on average, improve for participants, participants also felt significantly more related to others, but they did not feel more competent or autonomous. This provides further evidence that while some studies may find improvements in need satisfaction overall, different interventions may be targeting the satisfaction of different needs. Understanding this information could provide important information for individuals who want to meet specific needs in an effort to balance their overall need satisfaction. Thus, to better understand the why an intervention is effectively increasing overall need satisfaction, intervention studies need to investigate increases in each need individually, not just overall increases in need satisfaction.

Thus, positive psychology interventions focused on addressing need satisfaction should identify both overall need satisfaction scores as well as an individual need satisfaction scores. This would enable researchers to evaluate both how satisfied an individual's needs are, as well as how balanced that satisfaction level is. While the aim is for each intervention to increase overall need satisfaction and well-being, identifying which activity is best for each individual need would create a more detailed understanding of how emerging adults can correct an imbalance of

needs, should one exist. The four strategies that show the most promise at increasing need satisfaction among emerging adults are described in detail below. In each section first the empirical background for each section is provided, followed by the more specific instructions used in this experiment.

Activity 1: Random Acts of Kindness

The positive psychology intervention that most effectively fosters overall psychological need satisfaction (*d*=.48-.64) is random acts of kindness. This activity increases both overall need satisfaction and well-being, though researchers have not yet examined the extent to which it contributes to increases in individual psychological needs (Nelson et al., 2015). Acts of kindness refer to behaviors that convey kindness toward another person. An act of kindness could be giving a friend a compliment, buying a coworker a surprise cup of coffee, or giving up a seat on the bus for someone. Researchers testing the acts of kindness intervention find that participants who commit random acts of kindness, compared to those who do not, have greater gains in overall need satisfaction and well-being (Nelson et al., 2015). The mechanism responsible for this change, however, has not been explored. It stands to reason that this social activity may help create a sense of relatedness to others because it encourages positive, interpersonal connections. Compared to individuals in a control group, individuals who completed acts of kindness reported more positive emotions, such as joy and contentment (Lyubomirsky, Tkach, & Sheldon, 2004). In creating this positive emotional state, act-of-kindness givers may activate broaden-and-build, increasing positive emotions and encouraging the development of psychosocial resources. As they go about the remainder of their day, they may find their minds are more open, creative, and flexible, thereby enhancing the probability that they will develop new competencies (Fredrickson, 2001). Researchers do not yet understand why committing acts of kindness

increases psychological needs overall. By testing this intervention with the satisfaction of each individual need, researchers will learn whether this intervention targets a specific need area, such as social relatedness, or whether it increases the satisfaction of each need equally. This, in turn, would help researchers combine the activity appropriately with others to create a battery that satisfies all three psychological needs among emerging adults.

In the current study, this activity asked participants to complete five acts of kindness in one day. In session one, participants learned about what constitutes an act of kindness. Participants were told that acts of kindness could be big or small, and they could be performed on people they did or did not know personally (as long as each act was performed in a safe and respectful manner). Examples of acts of kindness were given in each session, and participants were asked to write a few acts of kindness they might want to try in their first session. In each session, the examples changed to match an aspect of need satisfaction. For instance, to emphasize relatedness participants were given examples of how they could commit kind acts for close friends and family members. In each subsequent session, participants were asked if they were able to complete their acts as intended (if no, why not), which acts of kindness they had performed since the previous session and how completing the acts made them feel, and to generate ideas for more acts they could perform for their next session. A copy of the session 1 activity instructions was included at the end of each subsequent session for reference.

Activity 2: Self-affirmations

Performing self-affirmations has been found to improve overall need satisfaction, as well as well-being. Self-affirmations are statements that help affirm people's values (Nelson et al., 2014). For instance, if I felt my purpose in life were to help heal other's physical pain, I may choose to become a doctor; in this specific domain of my life, my self-affirmation may be "heal"

because this helps remind me of the core value that drives my career decisions. In one self-affirmation study, participants were randomly assigned to either a self-affirmation group, where they were asked to write statements affirming their most important values, such as relationships with family/friends, independence, and honesty, or to the control group, where they practiced organizing their life events from the previous day. From pre- to posttest, participants in the self-affirmation group reported feeling significantly more competent and autonomous, compared to control group participants. Although the mechanism behind this effect has not been identified, it is reasonable to conclude that conducting positive affirmations helps people reflect on their strengths and capacities, which makes them feel more competent. Emerging adults may also feel more connected to others when they reflect on their close social relationships, which is a common value chosen for self-affirmations (Nelson et al., 2014). This study also indicated that participants who completed the self-affirmations compared to those who did not experienced significantly more positive emotions. As indicated by the broaden and build theory (Fredrickson, 2001), the success of this intervention may be aided by this increase in positive emotions, which may in turn help individuals be more open to new experiences and increase the likelihood of gaining new skills, which could again increase competence; gaining new skills may in turn provide new personal insights which, when acted upon, could increase autonomy (Nelson et al., 2014). Though these pathways still need to be explored, applied researchers should continue testing this intervention to better understand how it influences not only competence and autonomy, but also how it influences relatedness.

In this study, participants were first taught how to create self-affirmation statements. In session 1, participants learned what a self-affirmation is and how to create one that is personally meaningful. Each session emphasized a different aspect of need satisfaction, which was

presented as that week's "theme." Themes included, "family and friends" (relatedness), "things I'm good at" (competence), "making my own decisions" (autonomy), and "feeling my best" (overall need satisfaction/well-being). Participants were given examples of different types of values that matched each week's theme. For instance, ... Participants generated a list of three personally meaningful values that matched that session's theme, then they chose one of those three values to write about in more detail, including "1. What this value means, in your own words, 2. Why this value is important to you, and 3. A time in your life when you had the opportunity to really express this value." After writing on their personal value from that week's theme, participation in that day's session was complete.

Activity 3: Using Signature Character Strengths

Positive interventions that help individuals identify and augment their character strengths have also been found to increase need satisfaction (Linley et al., 2010). Character strengths are thought of as individual personality differences in people that are relatively stable, but – because our environment can change what characteristics we may express – when, how, and why we exhibit a certain character strength can change (Peterson & Seligman, 2004). These characteristics include qualities such as open-mindedness, social intelligence, and kindness (Seligman, 2004). Enactment of these strengths has been linked to flourishing and well-being (Park & Peterson, 2009). Researchers theorize that using an individual's top five character strengths can be fulfilling, leading to a heightened sense of self – understood as an integration of a person's thoughts and feelings with their interpersonal experiences - and authenticity (Deci & Ryan, 2000). When individuals feel a heightened sense of self, their internal motivation may be more autonomous (Deci & Ryan, 2000). Additionally, an increased sense of self may improve mood and interaction styles, which may in turn increase a sense of relatedness (Peterson &

Seligman, 2004; Fredrickson, 2004) Furthermore, in enacting their strengths, emerging adults are likely to feel skilled, which could increase their sense of competence. To date, only one type of character strength intervention has examined need satisfaction. In this character strength intervention, individuals are instructed to use their top character strengths in new ways in their everyday life (Linley et al., 2010). For instance, individuals with a strength in being humorous may try to find new ways to laugh and smile throughout their day. Individuals with a strength in working in teams may find more opportunities to bring people together to work in teams. Studies that tested this activity, similar to the acts of kindness studies, have only tracked overall psychological needs satisfaction scores (Linley et al., 2010). The next step is to test the satisfaction of all three psychological needs as outcomes of this intervention.

In this activity, participants learned about their personal Values In Action (VIA; Peterson & Seligman, 2004) character strengths. Participants learned about their character strengths by reading them, though all participants were given the option of taking the VIA strengths inventory quiz. However, likely because the quiz was more time intensive, no participants elected to take the quiz in this sample. In session 1, participants learned what character strengths are, and they read over a list of strengths. Participants were given the option of taking the VIA strength survey, but, due to time constraints, this was not required. Participants were then asked to list what they believed were their top five strengths. In session 2, participants were given a theme for the week and asked to identify a task they could complete, related to that theme, before the next activity session. Each theme emphasized an aspect of need satisfaction. For example, in one session participants were asked to identify a goal/task they could complete related to "friends/family/loved ones" (relatedness). Participants were asked to write about how they could use two of their top five strengths to complete this goal and instructed to ultimately choose at

least one strength to use to complete the actual task. In subsequent sessions participants were asked whether or not they were able to complete their goal (and if not, why).

Activity 4: Best Possible Selves

Finally, the best possible selves intervention asks participants to imagine their best possible future life and, in some versions, to write short-term goals that may help them achieve it (Layous et al., 2013). Across dozens of studies with people from a wide range of demographic backgrounds, the best possible selves intervention has consistently been found to contribute to overall psychological need satisfaction (Layous et al, 2013) and well-being (Sin & Lyubomirsky, 2009). However, researchers have not yet tested this intervention's contribution to the satisfaction of each psychological need individually. In addition, this intervention was not specially designed for emerging adults; however, it has been administered to college-aged youth. In a recent study, college students were asked to imagine their best possible future in multiple domains, including in relation to their families, schools, social relationships, and health; control participants were asked to write facts about their day (Layous et al., 2013). After four weeks, participants in the best possible selves group not only showed increases in well-being, but also in their sense of relatedness (Layous et al., 2013). It is possible that relatedness increased because this variation of the best possible selves intervention specifically asked for ideal future images focused on social domains – family, friends, and school. Researchers speculated that encouraging individuals to focus on goal-setting might contribute to increases in competence, and that achieving these goals might lead to a greater sense of autonomy (Layous et al., 2013). This study did not track goal setting or attainment, but another study did, and it concluded that students who set and completed their goals demonstrated significant increases in their sense of competence and autonomy (Mangan, *in press*). As other studies have shown, altering the

instructions influences the things individuals attend to in this activity (Layous et al., 2013). Thus, the best possible selves activity could emphasize psychological need satisfaction by asking participants to focus specifically on how they can be more autonomous, competent, and socially connected to others in the future. In this way, this intervention could help enhance the satisfaction of all three individual needs, as well as need satisfaction scores overall.

In this activity, participants were given a different themed prompt and asked to write about how the subject matter of this prompt would look in their ideal future. Prompts were modified to emphasize need satisfaction, including the participant's best possible "social life" (relatedness), "hobbies, skills, and talents" (competence), "my best decisions" (autonomy), and "your happiest, healthiest self" (overall need satisfaction/well-being). Participants were instructed to write about their best possible life – in relation to that session's theme – for approximately five minutes. Following this, participants were given instructions on how to form a small step goal that could eventually help lead them to their ideal future. Participants listed a realistic goal they felt they could complete before the next session. In sessions 2-4, participants were asked if they were able to complete their small step goal (and if not, why).

Activity 5: Control Condition

In the control activity, participants were asked to write about their daily lives. In part one, participants were instructed to:

> "Please take a moment to think about what you did during the past 24 hours. Create a mental outline of what you did during that time from eating breakfast to going to sleep. For the next 5 minutes, please write out these activities in a list format. Be as detail oriented as possible, but try to leave out emotions, feelings, or opinions that relate to what

you did. In other words, focus on listing out the exact tasks and activities you did in as much detail as possible. After 5 minutes, you can proceed to part II."

In part two, participants were asked to:

"…choose one of the activities you listed previously and take a couple minutes to write about it in even more detail (i.e. instead of just saying "I got ready for bed," say "To get ready for bed, I washed my face with soap and water, brushed my teeth for two full minutes, and put on my pajamas. In this part of the exercise, you want to dissect the activity you previously listed into smaller pieces to describe exactly what you did.").

This is a standard placebo control activity used in many positive psychology interventions (Layous et al., 2013, Sin & Lyubomirsky, 2009).

Intervention Design

In addition to identifying positive psychology interventions likely to enhance need satisfaction among emerging adults, researchers also need to consider important aspects of intervention implementation. Research into how to effectively implement positive psychology interventions is growing rapidly (Yeagar & Walton, 2011). This literature has identified a series of implementation features that can enhance intervention effectiveness, including autonomy support, peer testimonials, intervention length, and online-accessibility. A well-designed positive psychology intervention could prove ineffective if these features of implementation are not enacted. A detailed description of why each of these factors is considered in the present study is included in chapter 2.

CHAPTER 2

DESCRIPTION OF CURRENT STUDY

The goal of this study was to determine if, and how, positive psychology activities improve need satisfaction and well-being in emerging adults. In previous research, each of the four interventions used in this study increased well-being and overall need satisfaction both over time and compared to a control group (Layous et al., 2013; Linley et al., 2010; Nelson et al., 2014; Nelson et al., 2015). As such, it is anticipated that these results will be replicated in this study. Furthermore, previous research indicates differences in effect sizes between these four interventions. In terms of well-being, previous research has found the highest effect size with the character strengths intervention (.64), followed by the random acts of kindness exercise (.33), best possible selves (.30), and self-affirmations (.25). In terms of overall need satisfaction, the random acts of kindness exercise proved most effective (.64), followed by character strengths (.45), self-affirmations (.28), and the best possible selves (.28). A similar pattern of effectiveness is expected in this study. A summary of these past results and their corresponding hypotheses is included in Table 1 below.

Table 1.

Intervention Effect Sizes from Previous Literature

Intervention Activity	**Effect size (Well-Being)**	**Effect size (Overall Need Satisfaction)**	**Effect size (Individual Needs – if measured)**
Character Strengths	.64	.45	NM
Acts of Kindness	.33	.64	NM
Best Possible Selves	.30	.24	Relatedness (.13)
Self-affirmations	.25	.28	NM

Notes. NM=Not Measured

However, only two of these studies (the best possible selves and self-affirmations) measured the fulfillment of individual needs (Layous et al., 2013; Nelson et al., 2014). First, past research indicates increases in relatedness (but not autonomy or competence) for participants in the best possible selves intervention (Layous et al., 2013). It is possible that relatedness increased because this variation of the Best Possible Selves intervention specifically asked for ideal future images focused on domains that could include aspects of social interaction – social life, career, academics, and health. Researchers speculated that encouraging individuals to focus on goal-setting might contribute to increases in competence, and that achieving these goals might lead to a greater sense of autonomy (Layous et al., 2013). In this study, participants were instructed to set goals and report on whether or not these goals were accomplished, in an attempt to help emphasize these needs. As such, it is anticipated that participants in this condition will increase in their satisfaction of all three needs.

Furthermore, participation in the self-affirmation activity has led to increases in competence and autonomy in previous research (Nelson et al., 2014). In previous research,

participants were randomly assigned to either a self-affirmation group, where they were asked to write self-affirmations that focused on their most important values, such as relationships with family/friends, independence, and honesty, or to the control group, where they practiced organizing their life events from the previous day. From pre- to posttest, participants in the self-affirmation group reported feeling significantly more competent and autonomous, compared to control group participants. This intervention also produced significantly greater positive emotions in participants who completed the self-affirmations compared to those who did not, once again highlighting the importance of how positive emotions may help individuals be more open to new experiences and increase the likelihood of gaining new skills, which could increase competence, and new personal insights which, when acted upon, could increase autonomy (Nelson et al., 2014). Although the mechanism behind this effect has not been identified, it is reasonable to conclude that, in addition to increasing positive emotions, conducting positive affirmations helps people reflect on their strengths and capacities, which makes them feel more competent and autonomous. Emerging adults may also feel more connected to others when they reflect on their close social relationships, which is a common value chosen for self-affirmations (Nelson et al., 2014). In this study, the instructions for each session were altered to help participants focus on one need per session. For instance, one session asked participants to choose a self-affirmation that relates specifically to some aspect of their social life; modifying activity instructions this way has been shown to help participant's focus their attention on certain areas of life (Layous et al., 2013). As such, it is anticipated that participants in this activity will increase in their satisfaction of all three needs.

No information on individual need satisfaction has been measured for the additional two interventions (i.e. random acts of kindness and character strengths). Given this, there are no specific hypotheses regarding which needs will be satisfied for these two interventions.

Furthermore, while previous research has examined the effect of these four interventions on well-being and overall need satisfaction, little is known about why or how this relationship exists. One finding that may shed light is new research that indicates the relationship between participation in positive psychology interventions and well-being may actually be explained fully by increases in need satisfaction (Mackenzie et al., 2018). This mediation relationship has not been tested with any of these four interventions specifically. Furthermore, research also points to the importance of a balanced need satisfaction score – that is, a need satisfaction score that would show roughly similar levels of competence, relatedness, and autonomy. Individuals who have this balance are more likely to feel higher levels of well-being (Sheldon & Niemic, 2006). However, the effects of balanced need satisfaction scores have yet to be examined with most positive psychology interventions, including the four used in this study, nor has this been examined specifically with emerging adults. Lastly, because so little information exists on for whom these interventions work best, it is critical to explore additional the potential moderating effects of common demographics, such as gender and ethnicity. As such, this study has five main research questions and hypotheses.

The current study was designed to address five key questions;

(1) Will interventions designed for emerging adults improve need satisfaction and hedonic well-being from pre- to posttest?

(2) If so, which intervention increases overall need satisfaction the most from pre- to post-test? Individual need satisfaction? Which increases hedonic well-being the most from pre- to post-test?

(3) If there is an improvement in well-being from pre- to post-test, is it mediated by the eudaimonic pathway of need satisfaction?

(4) Does balanced need satisfaction, as compared to unbalanced need satisfaction, increase well-being among emerging adults?

(5) Does gender influence the strength of the relationship between intervention and well-being? Ethnicity?

To address these questions, the current studies were designed using a 5 (Kindness vs. Self-affirmations vs. Character strengths vs. best possible selves vs. control) x 2 (time 1 vs. time 2) research study design with an emerging adult sample over a period of two weeks.

Research and theory support the following five hypotheses, each of which corresponds to a research question:

1) Participants completing any of the positive psychology interventions **were** expected to show significant increases in overall need satisfaction and well-being from pre- to post-test.

    1a) Additionally, there were some specific hypotheses per condition. Participants in the best possible selves intervention and self-affirmations intervention were expected to increase in satisfaction of all three needs. For participants in the acts of kindness and character strengths interventions, this hypothesis was exploratory.

2) Compared to participants in the control condition, those in the treatment conditions were expected to demonstrate greater gains in well-being and need satisfaction.

    2a) Additionally, there were some specific hypotheses per condition. Participants in the best possible selves intervention and self-affirmations intervention were expected to increase in satisfaction of all three needs compared to a control group. For participants in the acts of kindness and character strengths interventions, this hypothesis was exploratory.

    2b) In terms of strength of effects, the character strengths intervention was expected to have a medium effect on well-being, while the remaining interventions were expected to produce small effects. For need satisfaction, the acts of kindness exercise was expected to produce a medium effect size, while the remaining interventions were expected to have a small effect size.

3) Increases in well-being were expected to be mediated by need satisfaction for all interventions, such that participants with higher need satisfaction would also have higher well-being.

4) For participants with the same overall need satisfaction score, those with a balanced need satisfaction score, compared to those with an unbalanced need satisfaction score, were expected to demonstrate greater gains in overall well-being.

5) Intervention effectiveness were expected to be moderated by gender and ethnicity. Since research in this area is lacking, no hypotheses were offered regarding how

the effectiveness of these interventions would vary. This hypothesis was exploratory.

Intervention Activity Modifications

To prepare the intervention activities for this study, each positive psychology intervention was modified so it featured opportunities for individuals to foster autonomy, competence, and relatedness. In addition, important elements of effective positive psychology intervention design were considered including autonomy support, peer testimonials, appropriate intervention length, and online accessibility. Previous research indicates these elements of intervention design enhance the effectiveness of a variety of positive psychology interventions (Layous et al., 2013; Nelson et al., 2015; Sin & Lyubomirsky, 2009), and it is expected that these elements will enhance the four activities in this study. Additionally, age and ethnicity were measured as potential moderators. Details on these modifications are elaborated on below.

Step 1. Interventions were modified to specifically foster need satisfaction.

In emerging adulthood, interventions that target Psychological Need Satisfaction as a pathway to well-being may be particularly effective at improving hedonic well-being (Mackenzie et al., 2018). However, none of the four interventions in this study was designed with need satisfaction in mind. To correct this, slight modifications were made to each of the four interventions. Altering intervention instructions can change what individuals pay attention to when they complete activities (Layous et al., 2013). For example, to emphasize autonomy, participants in the random acts of kindness activity were encouraged to choose where, when, and with whom they wanted to engage in an act of kindness. Similar edits were made to all experimental activities to ensure they emphasized all three needs: autonomy, competence, and social relatedness. Modified instructions for each activity are available in Appendix A. To verify

that these modifications helped participants experience each psychological need, participants were asked qualitative evaluation questions related to their activity conditions. Specifically, participants were asked directly if the activities they participated in made them feel more competent/skilled, autonomous/in control of their own lives, and connected to others/socially related. As expected, participants answering this evaluation question in each of the experimental groups reported feeling that their activities helped them feel more autonomous, competent, and socially related, while participants in the control group did not generally feel their activity helped them feel any of the three psychological needs.

Step 2. Autonomy support and peer testimonials were added to maximize intervention effectiveness.

In addition to modifying each intervention to emphasize need satisfaction, autonomy support and peer testimonial messages were created to increase overall intervention effectiveness. First, studies find that people benefit from interventions that allow for autonomy support, or encouragement toward autonomous action (Nelson et al., 2015). Participants granted autonomy support show greater gains in well-being – above and beyond participants in the same intervention conditions who lack autonomy support (Nelson et al., 2015). In an intervention, autonomy support is typically manifested as regular encouragement to the participant to complete the activity in a way that best suits them, which comes in three forms: providing choice, providing rationale, and acknowledging the participant's perspective (Nelson et al., 2015).

Second, interventions with emerging adults are more effective when they include peer testimonials (Layous et al., 2013). This may be because participants feel more confident in the interventions' effectiveness when they see that someone with whom they identify has had

success with it (Layous et al., 2013). Compared to interventions that lack these, interventions that provide emerging adults with peer testimonials show greater gains in well-being (Layous et al, 2013). Accordingly, peer testimonials by other emerging adults were added to each intervention.

To address these points, in the current study participants were sent a total of six emails during the study. After signing up, participants were sent a welcome email, re-iterating the logistics of the study and letting participants know when to begin the first session (email 1). Participants were then sent 4 additional email reminders on the day their next study activity was due (emails 2-5). In all experimental conditions, participants were also shown a quote from a "former emerging adult participant" in each reminder email. These quotes included a) autonomy support for the activity and b) peer testimonials that emphasized an aspect of need satisfaction, including autonomy, competence, and relatedness. Control participants received email reminders at the same time, but without peer testimonials or autonomy support. Additionally, peer testimonials were created to enhance intervention effectiveness (Layous et al., 2013). The testimonials in this study were modeled off of messages used in previous positive psychology intervention studies and emphasized language that would be common for emerging adults. Autonomy support messages were also created to help emerging adults feel more empowered during the experiment. These messages were also modeled from previous studies (i.e. Nelson et al., 2015). Below is an example of a quote from a participant in the acts of kindness condition. Note that some sentences purposely use slang or inaccurate grammar, to reflect a more familiar tone that sounds truly as if it was written by an emerging adult. This aspect of the study involved deception, which was addressed in the study debrief (see appendix B).

(Autonomy support): Hey! I hope you're excited to do five acts of kindness all in one day :) Just wanted to let ya know that where you do these acts and who you do them for is totally up to you. Feel free to do this however u want! :)

(Peer testimonial - relatedness): At first doing the kindness acts felt a little weird and intimidating, but tbh in the end it was kind of fun! For me the easiest thing to do was to zero in on my best friend, boyfriend, and family members. I would just pick a couple people a week that I loved and find ways to do something little to make their day better. Like one week I made my boyfriend's bed in the morning (for some reason he totally loves this) and bought donuts for my dorm. It was actually really nice to see how excited people were when I did these things, and I felt so good afterward! So, try picking a person/people to focus on if you feel stuck!

After completion of the study was verified, workers were paid through Mturk and sent a final debrief email (email 6), describing the study in more detail. This debrief email also offered control participants access to well-being activities, and it explained the deception used in the study (See Appendix B for copies of participant correspondence, including the screener, debrief, and additional examples of autonomy/peer testimonial quotes). Participants were invited to reply with questions or concerns. Though many participants replied that they were interested in trying out additional activities and learning more about the study results, no concerns or questions were raised. In fact, the only non-administrative replies participants made were to thank the research team and express appreciation for the activities. For instance, one participant replied, "Thanks it was REALLY eye opening, fun and interesting", and another replied "I have done over 900 hits on mturk, nearly all of which were surveys or variations of research studies. I just have to say- your study was by far the most enjoyable. I could tell how much you care about the research, and

how much you value the survey participants' input", and yet another replied "Thank you for the information! I got very engaged with those activities and greatly enjoyed my time answering your study."

Step 3. All interventions were converted to an online format, with similar intervention durations

Presenting positive psychology interventions in an online format may be useful for emerging adults. According to recent studies, 93% of emerging adults (18-29) are online regularly (Lenhart, Purcell, Smith, & Zickuhr, 2010), and they increasingly learn through online formats. At present, 91% of two-year colleges and 89% of four-year colleges offer classes online with 15% of students earning a degree fully online (Lenhart et al., 2010). In part, researchers posit that the increased popularity of online learning is due to the flexibility and convenience offered by the format (Bristow, Humphreys, & Ziebell, 2011), the unique characteristics of the millennial generation (Wood, Solomon, & Allan, 2008), and the general advancement of technology (Close, Dixit, & Malhotra, 2005). Researchers find interventions can be equally effective when completed online as when they are completed in person (Layous et al., 2013). In fact, other interventions, especially those designed for use with busy professionals, find that online administration is *more* effective for fostering important precursors to well-being, such as positive emotions (Ouweneel, Le Blanc, & Schaufeli, 2013). Additionally, compared to face-to-face interventions, online interventions offer emerging adults greater privacy, anonymity, and accessibility (Barak & Grohol, 2011). In line with these findings, each intervention activity in this study was offered online.

Additionally, to compare the relative effectiveness of positive psychology interventions, they need to be administered for similar durations. When determining which intervention is most

effective, it is important to present each intervention for approximately the same length of time, otherwise dosage could become a confounding variable. Research was consulted to determine the most effective intervention duration. Researchers found that interventions administered over longer periods of time engender longer-lasting, positive effects (Sin & Lyubomirsky, 2009), and that shorter interventions may not allow participants enough time to change habits (Vella-Brodrick, 2013). This research suggests the longer the intervention lasts, the better. Although interventions may be more effective when spread over a longer period of time, research also indicates that practicing an intervention too frequently may decrease its effectiveness, especially if participants become bored or habituated to the intervention (Lyubomirsky, King, & Diener, 2005). Taking these findings together suggests the duration of an intervention activity needs to be long enough to allow for sustained change, but short enough to avoid boredom. In this study, intervention activities were offered four times over two weeks. This length of time represents a compromise between the longer (6-week) and shorter (often as brief as 4 days) intervention schedule followed by typical positive psychology interventions; and on average, positive interventions are most effective when conducted at least four times over the duration of the study (Sin & Lyubomirsky, 2009).

Step 4. Additional moderator testing.

After modifications were made for each experimental activity, questions were added to the study survey measurements to assist in tracking the fidelity of implementation as well as the potential impact of certain demographics. For instance, participants who follow instructions carefully are more likely to experience the intended effects of an intervention (Lyubomirsky & Layous, 2013). Thus, it is important to measure and evaluate how closely participants follow instructions. Lastly, to track whether interventions may be better for people of a certain gender,

age, or ethnicity, these individual characteristics were measured and evaluated as potential moderators of well-being.

CHAPTER 3

Method

Participants

This study featured 335 emerging adult participants from Amazon's Mechanical Turk. Compared to convenience samples, such as college undergrads, MTurk samples have been found to be more representative of the general population (Buhrmester, Kwang, & Gosling, 2011). Participation was limited to MTurkers who were US residents between 18-30 years of age and who had Internet access. Mturk fair worker wages indicate that workers should be paid $6/hr for participating in research. This study took approximately 60 minutes over the course of 4 weeks, for which participants were paid $7. A G*power analysis at the .05 significance level indicated that a minimum of 276 participants total would be needed for analysis; which, with five conditions, means that at least 56 participants were needed per condition. The final sample sizes were n = 68 (random acts of kindness), n = 60 (self-affirmations), n = 75 (character strengths), n = 60 (best possible selves), and n = 72 (control condition). As such, this sample displayed adequate power for moderate effect sizes. All participants were emerging adults between 18 and 30 years old, with a mean age of 26.07 (SD = 3.05). The majority of the sample was female (63%) and Caucasian (70.1%). In addition, the sample was 9.3% African American/black, 8.4% Asian, 6.3% Hispanic/Latino, 5.1% more than one race and 0.9% other.

Procedure

Participants were initially recruited through a screener ad on Mturk. This median time for reading the half-page ad was 1.2 minutes, for which participants were paid $0.20. The screener laid out the basic study details and indicated qualifying Mturk workers should email the primary researcher to sign up, if interested. Participants were randomly assigned to one of five

conditions; either one of four experimental conditions (Kindness, Self-affirmations, Character Strengths, or Best Possible Selves) or a control condition. Within 1-2 days of signing up, participants were sent a welcome email with information to begin the study. After being assigned to a condition, participants were instructed to create a unique study ID which they used for the remainder of the study. Participants completed four study sessions in total:

1. Study session 1: 20 minutes total consisting of a Pretest (10min) + Activity 1 (10min)
2. Study session 2: Activity 2 (10min)
3. Study session 3: Activity 3 (10min)
4. Study session 4: Activity 4 (10min) followed by posttest (10-15min).

All surveys and activities were made available online through Qualtrics (see Appendices C and D). With four activity sessions (40 minutes total), and two survey sessions (20-25 minutes total), the total experimental time for this study was 60-65 minutes for participants in all conditions. Exact time spent in each activity was recorded and tracked through Qualtrics.

For each of the surveys, participants completed a battery of measures. On the pretest survey, participants completed the Psychological Need Satisfaction Scale, Subjective Well-being scales, and demographic questions. The posttest was identical to the pretest but included additional activity and engagement-related evaluation questions. Each of the non-evaluative study scales has been previously administered to emerging adults (for links to the pre- and posttest, including evaluation questions, see Appendix C). Evaluation questions were created for this study. More detail on these measures is included below. Each measure description includes Cronbach alpha scores for both the pre- and post-test administrations. All measures used in this study had Cronbach's alpha scores that indicated, at minimum, acceptable (0.7 or above) internal consistency (DeVellis, 1991).

Measures

Need Satisfaction (including autonomy, competence, and relatedness). The 21-item Intrinsic Need Satisfaction Scale (Deci & Ryan, 2000), which generates an overall score as well as individual scores for competence, autonomy, and relatedness, was administered. Participants rated how much they identified with statements on a Likert scale ranging from 1 (*not at all like me)* to 7 (*very much like me)*. The scale consists of three sub-scales, each of which measures the presence of a separate need. Sample items from each include: "I felt that my choices were based on my true interests and values" (autonomy), "I felt that I was taking on and mastering hard challenges" (competence), and "I felt a sense of contact with people who care for me, and whom I care for" (relatedness). Previous research suggests this scale is highly reliable (α from .83 - .91; Layous et al., 2013). This measure also showed high internal consistency in the current study (α = .907-.924). Additionally, each subscale indicated adequate internal consistencies (autonomy, α=.830-.868; competence α=.773-.850; Relatedness α=.905-.918).

Balanced Need Satisfaction Scores. Total scores for each need (competence, relatedness and autonomy) were taken from the Intrinsic Need Satisfaction Scale. To measure balanced need satisfaction, first the absolute value difference was taken from each pair of needs, then each set of need scores was summed together. For example, if an individual's score for autonomy was 5 and his/her score for competence was 3, the difference score for autonomy and competence would be 2; this procedure was then repeated for the remaining pairs of means, and all difference scores summed. This method produced a continuous variable for balanced need satisfaction with higher scores representing a less balanced set of needs, and lower scores representing balance between the three needs. This method for creating a balanced need satisfaction variable has been used in previous literature (Shelden & Niemiec, 2006).

Well-Being (life satisfaction, positive affect, negative affect). In past studies, hedonic well-being has been measured most commonly by the Positive Affect (PA), Negative Affect (NA) and Life Satisfaction scales (Diener et al., 1985; Sin & Lyubomirsky, 2009). Accordingly, this study measured well-being with these three scales. The Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988) asks participants to rate the extent to which they have experienced one of twenty different emotions on a Likert scale from 1 (*Not at all)* to 7 (*Extremely)*. Examples of positive emotions used in this scale include "excited," "interested," and "inspired." Negative emotions include "distressed," "irritable," and "ashamed." Previous research suggests this measure is internally consistent (α= .88; Fredrickson & Joiner, 2002). In this study, both negative affect (α= .880-.892) and positive affect (α= .920-.934) were also internally consistent. The Satisfaction with Life Scale (SWLS; Diener et al., 1985) includes questions that ask participants to rate their overall life satisfaction on a 7-point Likert scale ranging from 1 (*strongly disagree)* to 7 (*strongly agree)*. Items include, "I am satisfied with my life" and "In most ways my life is close to my ideal." In line with recommendations from previous researchers (Diener et al., 1985), well-being was measured by summing life satisfaction and positive affect scores, and then subtracting negative affect scores. Previous research finds that this scale is highly reliable (α = .85 to .92; Lyubomirsky, Dickerhoof, Boehm, & Sheldon, 2011). This remained true for this measure in the current study (α= .916-.917).

Intervention fidelity and activity evaluation. Participants were also asked questions to determine how well they followed instructions as well as evaluation questions related to whether or not they liked the activity and what feedback they might have about the experience. First, to assess the degree to which participants followed activity instructions, they were asked directly whether they followed instructions. Additionally, researchers reviewed writing samples from

each activity to evaluate whether participants completed each activity according to instructions. If a writing sample related to the instructions given, regardless of the quality of the sample, the participant was marked as attentive to the study procedures. Any responses that either a) did not appear to relate to the prompt in question or b) were blatantly nonsensical (for instance, a response of "ffffffff") was disqualified. In this sample, all writing samples indicated that participants were following instructions in earnest. Additionally, to assess important elements of the intervention that were expected to enhance the participants' experience, including peer testimonials and autonomy support, participants were asked to report on these intervention modifications. For instance, they were asked a) if they read their peer testimonials and b) if they read the autonomy support emails sent to them throughout the activity. These items were created for this study, and only appeared on the posttest (see Appendix C).

Second, participants were asked questions aimed at evaluating their experience with the activity they participated in, such as whether they liked the activity, what they would change if they could, and what, if any, additional feedback they have. These responses were collected to add a qualitative understanding of each participants' experience to the quantitative data. This added additional insight into why a given activity was or was not effective for this population.

Demographics. At the end of the study, participants will be asked to report their gender, age, and ethnicity.

Attention checks. To ensure participants were paying attention while taking their surveys, one attention check item was included in both the pre- and post-test. This question was embedded in the need satisfaction questions and asked participants to "Please select 'neutral' for this question so we can verify you're reading these statements closely :)." Including attention

check items is a common strategy for verifying data quality (Berinsky, Margolis, & Sances, 2014).

Intervention Activity Instructions

Participants were randomly assigned to one of four experimental conditions or to a control condition. The four experimental conditions included 1) conducting random acts of kindness, 2) using a signature character strength in a new way, 3) writing self-affirmations, or 4) imagining a person's best possible self in the future. Activities included reflecting, performing tasks, making plans, and setting goals. Experimental activities were modified to emphasize an aspect of need satisfaction (autonomy, competence, relatedness, overall need satisfaction/well-being). In the control activity, participants were asked to report on their daily tasks and activities on the same weekly schedule as experimental groups. A full list of materials and instructions for each of the five conditions is available in Appendix A.

Preliminary analyses and data screening

Initially, there were 527 participants recruited into the study. Of these, 30 reported being too old for the study in the demographics section, 4 did not consent, 20 were removed because they took three minutes or less to complete the pretest (which, on average, took 10 minutes), 8 failed the pretest attention check, and 13 did not finish the survey for a total remaining sample size of 452. Then, to prepare the data for analysis, cases from the pre and post- test were matched and merged by study ID. Participants were included in the final dataset only if they completed the study, including all four activity time points and both survey measures (pre- and post- test). In total, there were 370 participants who satisfied these conditions, indicating an attrition rate of 18.1%, which is within the expected range of 10-20% for longitudinal data (Bolier et al., 2013). Of those included in the study, 10 were removed because they took three minutes or less to

complete the posttest (which, on average, took 12 minutes), 11 failed the posttest attention check, and 14 did not meet the age requirements. The final sample included 335 emerging adults, with 60-75 participants in each condition (n = 68 random acts of kindness; n = 60 self-affirmations; n = 75 character strengths; n = 60 best possible selves; n = 72 control). Additionally, each activity was reviewed for implementation fidelity. Specifically, participant's qualitative responses were reviewed to verify that they followed instructions, were engaged, and completed each activity. Participant responses indicated a satisfactory adherence to the activity instructions, and participants reported being at least moderately engaged and following instructions at least half the time.

The independent variable in this study was the condition (four experimental conditions and one control condition). The dependent variables were competence, autonomy, relatedness, and hedonic well-being. Before running analyses, statistical assumptions and construct reliabilities were checked for all variables. Running descriptive statistics indicated that there was a normal distribution of scores for each construct, including an acceptable level of skew and kurtosis for each variable. Correlations for baseline scores on all key variables are displayed in table 2 below. Additionally, considerations for possible age variations were explored. For instance, age was run as a covariate for all analyses with no significant findings. As such, age was not considered a significant factor in this sample.

Table 2.

Correlation Matrix for Baseline Scores of Key Variables

	1	2	3	4	5	6	7	8
1. Overall PNS	--							
2. Autonomy	.90**	--						
3. Competence	.85**	.72**	--					
4. Relatedness	.85**	.64**	.53**	--				
5. Life Satisfaction	.60**	.53**	.51**	.53**	--			
6. Positive Affect	.50**	.41**	.50**	.40**	.33**	--		
7. Negative Affect	-.41**	-.41**	-.37**	-.30**	-.28**	-.14*	--	
8. Age	.002	-.02	-.03	.05	0.04	.12*	-.03	

Notes. * $p < .05$, ** $p < .01$. Correlations are based on baseline scores.

Additionally, the data were tested for initial baseline differences between groups, as well as differences in age, gender, and ethnicity and found no significant differences between groups. All additional statistical assumptions were met. Lastly, effect sizes are reported for ANOVA analyses; because these are F-based tests, effect sizes are reported in partial eta-squared. This effect size measure is on a different scale than the commonly reported Cohen's d test, and, without considering this, the effect sizes may appear quite small. Note that for partial eta squared F-based tests, a small effect is between .01 and .06, a medium effect is between .06 and .14, and a large effect is .14 or higher (Cohen, 1988). For easier understanding, the interpretation of effect sizes is included in all relevant tables below. Additionally, note that all figures reported in this results section were adjusted to accommodate baseline differences; specifically, the lowest score among groups for each pretest was selected. Then, other pretest scores were subtracted by the

relevant amount to meet the lowest pretest score. This same difference amount was then subtracted from the posttest scores, to match changes made to the pretest scores. The correct values for all results are reported in text and tables. Additionally, the y axis is truncated. These corrections were made to make the figures easier to interpret.

Lastly, though well-being was intended to be calculated as a combination of positive affect and life satisfaction, minus negative affect, it was not possible to use this well-being calculation in this study. Unfortunately, the correlations between positive affect, negative affect, and life satisfaction were not high enough to be considered related concepts and could not be combined (see table 2). As such, the results of this study were interpreted by investigating each outcome separately (i.e. life satisfaction, positive affect, negative affect), instead of combined.

CHAPTER 4

RESULTS

Hypothesis 1: Pretest-Posttest Changes in Well-being and Need Satisfaction

Hypothesis 1 suggested participants in the experimental conditions would show significant increases in well-being and overall need satisfaction from pre- to post- test, and participants in the control condition would not. Hypothesis 1 was partially supported. To test hypothesis 1, a mixed factorial ANOVA was run to assess the main effect of time. Then paired *t* tests were performed to analyze how participants were affected in each condition.

Well-being Outcomes: Life satisfaction, positive affect, and negative affect. In terms of well-being outcomes, analyses revealed a main effect of time, though no main effect of condition. First, there was a main effect of time, indicating that well-being outcomes significantly increased from pre- to post-test for participants when all conditions were combined, $F(1,330) = 19.39$ $p < .001$ (life satisfaction), $F(1,330) = 22.38$, $p < .001$ (positive affect), $F(1,330) = 5.75$, $p = .017$ (negative affect).

Pairwise comparisons were used to investigate these results further. These t-tests revealed that, over time, life satisfaction significantly improved for participants in the acts of kindness, self-affirmation, and control conditions (but not participants in the best possible selves or character strengths conditions). Positive affect significantly improved for participants in the self-affirmation, character strengths, and best possible selves conditions, and negative affect improved for participants in the self-affirmation condition only (see table 3).

These results were surprising on two fronts. First, only some, but not all, participants in each experimental condition improved in well-being outcomes. Second, and perhaps most surprisingly, while participants in the control group did not significantly change in either

emotional component of well-being (positive and negative affect), these participants did increase in the more cognitive aspect of well-being, life satisfaction, $t(71) = -2.63$, $p = (.010)$. To understand the control group results in more depth, qualitative responses, collected from the activity evaluation questions, were examined. Unexpectedly, most participants in the control group indicated that simply taking the time to review their daily activities helped them be more mindful of their habits. For instance, one participant commented,

> "I liked having to spend some time reflecting on what I had done in the past 24 hours and I realized how similar my day to day life can be. I focus more on . . . putting another dollar in the bank, in the process I think I zone out the steps taken each day. . . . When asked to focus on my last 24 hours I found myself focusing less on that progress and instead thinking about how to make my spare time more meaningful."

Another participant commented that "I feel like participating in this survey made me more aware of how I was spending my time, and the lack of activities I was doing. It made me want to try to do more in my day." A third participant said "I liked basically being able to review my day and think about everything I did all day long, which is something I honestly never do. I know it sounds crazy, but it was kind of therapeutic. There was nothing I disliked about it. I only wish I could have done it everyday 😊."

Second, there was a non-significant main effect of condition for each well-being outcome, $F(1,330) = .774$, $p = .542$ (life satisfaction), $F(1,330) = .658$, $p = .622$ (positive affect), $F(1,330) = .512$, $p = .727$ (negative affect). Together, these results indicate that, though participants in all groups combined significantly changed in their feelings of well-being outcomes over time, there were no differences in the pattern of change between conditions,

indicating that participants feelings of well-being in each condition did not significantly differ from each other.

Thus, hypothesis 1 was partially supported. Specifically, hypothesis 1 was supported in that participants in each of the experimental conditions demonstrated significant increases from pre- to post-test, as expected. However, it is important to note that groups were not significantly different from each other, and that, against expectations, individuals in the control condition reported similar increases in well-being compared to those in the experimental conditions, which does not support hypothesis 1.

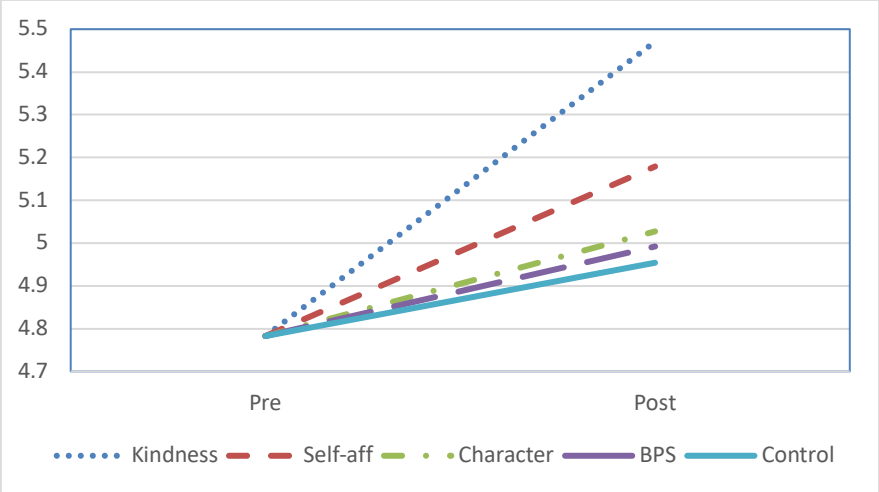
Overall Need Satisfaction. Similar to well-being, there was a main effect of time for each overall need satisfaction, indicating significant changes in need satisfaction over time with all conditions combined; however, there was a non-significant interaction of condition, again indicating that there were no significant differences in overall need satisfaction between participants in each condition, $F(1,330) = .337$, $p = .853$.

There was a main effect of time, indicating that need satisfaction significantly increased from pre- to post-test for participants when all conditions were combined, $F(1,330) = 50.43$, $p < .001$. Specifically, pairwise comparisons revealed that participants in the random acts of kindness, self-affirmation, and character strength conditions, need satisfaction significantly improved from pre- to post test (see Table 3). Individuals in the best possible selves condition were trending in that direction, but they did not show significant improvements from pre- (M=5.05, SD= 0.93) to posttest (M=5.26, SD=1.07), $t(59)$=-1.72, p=(.091). Interestingly, the same can be said of participants in the control condition, who, as a whole, also had nonsignificant results that were trending in the direction of increasing need satisfaction from pre- (M=4.99, SD= 1.26) to posttest (M=5.16, SD=1.24), $t(71)$=-1.82, p=(.074). See Figure 1. Thus,

regarding overall need satisfaction, hypothesis 1, that participants in each condition would improve in well-being outcomes over time, was partially supported in that participants in some conditions improved in some outcomes over time. Additionally, this hypothesis was supported in that participants in the control group did not show significant improvements in positive affect or negative affect; however, participants in the control group did show improvements in life satisfaction, which did not support hypothesis 1. Additionally, because there was no main effect of condition, these results reveal that there were no significant differences in any outcome between any conditions, including the control condition. Thus, it is not possible to interpret whether or how participants in any condition differed from participants in other conditions on these outcomes.

Figure 1.

Changes in Overall Need Satisfaction across Time Points



Need Satisfaction Subscales: Autonomy, Competence, and Relatedness.

There was a main effect of time for each subscale of need satisfaction, indicating that need satisfaction outcomes significantly increased from pre- to post-test for participants when all

conditions were combined, $F(1,330) = 40.32$, $p < .001$ (autonomy), $F(1,330) = 35.33$, $p < .001$ (competence), $F(1,330) = 19.94$, $p < .001$ (relatedness).

Looking at the individual components of need satisfaction revealed slightly different results than when viewing overall need satisfaction alone. Pairwise comparisons indicated that, for the acts of kindness and self-affirmation activities, satisfaction of all three basic psychological needs (autonomy, competence, and relatedness) improved significantly from pre- to post test, confirming hypothesis 1. The character strength activity showed significant increases in competence, $t(75)=-2.08$, $p=.041$) and relatedness $t(75)=-2.01$, $p=.048$, and was trending towards significance for autonomy $t(74)=-1.85$, $p=.068$. The best possible selves activity showed significant increases in autonomy $t(59)=-2.24$, $p=.029$), and was trending in the hypothesized direction for competence $t(59)=-1.91$, $p=.061$. However, this activity was non-significant for relatedness $t(59)=.218$, $p=.828$. While participants in the control condition did not show significant improvements in any of these outcomes, it was again trending in the hypothesized direction for autonomy $t(71)=-1.90$, $p=.061$. Again, qualitative responses offer insight into this unexpected outcome. For instance, one participant said, “I liked the activities because they made me think about what I had done and accomplished.” See Table 3 for a complete list of means, standard deviations, and effect sizes. For a visual display of each outcome see Figures 3-5.

These results, in line with well-being and overall need satisfaction results, indicate partial support for hypothesis 1. That is, there was support for hypothesis 1 in that there was a main effect of time, and pairwise comparisons revealed that there were significant increases in autonomy, competence, and relatedness for some conditions, but not others. However, because there was no main effect of condition, this result only indicates that conditions showed significant improvement over time with all conditions combined, including participants in the

control group; thus, it is not possible to say that participants in any one condition differ significantly from each other. It is only possible to understand how participants performed in each condition, separately from one another.

Figure 2.

Changes in Autonomy across Time Points

Figure 3.

Changes in Competence across Time Points

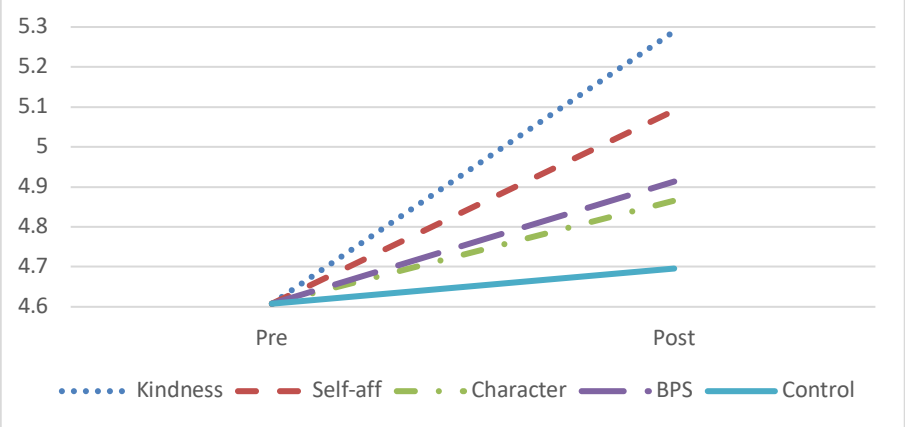


Figure 4.

Changes in Relatedness across Time Points

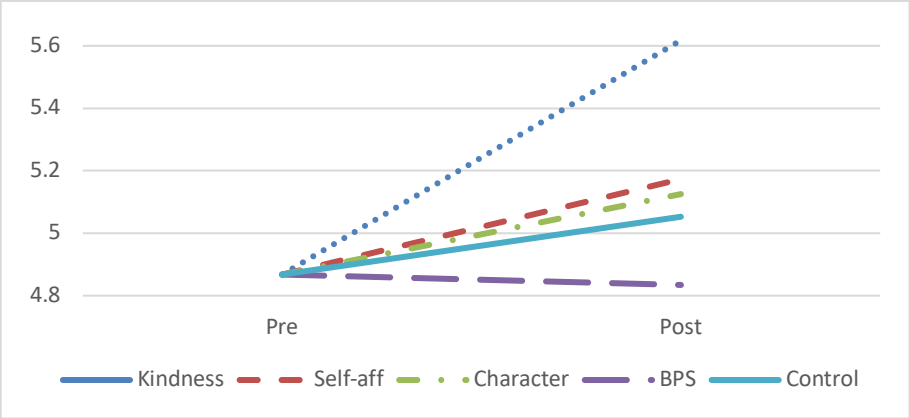


Table 3

Mean Scores T1 to T2 for Well-being and Psychological Need Satisfaction (PNS)

			Pretest (T1)		*Posttest (T2)*				
		n	*M*	*SD*	*M*	*SD*	*p-value*	η^2	EFI
Life Satisfaction	Kindness	68	4.04	1.63	4.40	1.56	.003**	.128	medium
	Self-affirmation	60	4.32	1.55	4.66	1.55	.001**	.162	large
	Character Strengths	75	4.52	1.47	4.68	1.21	.088	.039	
	BPS	60	4.35	1.29	4.27	1.42	.411	.011	
	Control	72	4.29	1.50	4.47	1.47	.010*	.089	medium
Positive Affect	Kindness	68	3.20	1.16	3.45	1.36	.081	.045	
	Self-affirmation	60	3.28	1.27	3.60	1.27	.004**	.130	medium
	Character Strengths	75	3.38	1.17	3.65	1.31	.014*	.078	medium
	BPS	60	3.19	1.06	3.44	1.23	.027*	.081	medium
	Control	72	3.21	1.05	3.29	1.07	.317	.014	
Negative Affect	Kindness	68	1.62	0.71	1.60	0.79	.763	.001	
	Self-affirmation	60	1.63	0.72	1.41	0.61	.013*	.101	medium
	Character Strengths	75	1.62	0.75	1.62	0.75	1.00	0.00	
	BPS	60	1.71	0.80	1.61	0.75	.113	.042	
	Control	72	1.60	0.70	1.50	0.72	.355	.012	
Overall PNS	Kindness	68	4.78	1.30	5.47	1.09	.000**	.296	large
	Self-affirmation	60	5.07	1.24	5.47	1.08	.000**	.263	large
	Character Strengths	75	5.09	1.08	5.33	1.07	.015*	.078	medium
	BPS	60	5.05	0.92	5.26	1.07	.091	.048	
	Control	72	5.01	1.26	5.16	1.24	.074	.044	
Autonomy	Kindness	68	4.87	1.51	5.51	1.21	.000**	.240	large
	Self-affirmation	60	5.14	1.34	5.54	1.12	.000**	.208	large
	Character Strengths	75	5.16	1.18	5.37	1.11	.068	.044	
	BPS	60	5.07	1.01	5.42	1.16	.029*	.078	medium
	Control	72	4.88	1.34	5.12	1.34	.061	.049	
Competence	Kindness	68	4.61	1.39	5.29	1.16	.000**	.208	large
	Self-affirmation	60	4.92	1.41	5.40	1.25	.000**	.225	large
	Character Strengths	75	5.07	1.15	5.33	1.15	.041*	.055	medium
	BPS	60	4.73	1.16	5.04	1.36	.061	.058	
	Control	72	4.91	1.30	5.01	1.36	.436	.009	
Relatedness	Kindness	68	4.87	1.59	5.62	1.31	.000**	.212	large
	Self-affirmation	60	5.14	1.45	5.45	1.29	.020*	.088	medium
	Character Strengths	75	5.04	1.45	5.29	1.41	.048*	.052	small
	BPS	60	5.34	1.27	5.31	1.23	.828	.001	
	Control	72	5.18	1.58	5.37	1.50	.184	.025	

Note. EFI = Effect Size Interpretation; * $p < .05$ (2-tailed); ** $p < .01$ (2-tailed)

Hypothesis 2: Changes in Well-being and Need Satisfaction compared to Control Condition

Hypothesis 2 suggested that participants in experimental conditions would have greater gains in well-being and need satisfaction compared to participants in the control condition. Hypothesis 2 was not supported for outcomes related to well-being, and partially supported for participants in some conditions related to need satisfaction. To test hypothesis 2, a mixed factorial ANOVA was run to assess the interaction of time and condition. This was followed by pairwise comparisons to examine how participants in each experimental condition performed compared to those in the control condition. To control for familywise alpha inflation the Holm-Bonferroni sequential procedure was applied (Olejnik, Supattathum, & Huberty, 1997). In this method, the total a-priori alpha level is divided by the number of the family-of-tests used; in this case, .05/5=.01. P-values are then ranked from lowest to highest. Using the Holm-Bonferroni correction, each p-value (from lowest to highest) is judged by a sequential alpha value such that the lowest p-value is judged by the strictest alpha level (.05/5=.01), the second lowest p-value is then judged by the number of tests - 1 (.05/4=.0125), the third lowest p-value is judged by the number of tests – 2 (.017) and so on. In previous literature, this procedure was found to control type 1 error without reducing power as much as a standard Bonferonni correction (Aicken & Ginsler, 1996).

Well-being. A mixed factorial ANOVA revealed a significant interaction of time on condition for life satisfaction ($F(1,330) = 3.18$, $p = .014$, $\eta^2 = .046$), but not positive affect ($F(1,330) = .729$, $p = .573$, $\eta^2 = .009$) or negative affect ($F(1,330) = 1.24$, $p = .30$, $\eta^2 = .015$). However, pairwise comparisons did not indicate significant differences between the control group and any individual experimental group on life satisfaction. These results indicate a lack of support for hypothesis 2.

Overall Need Satisfaction, Autonomy, Competence, and Relatedness. A mixed factorial ANOVA revealed a significant interaction of time and condition for overall need satisfaction, $F(4, 330) = 3.96$, $p = .004$, $\eta^2 = .046$, as well as for competence, $F(4, 330) = 2.87$, $p = .023$, $\eta^2 = .034$, and relatedness, $F(4, 330) = 3.76$, $p = .005$, $\eta^2 = .044$, but not for autonomy, $F(4, 330) = 1.71$, $p = .148$, $\eta^2 = .020$. Using post hoc tests, each experimental condition was investigated against the control condition for those variables with significant interactions. For participants in the random acts of kindness condition, hypothesis 2 was fully supported for overall need satisfaction, $F(1, 138) = 10.55$, $p=.001$, $\eta^2 = .071$ as well as respectively for competence, $F(1, 138) = 9.22$, $p=.003$, $\eta^2 = .063$ and relatedness, $F(1, 140) = 6.42$, $p=.012$, $\eta^2 = .044$. Additionally, participants in the self-affirmation condition displayed significant increases in competence compared to the control group, $F(1, 130) = 5.91$, $p=.017$, $\eta^2 = .043$. Furthermore, though nonsignificant, for participants in the self-affirmation condition overall need satisfaction was trending in the hypothesized direction, $F(1, 130) = 3.01$, $p=.086$, $\eta^2 = .023$ (see Table 4).

Table 4

Significance and effect sizes for relevant experimental vs. control conditions

		p-value	η^2	Effect size interpretation
Overall PNS	Kind vs. Control	.001*	.071	medium
	SA vs. Control	.086	.023	
Competence	Kind vs. Control	.003**	.063	medium
	SA vs. Control	.017*	.043	small
Relatedness	Kind vs. Control	.012*	.044	small
	SA vs. Control	.530	.003	

*Note. * p= significant using the Holm-Bonferroni sequential procedure*

Table 5

Summary of Findings from Hypothesis 1 and Hypothesis 2

		PNS	*PNS - Auto*	*PNS - Comp*	*PNS - Relate*	*SWB - PA*	*SWB - NA*	*SWB - LS*
H1: pre to post	Kindness	x	x	x	x	trending	-	x
	Self-affirmation	x	x	x	x	x	x	x
	Character Strengths	x	trending	x	x	x	-	trending
	BPS	trending	x	trending	-	-	-	x
	Control	trending	trending	-	-	-	-	x
H2: vs. control	Kindness	x	x	x	x	-	-	-
	Self-affirmation	trending	-	x	-	trending	-	-
	Character Strengths	-	-	-	-	-	-	-
	BPS	-	-	-	-	-	-	-

Notes. x = p < .05 (2-tailed); trending = p < .10 (2-tailed); - = non-significant; H = Hypothesis; PNS = Psychological Need Satisfaction overall; Auto = Autonomy; Comp = Competence, Relate = Social Relatedness; SWB=Subjective Well-Being; PA=Positive Affect; NA=Negative Affect; LS=Life Satisfaction
Kind = Kindness; SA = Self-Affirmation; PNS = Psychological Need Satisfaction

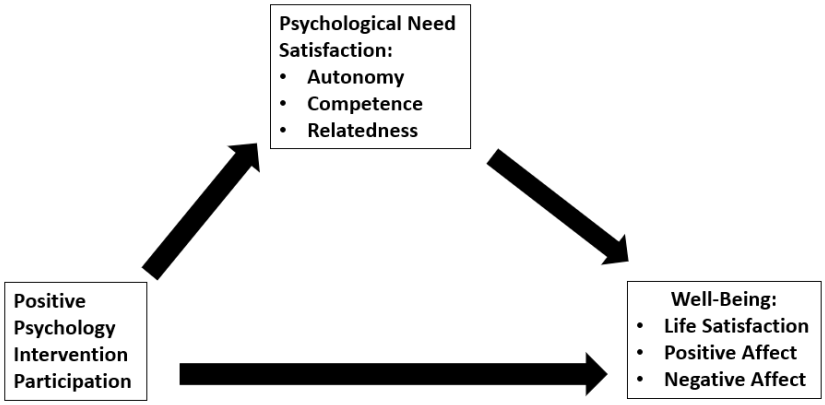
Participants in all other experimental conditions had nonsignificant results for these outcomes, which indicates a lack of support for hypothesis 2 in these conditions. For a summary of results from hypotheses 1 and 2, please see Table 5.

Hypothesis 3: Mediation of Intervention Effects

Hypothesis 3 investigated whether increases in life satisfaction, positive affect, or negative affect were mediated by overall need satisfaction or by autonomy, competence, and relatedness separately (see Figure 5).

Figure 5.

Hypothesized Model of Intervention Effects



To explore this hypothesis, a percentile bootstrapping estimation approach with 10,000 samples was used (Shrout & Bolger, 2002), implemented with the PROCESS macro Version 3 (Hayes, 2017). This mediation model was run only for participants in those conditions that had significant main effects (self-affirmation and acts of kindness conditions). Mediation was tested with both conditions combined (n = 128) as well as with each condition separately (n = 68 acts of kindness, n = 60 self-affirmation). Results indicated a lack of mediation of need satisfaction related outcomes on any of the three well-being related outcomes.

Hypothesis 4: **Balanced Need Satisfaction Scores**

Hypothesis 4 suggested that for participants in experimental conditions with the same overall need satisfaction score, those who have a balanced need satisfaction score, compared to

those with an unbalanced need satisfaction score, will show greater gains in well-being. As this analysis did not require an intervention to test its effects, only time 1 data was used. To test this hypothesis, first a continuous variable for balanced need satisfaction was created by taking the difference of each pair of needs at time 1 and then summing the absolute value of each pair of needs (i.e. autonomy and competence, competence and relatedness, autonomy and relatedness). Hierarchical regression analyses were conducted to evaluate the additive effect of a balanced need satisfaction score on individuals' three well-being components at time 1 above and beyond the overall need satisfaction score at time 1. In the first step, the overall need satisfaction score was entered into the model. In the second step, balanced need satisfaction scores were added as well.

Results indicate that a balanced need satisfaction score did not significantly predict any of the three components of a participants' well-being, which did not support hypothesis 4. For each analysis, the first model with overall need satisfaction predicting participants' well-being showed good fit, R^2=.364, F(1,333) = 190.26, p < .001 (life satisfaction), R^2=.249, F(1,333) = 110.63, p < .001 (positive affect), R^2=.169, F(1,333) = 67.63, p < .001 (negative affect). . Results indicated that overall need satisfaction significantly predicted participants' well-being, β = 603, p < .001 (life satisfaction), β = .499, p < .001 (positive affect), β = -.411, p < .001 (negative affect). However, the second model with balanced need satisfaction scores as an added predictor did not show good fit, R^2=.363, F(1, 332) = 1.86, p = .174 (life satisfaction), R^2=.251, F(1, 332) = 2.64, p = .105 (positive affect), R^2=.169, F(1, 332) = .111, p = .740 (negative affect). These results indicate that overall need satisfaction did not significantly predict participants' well-being in this model. These results do not indicate support for hypothesis 4.

Hypothesis 5: Exploration of Gender and Ethnicity

This hypothesis explored whether the effectiveness of participating in a positive psychology intervention may differ depending on common demographic factors, such as gender or ethnicity. First, baseline correlations (see table 2) indicated only one significant correlation for age; in this table, we can see that the older an emerging adult is, the more positive affect they are likely to feel. There were no other significant correlations from baseline data. Overall, participants who participated in a positive psychology intervention (all experimental conditions combined) did not display any significant differences on these demographic factors, suggesting that the effects of the intervention are the same for all participants in this sample who participated in a positive intervention, regardless of gender. Furthermore, each individual positive psychology intervention was examined based on gender, with no significant differences found. Differences were not examined by individual positive psychology intervention based on ethnicity, as there was not enough ethnic variability in this sample to provide adequate power for that analysis.

Specifically, gender was run as a covariate in each mixed factorial ANOVA, with no significant results for any outcomes including need satisfaction $F(1, 329) = 0.286$, $p = .593$, autonomy $F(1, 329) = 0.001$, $p = .974$, competence $F(1, 329) = 0.024$, $p = .878$, relatedness $F(1, 329) = 2.036$, $p = .155$, life satisfaction $F(1, 329) = 0.435$, $p = .510$, positive affect $F(1, 329) = 3.353$, $p = .068$, or negative affect $F(1, 329) = 0.394$, $p = .531$. These results indicate that there were no differences in outcomes between males and females in this sample.

CHAPTER 5

DISCUSSION

The third decade of life represents an important developmental period, where young people take their first steps as legal adults. This can be an exciting period of positive growth as well as a confusing period of continued identity development (Arnett, 2007; Padilla-Walker & Nelson, 2017). Perhaps unsurprisingly, research indicates that emerging adults (18-30 years old) experience less well-being than their older adult counterparts (Mackenzie et al., 2017). One way to improve well-being is through satisfying the three basic psychological needs for competence, autonomy, and relatedness (Mackenzie et al., 2017). This pathway to well-being improvement may be particularly salient for emerging adults, who are just starting out in new lifestyles and careers (Arnett, 2007) where they may not yet feel competent or autonomous. Additionally, due to more frequent location and lifestyle changes (Arnett, 2007), emerging adults may find themselves having to start over with new friendship groups, which could contribute to feeling less socially related. If fulfilling these needs is an important pathway to higher well-being, how, then, can emerging adults satisfy these needs? Additionally, past research finds that having a balance of needs – that is, having similar levels of autonomy, competence, and relatedness, contributes to additional gains in well-being (Sheldon & Niemic, 2006). However, is this balance important for emerging adults, specifically?

To investigate these questions, emerging adults were given different positive psychology interventions to complete. A literature review revealed four positive psychology interventions that held promise for improving emerging adult well-being through satisfaction of their psychological needs for competence, autonomy, and relatedness. Emerging adults were randomly assigned to either one of four experimental conditions (acts of kindness, self-

affirmations, character strengths, or best possible selves) or a control condition. The interventions used in this study were then modified to emphasize autonomy, competence, and relatedness, as these interventions were not originally designed for emerging adults or with need satisfaction in mind. Additionally, peer testimonials included modern emerging adult language and the interventions were all placed online for emerging adult's ease of us. With these interventions prepared, this study investigated five main hypotheses related to emerging adulthood need satisfaction and well-being. First, will emerging adults improve in well-being and need satisfaction from pre- to posttest? Second, will there be a hierarchy, such that some activities improve each outcome better than others? Third, is the relationship between positive psychology activity participation and well-being still mediated by need satisfaction in emerging adults? Fourth, does a balance of needs contribute to increased well-being in emerging adults? Fifth, and finally, does gender or ethnicity influence these results?

Findings from the present study presented mixed insights. Results suggested that participants in the control and experimental conditions did not experience different rates of change in well-being and need satisfaction from pre- to post-test, indicating that participants in all activities improved in well-being and need satisfaction to about the same degree. However, participants in two conditions – acts of kindness and self-affirmations – showed some significant differences in need satisfaction compared to the control condition, indicating that participation in these two activities may lead to improvements in some need satisfaction related outcomes. Further, this study failed to find support for the importance of balanced need satisfaction scores. This indicates that emerging adults may not need to focus on how well they are balancing their various needs to improve their well-being; rather, they can work to improve their satisfaction with their basic needs, overall, balanced or unbalanced. Additionally, these results did not

indicate mediation between need satisfaction and well-being; this was likely the result of an underpowered analysis. Lastly, while it was not possible to evaluate the influence of ethnicity in this sample, this study indicated that a participant's gender did not influence results; that is, participation in each activity yielded the same changes in well-being or need satisfaction regardless of whether the participant was male or female. These results add valuable insights into an initial set of interventions designed specifically for need satisfaction, and their implications for emerging adult populations.

Changes in Need Satisfaction and Well-Being Over Time

To understand the effectiveness of each intervention in this study, this study first explored how participants well-being and need satisfaction changed from pre to post-test. Hypothesis 1 predicted that, in line with previous research (Layous et al., 2013; Linley et al., 2010; Nelson et al., 2014; Nelson et al., 2015), participants in the experimental conditions would demonstrate increases in overall need satisfaction and well-being from pre to post-test, whereas participants in the control group would not show increases in these outcomes. Results indicated mixed support for this hypothesis. While results did indicate a main effect of time, such that participants across conditions experienced more well-being from time 1 to time 2, there was no main effect of condition, indicating that the rate of growth in the experimental conditions was no different than the rate of growth in the control conditions. This means it is not possible to interpret whether participants in one condition improved on any given outcome more than participants in other experimental conditions or in the control condition. Thus, it may be that these activities are simply not effective at improving emerging adults' well-being in their current format.

Furthermore, while participants in each of the experimental activities (i.e. acts of kindness, self-affirmations, and character strengths) did report more well-being and need satisfaction as expected, no activity indicated improvements for emerging adults in all expected outcomes. For instance, inconsistent with previous literature (Lyubomirsky et al., 2013), participants who completed the best possible selves activity did not show significant increases in either overall need satisfaction nor in well-being; however, results for both outcomes were trending towards significance. Though none of the activities in this study were designed for emerging adults, all four have been used with emerging adult populations. As such, it is not likely that any differing results in this study are due to characteristics unique to emerging adults. Instead, a deficit of power may have contributed to this lack of significance (see limitations).

Again, contrary to expectations, participants in the control group reported feeling significantly more well-being from pre- to post-test. This may be true because control group participants enjoyed listing their daily activities without emotion or feelings attached. However, this activity has not inspired increases in well-being in the past (Sin & Lyubormisky, 2009; Bolier et al., 2013), which means it may also be the case that these activities do not improve well-being as anticipated.

Additionally, hypothesis 1 sought to explore whether each intervention impacted a specific psychological need, such as competence, autonomy, or relatedness. Again, it is important to note that while there was a main effect of time, there was no main effect of condition for need satisfaction related outcomes. This indicates that participants in the experimental conditions did not improve significantly more than participants in the control condition. One explanation for this result is that these activities do not effectively increase need

satisfaction. However, to understand how participants fared in each condition, it is still informative to investigate the rates of growth for each condition, separately, over time.

Participants in the best possible selves condition yielded, perhaps, the most nuanced results. Previous research found that the best possible selves intervention helped participants feel more related, but not more competent or more autonomous (Layous et al., 2013). Additional research found that, in fact, the best possible selves intervention does make participants feel significantly more competent and autonomous, but only when they complete the goals they set out for themselves based on their future lives (Mangan, *in press*). Interestingly, in this study, participants in the best possible selves condition did not report feeling more related or competent, but did report feeling more autonomous. The reason participants did not feel more social may be due to differences in the instructions given for this intervention. Researchers using the best possible selves intervention have not offered a consistent set of instructions (King et al., 2001; Layous et al., 2013). In some cases, they have asked participants to think about any aspect of their best future life that they desire (King, 2001). In other cases, they have asked participations to think about specific aspects of their future lives, such as their social, career-oriented, or academic lives (Layous et al., 2013). These instructions were open-ended and may have lent themselves to discussions of more socially related interactions with friends, coworkers, or classmates. In this study, participants were asked to consider their best possible future lives in four categories, including their best possible life of competence, autonomy, relatedness, and overall need satisfaction. Previous researchers have asked participants to describe their best possible social life (Layous et al., 2013), which is likely similar to being asked to describe one's best possible socially related life. However, none of the other three categories (overall need satisfaction, competence, autonomy) have been emphasized in the instructions of this activity

before. Further, these additional three categories are not inherently social. It may be that, because emerging adults completed three potentially non-social versions of this activity, they did not feel as socially related as participants have in previous research (Layous et al., 2013). Additionally, participants in this study felt more autonomous which aligns with some previous research (Mangan, *in press*), but not others (Layous et. al., 2013). Participants may have felt more autonomous for two reasons. First, because this is the first study to emphasize autonomy in the instructions. Second, because in this study almost all participants (98.3%) reported completing their goals, which previous research indicates is the key to participants feeling more autonomous after using this activity (Mangan, *in* press). However, conversely, participants who completed their goals were also expected to feel more competent, which, in this study, they did not. However, the results for competence were trending towards significance. Thus, this result may be due to an underpowered sample (see limitations). Another possible explanation is that simply setting a goal may not be enough; the quality or type of goal may also be important (Shilts, Horowitz, Townsend, 2004). Future studies should consider adding more instructions related to the type of goal each participant sets, as well as evaluating the quality of each goal. Future studies looking to improve the satisfaction of all three needs in emerging adults may consider re-focusing the activities in this intervention to include more opportunities to reflect on relatedness and competence. In summary, in this study, participants who completed the best possible selves activity felt more autonomous and socially related, but not more competent.

Participants in the self-affirmation condition reported more straightforward results. Previous research indicated that participants who completed the self-affirmations activity felt more competent and autonomous (Nelson et al., 2014). This result was consistent with findings from this study; that is, emerging adults in this study experienced significantly more competence

and autonomy from pre- to post-test. Unlike in previous studies, however, in this study participants also reported feeling more socially related after completing self-affirmations. Participants may have felt this way because the instructions in this study were modified to emphasize self-affirmations related to their social lives, specifically, whereas most self-affirmations are selected more generally. This contributes valuable information about the self-affirmation activity; specifically, this indicates that with modified instructions, practicing self-affirmations may actually lead to improvements in all three psychological needs.

There were no clear hypotheses related to need satisfaction for emerging adults participating in the remaining two conditions; these analyses were exploratory. The results here represent important, never-before-investigated insights into which needs are at play in the character strengths and acts of kindness activities.

For participants in the acts of kindness activity, satisfaction of all three individual needs improved from pre- to posttest, indicating that participants felt more autonomous, competent, and socially related after participating in these activities. While the mechanisms behind why participants improved in all three aspects of need satisfaction require further exploration, it stands to reason that this social activity may have helped create a sense of relatedness with others because it encourages positive, interpersonal connections (Nelson et al., 2014). Additionally, compared to individuals in a control group, past researchers found that individuals who completed acts of kindness reported more positive emotions, such as joy and contentment, after acting kindly (Lyubomirsky, Tkach, & Sheldon, 2004). In creating this positive emotional state, act-of-kindness givers may activate broaden-and-build, increasing positive emotions and encouraging the development of psychosocial resources. As they go about the remainder of their day, they may find their minds are more open, creative, and flexible, thereby enhancing the

probability that they will develop new competencies (Fredrickson, 2001). Additionally, this may have been one intervention that benefited from the inclusion of autonomy support messages, which may have empowered participants to feel more autonomous during the activities (Nelson et al., 2014). This is the first study to investigate and confirm that all three psychological needs improve over time by participating in the acts of kindness activity.

Participants in the character strength activity felt significantly more competent and related, but not autonomous; however, the latter results were trending. Although the mechanisms behind this intervention also require further exploration, one explanation may be that using an individual's top character strengths can be fulfilling, leading to a heightened sense of self. A sense of self is understood as an integration of a person's thoughts and feelings with their interpersonal experiences and authenticity (Deci & Ryan, 2000). When an individual feels a heightened sense of self, their internal motivation may be more autonomous (Deci & Ryan, 2000). Additionally, an increased sense of self may improve mood and interaction styles, which may in turn increase a sense of relatedness (Peterson & Seligman, 2004; Fredrickson, 2004). Furthermore, in enacting their strengths, emerging adults are likely to feel more skilled, which could increase their sense of competence. Because autonomy was trending towards significance, it may again be that participating in this activity could improve all three needs, but participants did not increase in autonomy due to a lack of statistical power (see limitations). Of course, it is also possible that using one's character strengths improves relatedness and competence, but not autonomy. This represents the first time that individual needs have been explored in relation to the character strength activity, and contributes valuable information about which needs – competence and relatedness – are most likely to improve when emerging adults participate.

Lastly, in support of hypothesis 1, participants in the control condition did not feel significantly more need satisfaction, including any individual psychological need. Surprisingly, however, participants in the control condition did demonstrate significant improvements in life satisfaction, indicating that simply recalling the dry facts of one's day improves how satisfied emerging adults feels with their lives (see limitations for a discussion on the success of participants in the control condition).

Changes in Need Satisfaction and Well-Being Between Control and Experimental Groups

Beyond changes over time, this study also investigated changes in well-being and need satisfaction in comparison to a control group. Hypothesis 2 predicted that participants in the experimental conditions would feel significantly more need satisfaction and well-being from pre- to posttest compared to participants in the control group; this hypothesis was partially supported. In short, participants in three conditions – best possible selves, character strengths, and control – performed about the same, while participants in the acts of kindness and self-affirmation activities showed mixed improvements compared to the control group in need satisfaction related outcomes only. Past research indicates that writing about one's best self in the future or using one's character strengths in new ways leads to feeling more well-being and need satisfaction (Layous et al., 2013; Linley et al., 2010). However, in this study, that was not the case. Because participants in both of these conditions did feel more need satisfaction and well-being from pre to post-test (see discussion for hypothesis 1), there are two likely explanations for this result. First, this result may be explained by the unexpected success of the control group (see limitations). Participants in the control group improved so much in well-being that it may not be that participants in the character strengths and best possible selves activity underperformed, but rather that participants in the control group performed so well that all three groups performed

equally well (as opposed to equally unwell). Of course, this result may just as likely indicate that these activities are not effective at improving well-being or need satisfaction related outcomes in their current form.

However, participants in two activities – acts of kindness and self-affirmations – did feel more need satisfaction compared to the control group. First, participants in the acts of kindness exercise showed significant improvements in most psychological need-related outcomes, including competence and relatedness, but not autonomy. As there were no specific hypotheses for how participants would feel in each of these individual needs in this activity, this finding highlights new information that performing acts of kindness can influence competence and relatedness and confirms previous findings that participants will increase in their overall need satisfaction (Nelson et al., 2015). However, strangely, participants did not feel significantly more well-being, as previous researchers have found (Nelson et al., 2015). The explanation for this may again involve the curious success of the control group, as participants in the control group did not feel significantly more need satisfaction from pre- to posttest but did feel significantly more well-being. It was expected that the control group would not significantly increase in any outcome. As such, when participants in the acts of kindness condition were compared to those in the control group it is unsurprising that the results indicate no difference between these two groups, since both groups significantly increased in well-being from pre- to posttest. However, this result could also indicate that participating in the acts of kindness exercise just does not influence well-being. Additionally, participants in the self-affirmation activity did not feel more well-being or overall psychological need satisfaction but did feel significantly more competent. Further, results for overall need satisfaction were trending towards significance. In this case, the explanation may again be that this sample was underpowered (see limitations). Alternatively, it

may be that performing self-affirmations is not effective at improving outcomes related to well-being and need satisfaction, with the exception of competence.

Lastly, hypothesis 2 included an investigation of which activity performed best; that is, did some activities have a bigger impact on any given outcome? Though it is not possible to directly compare activities due to non-significant effects on condition (see discussion for hypothesis 1), it is possible to discuss effect sizes, and, furthermore, to compare the effect sizes found in this study to those found in previous research. First, previous research indicated that participating in the character strengths activity would have the largest effect size for well-being, and all other activities would have small effect sizes; additionally, previous research indicated that the acts of kindness exercise would have the largest effect on overall need satisfaction, and all other activities would have small effect sizes (Layous et al., 2013; Linley et al., 2010; Nelson et al., 2014; Nelson et al., 2015). In this study, consistent with previous research (Nelson et al., 2015), the acts of kindness activity produced the largest (and only) effect on overall need satisfaction; the effect size in both studies was medium. However, there were no significant effect sizes to report for well-being related outcomes, as no significant differences for well-being were found between experimental and control groups. There may be several reasons why this hierarchy was different from expectations. For participants in conditions that were non-significant, this may again have been the influence of surprisingly effective control group or that the activities simply are not effective. One reason for this lack of effectiveness may be that the modifications made to these activities may have influenced their effectiveness. These four activities have never been tested against each other directly in previous literature. To keep the conditions as similar as possible, all four conditions were altered slightly so that each condition would be a similar duration (10 minutes). Additionally, each activity was set to the same

administration schedule, which in this study was twice a week for two weeks. There is no standard administration for these activities, and different studies vary widely in administration. For example, the best possible selves activity has been administered in a range from once a day for four days to once a week for four weeks (Sin & Lyubomirsky, 2009). Other activities in this study have similarly been administered between two weeks (Nelson et al., 2014) and ten weeks (Linley et al., 2010), and the number of sessions varies just as widely (Sin & Lyubmorisky, 2009). Given this, researchers wonder if mixed results across intervention studies could be due to unexamined inconsistencies in how the activity is administered (Lyubomirsky, Sheldon, Schkade, 2005; Vella-Brodrick, 2013). In the case of this study, it may be that some activities, such as acts of kindness and self-affirmations, are better suited to a shorter dosage schedule (i.e. ten minutes four times over two weeks) than others, such as character strengths and the best possible selves. Indeed, research in positive interventions may remain hard to interpret without a true standard of practice for each activity that researchers can compare to. Future researchers should establish clear standard dosages for each intervention to alleviate this issue.

Replication: Mediation and Balanced Need Satisfaction

Hypothesis 3 predicted that a eudaimonic pathway to well-being would fully mediate the relationship between participation in a positive psychology activity and well-being. In a recent study, researchers found that adults with higher need satisfaction also had significantly higher well-being, and that, in fact, need satisfaction fully explained participants increased well-being (Mackenzie et al., 2018). However, this relationship has never been examined in positive psychology interventions or with emerging adults alone. To continue to understand how and why these positive interventions are effective, and for whom, this relationship was tested in this study with the hypothesis that this mediation result would be replicated. Results from the present study

did not support this hypothesis. In other words, the relationship between activity participation and well-being related outcomes was not explained by need satisfaction, including by any need individually, in this emerging adult population. Thus, this finding failed to replicate previous research (Mackenzie et al., 2018), and does not extend this finding to emerging adults. This result is likely due to an underpowered sample. As only two of the four experimental conditions – acts of kindness and self-affirmations – were significantly different from the control group on some outcomes, only these two experimental conditions were considered in the mediation analyses. This removed all participants from the character strengths and best possible selves conditions, a removal of 135 participants total from the sample. As such, this sample may have been too small to appropriately run this mediation analysis. Future studies should ensure they have an appropriate sample sizes to run mediation analyses. As such it is not possible to understand if the relationship from need satisfaction to well-being does or does not exist in this population.

Finally, hypothesis 4 predicted that individuals who reported a balance of autonomy, competence, and relatedness would experience greater well-being than individuals who reported experiencing one or two of these dimensions to a greater degree than the other(s). Previous research indicates that well-being depends on having a balance of needs (Sheldon & Niemic, 2006), but this finding has not been tested with emerging adults. However, in this sample, the results failed to support this hypothesis, indicating that, compared to participants who reported unbalanced need satisfaction scores, those who reported a more balanced psychological needs score reported no difference in their scores on well-being. This suggests that, for emerging adults, a balanced need satisfaction score may not be important for increasing well-being. As this is the first study to test this hypothesis with an emerging adult sample, future studies should seek

to replicate this result. Additionally, future studies should investigate why balance scores may not be as important in emerging adult populations as they have been in general adult samples (Sheldon & Niemic, 2006). The application of these results are summarized below.

Activity Take-Aways and Applications

While the concept of intervention is not novel to psychology, the development and testing of positive psychology interventions is still relatively new (Bolier et al., 2013). These activities are unique in that they are designed to promote positive emotions, feelings, and outcomes. While the exact mechanisms behind positive interventions are not fully understood, part of their success may be owed to the increase in positive emotions they produce, which research indicates can broaden the mind and help individuals build additional resources which may then lead to more positive emotions that again broaden the mind and build even more resources, and so on (Fredrickson, 2001). The results of this study offer valuable insights into how each of these four interventions influences need satisfaction and well-being. The implications of these results for emerging adults, per activity, are discussed in detail below.

Acts of Kindness. The acts of kindness activity was the only activity where participants feel improvements in all three psychological needs – competence, autonomy, and social relatedness – when compared to a control group. While participants in this activity did not experience significantly more well-being than control participants, this may be because the control participants experienced such unexpectedly high levels of well-being. Alternatively, this may indicate that this activity is only effective at improving need satisfaction, but not well-being. Results from the present study are underscored by earlier research pointing to the promise of this activity (Nelson et al., 2015). For researchers, practitioners, or emerging adults looking to choose

only one activity to best support need satisfaction in emerging adulthood, the results of this study would point to the acts of kindness intervention.

Self-affirmation. In line with previous research, participants in this condition felt significantly more competence and well-being from pre- to posttest compared to participants in a control condition (Nelson et al., 2014). Previous research has also found that participants in this study feel more autonomous (Nelson et al., 2014), though that result was unconfirmed in this study. These results indicate that self-affirmations may be particularly effective at improving emerging adult competence, but they may not be as effective at increasing the satisfaction of other needs. For emerging adults who do not feel particularly competent, this intervention may be an effective means to boost feelings of proficiency. Additionally, this is the only activity where participants felt more well-being, compared to control group participants. As such, of the four activities in this study, results point to self-affirmations as the best option for participants who want to feel more hedonic well-being.

Character Strengths. Though participants who completed this activity did experience significant changes in well-being and need satisfaction from pre to post-test, these differences were nonsignificant when compared to participants in a control condition. As such, the results of this study conclude that this activity is not any more effective at helping participants feel more well-being or need satisfaction than a control group activity. However, it is important to note that previous research has found that this activity significantly improves overall need satisfaction and well-being(Linley et al., 2010). As such, it is possible that some versions of this activity are more effective than others. Thus, practitioners wishing to improve these outcomes may wish to use a previous version of this activity; alternatively, the results of this study would encourage practitioners to instead use the self-affirmation or acts of kindness activities.

Best Possible Selves. Similar to participants completing the character strengths activity, participants completing the best possible selves activity did not significantly improve in well-being or need satisfaction from pre- to post-test when compared to a control condition. As such, the results of this study once again conclude that this activity is not any more effective at helping participants feel more well-being or need satisfaction than a control group activity. However, those interested in using this intervention should note that previous research did find that this activity was effective at increasing overall need satisfaction and social relatedness (Layous et al., 2013), as well as competence and autonomy (Mangan, *in press)*. Thus, it may be that the instructions used in previous studies are more effective at improving outcomes. Practitioners and other researchers interested in this activity should use previous iterations of the activity's instructions.

Control. As discussed, the control activity did not have the intended effect. The aim was to select an activity that was not emotionally charged and that would not influence participants' well-being or their psychological need satisfaction. However, this activity appears to have contributed, albeit in a non-significant way, to increases in well-being. Participants in this activity demonstrated smaller increases in well-being and psychological needs than participants in the experimental conditions; however, they did demonstrate consistent increases. In other words, the act of writing down one's daily activities may serve as a type of minimally effective positive psychological intervention for emerging adults. This activity did not influence the purely emotional aspect of well-being, that is, positive and negative affect, but it did significantly increase life satisfaction scores. Although not significant, scores for participants in this condition showed increases from pre- to post-test in overall need satisfaction and autonomy. It is not entirely clear why this activity led to increases in some indicators of well-being, but future

researchers should consider testing this activity against a less influential control activity to ascertain its true effectiveness. As this control activity was not tested against an additional control activity in this study, no real conclusions about its effectiveness can be drawn. As such, the results of this study would not yet recommend use of this activity for improving either well-being or need satisfaction. The limitations of the control group, among other limitations, are discussed below.

Limitations

Like all studies, this one is not without its limitations. The first shortcoming was the control group. Control group participants were asked to recall the events of their day, omitting emotions, feelings, and opinions about these events. To rule out potential placebo-based increases in well-being, participants in control and experimental conditions were told that completing the activity may influence their well-being. Recounting the activities in one's day represents a common control group activity (Layous et al., 2013; Lyubomirsky et al., 2011; Nelson et al., 2014), and this placebo-type comparison group is considered methodologically sound (Sin & Lyubomirsky, 2009). Contrary to results from previous literature (Layous et al., 2013; Lyubomirsky et al., 2011; Nelson et al., 2014), participants in the control group reported increases in well-being or need satisfaction as a result of the intervention, which makes the success of the control group activity strange. The most obvious explanation would be the placebo effect; participants expected that completing the activity would increase their well-being, so they reported that it did. However, given that this control group activity along with a statement about its likely effectiveness in increasing well-being has been used in more than 25 positive psychological intervention studies (Sin & Lyubormisky, 2009; Bolier et al., 2013), it would not

make sense for the placebo effect to have had such a big impact on well-being in this particular study. Instead, other factors are worth considering for future studies.

For instance, another explanation for the control group changes in well-being and need satisfaction may be attributable to the way well-being was measured. The present study measured well-being with both cognitive (life satisfaction) and emotional indicators (positive and negative affect). In similar studies that have used this same control group activity and a similar statement of likely effectiveness, well-being was only measured by positive affect (Layous et al., 2013) or by a combination of positive and negative affect (Nelson et al., 2014; Nelson et al., 2015; Linley et al., 2010). It may be that while this type of control group activity does not impact the emotional component of well-being, it does impact the cognitive component of life satisfaction. The results of this study are consistent with this possibility. It makes sense that reflecting on one's daily activities in an unemotional way would impact cognitive (but not emotional or affective) dimensions of well-being.

Yet another related explanation may have to do with the study sample. Though the activity was not designed to promote meaningful reflection, qualitative responses suggest it did. In particular, responses here suggest the activity encouraged control participants to reflect on their emerging sense of identity. Identity reflection has been found to help participants feel more aware of their most important goals and relationships (Cheavens, Feldman, Gum, Scott, & Snyder, 2006; Layous et al., 2013; Pavey, Greitemeyer, & Sparks, 2011). Participants also – unprompted – reflected on their future actions and plans. When recounting exactly what their daily tasks included, many made the leap to thinking about what that meant for their longer-term actions and how they could improve their lives. In this way, this activity may have encouraged emerging adults, who are already predisposed to reflect on their identity, to do so more than it

prompted adults, who are less inclined to reflect on who they are or what they want to do with their lives, and this may help explain why this activity led to unexpected changes in well-being and need satisfaction among the emerging adult sample.

Another limitation of this study is that it was likely underpowered. The power analysis used to determine the sample size for this study was based on earlier research, which suggested that positive psychological interventions are likely to have small to medium effect sizes (Sin & Lyubomirsky, 2009). However, research that came out since this study was conducted suggests most positive psychological interventions have a somewhat smaller effect that previously expected (Hendriks, Schotanus-Dijkstra, Hassankhan, Jong, & Bohlmeijer, 2019). To detect positive psychology intervention effects with appropriate power, this more recent research suggests a sample size of at least 202 participants per group would have been needed for a typical effect size of d=.28; the present study included only 60-75 participants per condition (Curry, Rowland, Lissa, Zlotowitz, McAlaney, & Whitehouse, 2018). While some conditions did have enough power to detect significant changes, different intervention activities had different effect sizes, so some conditions may have been more impacted by sample size restrictions than others.

Yet another limitation of the present study is that the instructions for these activities were modified, and these modifications were not evaluated before they were tested. This is common practice among positive psychology interventions, as there has been little consistency in the exact instructions, duration, or dosage of each intervention from study to study (Sin & Lyubomirsky, 2009). As such, there is presently no true standard version of any of these interventions, and this study showcased yet another iteration of each intervention. More specifically, the positive psychology interventions used in this study were modified to enhance

each aspect of psychological need satisfaction, including competence, autonomy, and social relatedness. They were also modified for emerging adults and to reflect effective intervention design practices (i.e. they were modified to include autonomy support and peer testimonials). Though these modifications were relatively minor, previous research indicates that altering interventions can significantly influence the study results (Layous et al., 2013). Ideally, these modified activities would have been tested against the original, validated versions before being included in this study. Future research should test modified activities against the original validated versions to gauge how this may alter outcomes. That said, it should be noted that positive psychology activities are often modified, and the possible effects of these varied versions are often not discussed (Layous et al., 2013). This issue brings to light a larger call for standardization within positive psychology interventions. Both the activities and the instructions should be standardized, and deviations should be clearly spelled out in resulting write-ups.

Another limitation in this study concerns the calculation of balanced need satisfaction scores. As balanced need satisfaction was calculated using regression analysis, it is not possible to know if the balance score and total score are independent of each other. As such, if a participant had high scores on all needs, their score would not be unbalanced; this effect cannot be discerned from these analyses. As such, the results of this study indicate that there is a discrepancy, but do not make it clear where that discrepancy is. Future studies should consider using Latent Profile Analysis to gain further insight into balance scores; specifically, future studies can study all three needs to examine if there are characteristic ways that participants score on all three needs, and if these characteristic profiles change after participating in positive psychology interventions.

A final limitation in this study is that these modified activities all followed the same pattern for need satisfaction: first, participants received an activity focused on relatedness, then competence, then autonomy, then overall need satisfaction. Due to this consistent ordering of activity type, this study did not take ordering effects into account. As such, it is possible that the order of activities – i.e. because all participants were primed for relatedness first – may have impacted their experience in the study (Couper, Kapteyn, Schonlau, & Winter, 2007; McFarland, 1981). Future studies should counterbalance the order of each type of activity to account for ordering effects.

Future Directions

This study suggests several future directions for research. For instance, a close review of the positive psychological intervention literature reveals conceptual obscurity around well-being. While all positive psychology interventions generally intend to impact some aspect of well-being, the components targeted vary widely. Some studies may only target the emotional components of hedonic well-being (positive affect and/or negative affect), others may consider cognitive aspects of well-being such as life satisfaction, and still others may use eudaimonic outcomes, such as purpose or meaning in life, to measure well-being. While both eudaimonic and hedonic aspects of well-being may be important to measure, both can be measured in a variety of ways, and these different approaches are likely to influence the outcomes. For example, as seen in this study, the control activity impacted life satisfaction, but not positive or negative affect. If, in this study, only positive affect had been used as the well-being variable, results would have been null, and if only used life satisfaction had been used as the well-being variable, results would have been positive. With this in mind, it may make sense to administer

multiple well-being outcome variables to gain a clearer sense of the particular dimensions of well-being the intervention shapes.

Additionally, in this study we found no significant age differences among emerging adults. Thus an emerging adult between 18-22 and one between 25-30 years old did not seem to differ on outcomes in this sample. As emerging adulthood continues to change and shift, future researchers should continue to investigate the potential age differences in this sample. Additionally, the sample size in this study was too low to adequately evaluate differences between different ethnicities. Future studies should ensure a larger sample size for different ethnic and cultural backgrounds to add richer information to our understanding of for whom these interventions work best.

Future positive psychological intervention research should also carefully consider control group activities. Previous research on positive psychology interventions indicates that the type of control group activity used can be a potential moderator (Sin & Lyubomirsky, 2009). For instance, researchers looked at control group conditions in a meta-analysis of 39 positive intervention studies, which included 6,139 participants. They found that the type of control group appeared to be a methodological moderator for positive interventions. For instance, studies that used a no-treatment (e.g. waitlist control, measurement-only) control group had the greatest gains in well-being, followed by studies that compared experimental groups to "treatment as usual" groups (e.g. standard therapeutic practices). The smallest increases in well-being were observed by experimental participants who were compared to neutral (e.g. writing about one's daily activities) or placebo type (e.g. writing about one's daily activities AND being told it will influence the participant's well-being) control groups. The reason for this hierarchy of

comparison group effects is not well understood, but it should be investigated further, and at a minimum, future studies should pilot test their control group activities prior to use.

Additionally, future researchers investigating these activities should consider including additional age groups so that the effects of these interventions can be directly compared between these demographic groups. It may be that some activities were more or less effective not only due to issues involving control groups, measurement, and sample size, but also due to the unique characteristics of emerging adults. Researchers should consider more exploratory studies that include all age groups and probe more deeply into why and how each activity is impacting autonomy, competence, and social relatedness for each age group.

Lastly, recent intervention studies have highlighted important elements of intervention design that should be investigated further. For instance, while many studies may use a standard two, four, or six-week dosage schedule, few studies have investigated the ideal dosage for any given intervention (Mangan, *under review*). Similarly, recent research indicate that, much like physical fitness, variety is key when engaging in well-being activities (Etkin & Mogilner, 2016). Doing the same activity four times in a row, for instance, may not be as effective as doing four different activities that all target well-being in slightly different ways. Another key point around intervention design highlights the diversity among participants. This study featured emerging adults, but of course, emerging adults are not a homogenous group. Finding a good fit between the person completing the activity and the type of activity influences the effectiveness of the intervention (Lyubomirsky & Layous, 2013). In the case of this study, personalization might be possible by first having participants take a psychological need satisfaction test to see where they rate on autonomy, competence, and relatedness and if they currently have a balanced need satisfaction score. If a participant scores high on both autonomy and competence, for instance,

but low on relatedness, the participant could be guided towards activities that boost relatedness. In short, researchers interested in creating effective positive psychological interventions have more work to do, especially around intervention design, including intervention activity timing, variety, and individualization.

Conclusion

The purpose of this study was to investigate how, and in what ways, positive psychology interventions modified for emerging adults could best impact need satisfaction and well-being. As positive psychology interventions have never been designed or modified specifically for emerging adult populations, this study adds valuable information not only about positive interventions but also about their use and effectiveness with emerging adult populations. Additionally, of the few studies that have tested the effects of positive psychological interventions on need satisfaction, most have only reported an overall score for psychological need satisfaction, as opposed to reporting scores for each component of the construct. Looking at the individual scores yields information that enables researchers to understand which interventions target the satisfaction of which psychological needs.

The other purpose of this study was to test, for the first time, new positive psychology interventions designed specifically for emerging adults, in the hopes of discovering interventions that could enhance both overall well-being and need satisfaction in this population. Given that many emerging adults report low levels of well-being, this is an important aim (Mackenzie et al., 2018). The results of this study failed to replicate previous studies, indicating that positive psychology interventions may not have the potential to increase well-being indirectly by increasing need satisfaction directly. Instead, future researchers looking to improve well-being in emerging adulthood may want to focus on interventions that either increase well-being more

directly, or influence well-being through a pathway other than need satisfaction. Additionally, this study failed to replicate the importance of balanced need satisfaction score on well-being. Thus, the results of this study do not support that balanced need satisfaction scores significantly add to well-being in emerging adults. Thus, the balance of needs in emerging adulthood does not appear to influence well-being, indicating that emerging adults who want to increase their need satisfaction can do so by increasing any (or all) needs, in unequal proportions.

Additionally, this study contributed information on which individual needs and well-being outcomes improved over time. Specifically, to enhance the satisfaction of individual psychological needs, including autonomy, competence, and social relatedness, the acts of kindness exercise was the most effective. The self-affirmation activity was also effective at increasing competence and overall well-being. The other activities in this study – including character strengths, the best possible selves, and even the daily-task control group showed improvements over time but not compared to a control group; these should be considered for future development and testing. However, because there were no significant differences between any of the conditions over time, it is equally likely that these activities simply did not improve well-being, at least any better than the control group did. Though there were improvements over time, this lack of separation from the control group signifies a serious possibility that these activities are simply not effective; or, at a minimum, not effective in their current, modified form that was not tested before use in this study. In the end, this study offers researchers limited insight on which activities increase emerging adults' well-being and need satisfaction related outcomes over time (but not in comparison to a control group). This study represents the first step in designing positive psychology interventions for emerging adults.

References

Aickin, M., & Gensler, H. (1996). Adjusting for multiple testing when reporting research results: the Bonferroni vs Holm methods. *American journal of public health*, *86*(5), 726-728.

Arnett, J. J. (2007). Emerging adulthood: What is it, and what is it good for? *Child Development Perspectives*, *1*(2), 68-73.

Arnett, J. J., Kloep, M., Hendry, L. B., & Tanner, J. L. (2011). *Debating emerging adulthood: Stage or process?*. Oxford University Press.

Baltes, P. B., Lindenberger, U., & Staudinger, U. M. (2007). Life span theory in developmental psychology. *Handbook of child psychology*, *1*.

Barak, A., & Grohol, J. M. (2011). Current and future trends in internet-supported mental health interventions. *Journal of Technology in Human Services*, *29*(3), 155-196.

Bolier, L., Haverman, M., Westerhof, G. J., Riper, H., Smit, F., & Bohlmeijer, E. (2013). Positive psychology interventions: a meta-analysis of randomized controlled studies. *BMC Public Health*, *13*(1), 119-139.

Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Amazon's Mechanical Turk: A new source of inexpensive, yet high-quality, data? *Perspectives on Psychological Science*, *6*(1), 3-5.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.

Côté, J. E. (2000). *Arrested adulthood: The changing nature of maturity and identity*. NYU Press.

Côté, J. E. (2006). Emerging adulthood as an institutionalized moratorium: risks and benefits to identity formation. In J.J. Arnett, J.L. Tanner (Eds.), *Emerging adults in America:*

Coming of age in the 21st century (pp. 85-116). Washington, DC: American Psychological Association

Côté, J. E. (2014). The dangerous myth of emerging adulthood: An evidence-based critique of a flawed developmental theory. *Applied Developmental Science*, *18*(4), 177-188.

Couper, M. P., Kapteyn, A., Schonlau, M., & Winter, J. (2007). Noncoverage and nonresponse in an Internet survey. Social Science Research, 36, 131–148.

Curry, O. S., Rowland, L. A., Van Lissa, C. J., Zlotowitz, S., McAlaney, J., & Whitehouse, H. (2018). Happy to help? A systematic review and meta-analysis of the effects of performing acts of kindness on the well-being of the actor. *Journal of Experimental Social Psychology*, *76*, 320-329.

Deci, E. L., & Ryan, R. M. (2000). The" what" and" why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*(4), 227-268.

Deci, E. L., & Ryan, R. M. (2011). Self-determination theory. In P.A.M Van Lange, W.W. Kruglanski, E.T. Higgins (Eds.). *Handbook of theories of social psychology* (pp. 416-437). United States of America: Sage Publications, Inc.

Diener, E. D., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, *49*(1), 71-75.

Disabato, D. J., Goodman, F. R., Kashdan, T. B., Short, J. L., & Jarden, A. (2015). Different Types of Well-Being?: A Cross-Cultural Examination of Hedonic and Eudaimonic Well-Being. *Psychological assessment*, 28(5), 471-482.

Etkin, J., & Mogilner, C. (2016). Does variety among activities increase happiness?. *Journal of Consumer Research*, *43*(2), 210-229.

Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist*, *56*(3), 218-226.

Fredrickson, B. L. (2004). The broaden-and-build theory of positive emotions. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *359*(1449), 1367-1377.

Fredrickson, B. L., & Joiner, T. (2002). Positive emotions trigger upward spirals toward emotional well-being. *Psychological Science*, *13*(2), 172-175.

Ge, X., Conger, R. D., & Elder Jr, G. H. (2001). The relation between puberty and psychological distress in adolescent boys. *Journal of Research on Adolescence*, *11*(1), 49-70.

Hendriks, T., Schotanus-Dijkstra, M., Hassankhan, A., de Jong, J., & Bohlmeijer, E. (2019). The efficacy of multi-component positive psychology interventions: A systematic review and meta-analysis of randomized controlled trials. *Journal of happiness studies*, 1-34.

Kahneman, D., Diener, E., & Schwarz, N. (Eds.). (1999). *Well-being: Foundations of hedonic psychology*. New York: Russell Sage Foundation.

Karlsen, E., Dybdahl, R., & VittersØ, J. (2006). The possible benefits of difficulty: How stress can increase and decrease subjective well-being. *Scandinavian Journal of Psychology*, *47*(5), 411-417.

Kok, B. E., & Fredrickson, B. L. (2013). Positive emotion: How positive emotions broaden and build. In J.J. Froh, A.C. Parks, J.J. Froh, A.C. Parks (Eds.), *Activities for teaching positive psychology: A guide for instructors* (pp. 61-63). Washington, DC: American Psychological Association

Layous, K., Nelson, S. K., & Lyubomirsky, S. (2013). What is the optimal way to deliver a positive activity intervention? The case of writing about one's best possible selves. *Journal of Happiness Studies*, *14*(2), 635-654.

Lenhart, A., Purcell, K., Smith, A., & Zickuhr, K. (2010). Social Media & Mobile Internet Use among Teens and Young Adults. Millennials. *Pew Internet & American Life Project*. Retrieved from: http://www.pewinternet.org/~/media//Files/Reports/2010/PIP_Social_Media_and_Young_Adults_Report.pdf

Lerner, R. M. (1989). Developmental contextualism and the life-span view of person-context interaction. In *A previous version of this chapter was presented as an Invited Address to the Eighth German Conference on Developmental Psychology, Bern, Switzerland, Sep 13-16, 1987.*. Lawrence Erlbaum Associates, Inc.

Linley, P. A., Nielsen, K. M., Gillett, R., & Biswas-Diener, R. (2010). Using signature strengths in pursuit of goals: Effects on goal progress, need satisfaction, and well-being, and implications for coaching psychologists. *International Coaching Psychology Review*, *5*(1), 6-15.

Lyubomirsky, S., Dickerhoof, R., Boehm, J. K., & Sheldon, K. M. (2011). Becoming happier takes both a will and a proper way: An experimental longitudinal intervention to boost well-being. *Emotion*, *11*(2), 391-402.

Lyubomirsky, S., King, L., & Diener, E. (2005). The benefits of frequent positive affect: does happiness lead to success?. *Psychological Bulletin*, *131*(6), 803-855.

Lyubomirsky, S., & Layous, K. (2013). How do simple positive activities increase well-being?. *Current directions in psychological science*, *22*(1), 57-62.

Lyubomirsky, S., Tkach, C., & Sheldon, K. M. (2004). Pursuing sustained happiness through random acts of kindness and counting one's blessings: Tests of two six-week interventions. *Unpublished raw data*.

Mackenzie, C. S., Karaoylas, E. C., & Starzyk, K. B. (2018). Lifespan differences in a self determination theory model of eudaimonia: A cross-sectional survey of younger, middle-aged, and older adults. *Journal of Happiness Studies*, *19*(8), 2465-2487.

Mangan, S. *(in press). What is the best way to administer Best Possible Selves?: Activity frequency and goal completion in emerging adults.* Manuscript conditionally accepted at the Journal of Positive Psychology.

McFarland, S. G. (1981). Effects of question order on survey responses. *Public Opinion Quarterly*, *45*(2), 208-215.

Nelson, S. K., Della Porta, M. D., Jacobs Bao, K., Lee, H. C., Choi, I., & Lyubomirsky, S. (2015). 'It's up to you': Experimentally manipulated autonomy support for prosocial behavior improves well-being in two cultures over six weeks. *The Journal of Positive Psychology*, *10*(5), 463-476.

Nelson, S. K., Fuller, J. A., Choi, I., & Lyubomirsky, S. (2014). Beyond self-protection: Self-affirmation benefits hedonic and eudaimonic well-being. *Personality and Social Psychology Bulletin*, *40*(8), 998-1011.

Olejnik, S., Li, J., Supattathum, S., & Huberty, C. J. (1997). Multiple testing and statistical power with modified Bonferroni procedures. *Journal of educational and behavioral statistics*, *22*(4), 389-406.

Ouweneel, E., Le Blanc, P. M., & Schaufeli, W. B. (2013). Do-it-yourself: An online positive psychology intervention to promote positive emotions, self-efficacy, and engagement at work. *Career Development International*, *18*(2), 173-195.

Padilla-Walker, L. M., & Nelson, L. J. (Eds.). (2017). *Flourishing in Emerging Adulthood: Positive Development During the Third Decade of Life*. Oxford University Press.

Park, N., & Peterson, C. (2009). Character strengths: Research and practice. *Journal of College and Character*, *10*(4), 1-10.

Peterson, C., & Seligman, M. E. (2004). *Character strengths and virtues: A handbook and classification*. Oxford University Press.

Pratt, M. W., Hunsberger, B., Pancer, S. M., Alisat, S., Bowers, C., Mackey, K… & Thomas, N. (2000). Facilitating the transition to university: Evaluation of a social support discussion intervention program. *Journal of College and Student Development*, *41(*5), 427-441.

Proyer, R. T., Wellenzohn, S., Gander, F., & Ruch, W. (2015). Toward a better understanding of what makes positive psychology interventions work: Predicting happiness and depression from the person× intervention fit in a follow-up after 3.5 years. *Applied Psychology: Health and Well-Being*, *7*(1), 108-128.

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

Ryff, C. D., & Singer, B. (2000). Interpersonal flourishing: A positive health agenda for the new millennium. *Personality and Social Psychology Review*, *4*(1), 30-44.

Schwartz, B. (2004, January). The paradox of choice: Why more is less. New York: Ecco.

Seligman, M. E. (2004). *Authentic happiness: Using the new positive psychology to realize your potential for lasting fulfillment*. New York: Free Press

Sheldon, K. M., & Lyubomirsky, S. (2006). Achieving sustainable gains in happiness: Change your actions, not your circumstances. *Journal of Happiness Studies*, *7*(1), 55-86.

Sheldon, K. M., & Niemiec, C. P. (2006). It's not just the amount that counts: balanced need satisfaction also affects well-being. *Journal of Personality and Social Psychology*, *91*(2), 331-341.

Shilts, M. K., Horowitz, M., & Townsend, M. S. (2004). An innovative approach to goal setting for adolescents: guided goal setting. *Journal of Nutrition Education and Behavior*, *36*, 155-156.

Sin, N. L., & Lyubomirsky, S. (2009). Enhancing well-being and alleviating depressive symptoms with positive psychology interventions: A practice-friendly meta-analysis. *Journal of Clinical Psychology*, *65*(5), 467-487.

Smith, C., Christoffersen, K., Davidson, H., & Herzog, P. S. (2011). *Lost in transition: The dark side of emerging adulthood*. New York: Oxford University Press.

Tanner, J. L., & Arnett, J. J. (2016). The emergence of emerging adulthood: The new life stage between adolescence and young adulthood. In *Routledge Handbook of Youth and Young Adulthood* (pp. 50-56). Routledge.

Twenge, J. M., Zhang, L., & Im, C. (2004). It's beyond my control: A cross-temporal meta-analysis of increasing externality in locus of control, 1960–2002. *Personality and Social Psychology Review, 8*(3)*,* 308–319.

Vella-Brodrick, D. A. (2013). Positive psychology interventions: Research evidence, practical utility, and future steps. In C.L.M Keyes (Ed.), *Mental well-being: International contributions to the study of positive mental health*, 331-353.

Waterman, E. A., Wesche, R., Leavitt, C. E., Jones, D. E., & Lefkowitz, E. S. (2017). Long-Distance Dating Relationships, Relationship Dissolution, and College Adjustment. *Emerging Adulthood*, *5(*4), 268-279.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: the PANAS scales. *Journal of Personality and Social Psychology*, *54*(6), 1063-1070.

Wood, N. T., Solomon, M. R., & Allan, D. (2008). Welcome to the matrix: E-learning gets a Second Life. *Marketing Education Review*, *18*(2), 47-53.

Appendices - Table of Contents

Appendix A. Intervention Activity Materials

Activity session 1 was embedded in the initial pretest (link in Appendix C). Full links to activity session 2-4 available here:

1. Random Acts of Kindness:
    i. https://cgu.co1.qualtrics.com/jfe/form/SV_9vsShOtXTfdH2QZ
    ii. https://cgu.co1.qualtrics.com/jfe/form/SV_7U1iVDCXdtmBWuN
    iii. https://cgu.co1.qualtrics.com/jfe/form/SV_a9I4bUh11Lyc4Jv
2. Self-affirmations:
    i. https://cgu.co1.qualtrics.com/jfe/form/SV_eFZXmShXMNVWRnL
    ii. https://cgu.co1.qualtrics.com/jfe/form/SV_2iBAhr0kHENRuJL
    iii. https://cgu.co1.qualtrics.com/jfe/form/SV_dnYU04VMDCF6Ejr
3. Character Strengths:
    i. https://cgu.co1.qualtrics.com/jfe/form/SV_bNQyluKNGu1h7IF
    ii. https://cgu.co1.qualtrics.com/jfe/form/SV_7UPIhRMugF0FV0V
    iii. https://cgu.co1.qualtrics.com/jfe/form/SV_b2TfBhY2Taa4YjH
4. Best Possible Selves:
    i. https://cgu.co1.qualtrics.com/jfe/form/SV_1MoqLffssmTieP3
    ii. https://cgu.co1.qualtrics.com/jfe/form/SV_4IW2aNY0ifX8lKJ
    iii. https://cgu.co1.qualtrics.com/jfe/form/SV_5gN77n42xWRJ1MF
5. Control Activity:
    i. https://cgu.co1.qualtrics.com/jfe/form/SV_bQKRC6IhJYhsPmB
    ii. https://cgu.co1.qualtrics.com/jfe/form/SV_4JzU4k8vTtY2XPv
    iii. https://cgu.co1.qualtrics.com/jfe/form/SV_9EygWzh7yxFNuq9

Instructions and materials for all interventions are briefly described below. To view each activity set in full, follow the associated link given for each activity.

Activity 1. Random Acts of Kindness.

Participants were given instructions on how to commit random acts of kindness, and then reported back on what they did each session. These instructions were modified slightly from the original study (Nelson et al., 2014) to emphasize need satisfaction. Because it was expected that participants would spend time completing these acts outside of the activity session, the session itself was kept as short as possible. An example of these instructions are below:

> "Welcome to your second activity session! In today's session, you'll be reflecting on the 5 acts of kindness you completed since the past activity session. Remember - you should have completed ALL FIVE acts in one day! Each act could be different, but you should have completed 5 total acts.
>
> Below, please tell us:
>
> 1. What you decided to do for each of your five acts
> 2. How did completing these acts make you feel?
>
> That's it, you're all set for today's activity! Each session we'll ask you to answer a few quick questions - most of your time for this activity is spent completing your acts! So please take a moment now to think about what acts you'll complete before next session. For example, maybe today you'll decide to send five people you love compliments via text - something you don't normally do. And maybe in two days you'll decide to bring soup to a sick friend, grab

surprise coffee for a coworker, help someone in your dorm bring groceries in - any combination of 5 acts that make sense in YOUR life! Think about another set of 5 acts you could do, and please write them below: _____. Then be sure to complete 5 acts of kindness in 1 day before next session."

Activity 2. Signature Strengths.

In this activity, participants spent session 1 taking the VIA in-action survey and discovering what their top five strengths are. Following this, in each session participants will be asked to use their top five strengths in a new way. Instructions were modified from previous research (Proyer, Wellenzohn, Gander, & Ruch, 2015). An example of the activity for relatedness is below:

> "Now, let's dive in! For the next 3 sessions, we're going to use your character strengths to focus on goals you may have. We'll also have a theme for each week - we'll ask you to set a goal in a specific area of your life and complete it. The exact goal you choose is completely up to you!
>
> This week's theme is "friends, family & loved ones." Please take a moment to think of a goal you may have that could help strengthen your relationships with a friend, family member, or loved one. Make sure whatever your goal is, that it's something you could complete before the next activity session. It can be super easy and small!
>
> Here are a two examples of goals people have made in the past that might help give you some ideas:

- Friend goal: "I'm not good at telling my friends how I feel. So one goal I could do before the next session would be to just text my best friend and tell her that I really appreciate all the advice and stuff she gives me."
- Family goal: "My dad drives me INSANE. So sometimes I avoid his phone calls because I know he's just going to tell me another story about his dogs and....uggghhhh Daaaaaadddd. But I do love him, and he lives far away. So one thing I could do is call him back tomorrow (and hopefully steer the conversation away from dog stories!)

Your goal can be of any kind that you want – just as long as it's something you can really work on before the next activity session. Try to have a specific, clear idea of what it would mean to complete that goal, so that it's easy for you to tell us next time if you achieved it. In the examples above, the participants chose bigger goals (i.e. speaking up for myself) but then found a specific way to track their goal (i.e. picking the lunch spot at work).

What is an idea of a goal - related to friends/family/loved ones - that you think you could complete before the next activity session?

NOW, think about your top 5 character strengths, which you said were ${q://QID208/ChoiceTextEntryValue}

Research shows that when you use your own personal strengths, it can help you achieve your goals more easily! For instance, someone who has the character strength of justice could use their sense of making things fair to suggest "hey, why don't we rotate who

picks lunch each week, so that everyone gets a turn to pick?" Or someone with a character strength of working in teams could find a study buddy to help keep them accountable for reviewing their study notes. Whatever your character strengths may be, try to think of ways you could use at least 2 of them to help you succeed at the goal you chose to complete.

Below write:

1. Character strength 1 (and how could you use this to help you complete your goal?)
2. Character strength 2 (how could you use this to help you complete your goal?)

That's it! Now that you've set your goal, please make sure to use at least ONE of your character strengths to help you complete your goal before our next activity session. For each session we'll have a new theme and ask you to set a new goal using one of your character strengths."

Activity 3. Self-Affirmations.

Participants in the self-affirmation condition were given a list of possible values to choose from each week that emphasize a different aspect need satisfaction (e.g. relationships with friends and family, independence, important skillsets). Participants were instructed to focus on one of their most important values each week, and to write a reflection about why this value is important to them. They were asked to include examples from their own lives that showcased the importance of this value. Below is an example of the activity for competence.

"Welcome to your second activity session! Remember that each activity session, we're going to have you do a simple writing exercise. We'll ask you to pick from a list of

common values people have, like being kind to others or having a strong work ethic. Each session we'll ask you to focus on a different value you have that fits into a specific theme for that session.

This session, we want you to focus on the theme of "Things I'm Good At." We want you to think of skills or talents you feel like you have. This could be something work-related, like "I'm good at accounting" or "I'm good at powerpoint presentations" or something personal, such as "I'm good at reading other people, and knowing what they need" or "I'm good at checking in with my family to make sure everyone's doing ok." Think about some of the things you're good at, and then think of why it is important to you to be good at those things. What do you like about having this skill or talent?

Here's how it works:

Read the following list of common values, thinking about WHY it is important to you to have some of the skills and talents you thought of. Which ones matter most to you? Which do you most naturally use to guide your choices? What do you appreciate about yourself? Pick your top three. If something comes to mind that is not on this list, but fits the theme, write it down! You are absolutely welcome to make up your own value (as long as it relates to things you're good at).

Here are a list of possible values that relate to things you're good at. Please try to pick a new value each week – avoid using values you've used before. Like we said, if you have

another value that relates to this theme please feel free to add that and use it instead! What you pick should feel like it truly matters to you.

You do not need to use one of the values below. What you pick should feel like it truly matters to you.

Example of values previous participants have chosen:

Confidence

Career Growth

Community

Competence

Creativity

Harmony

Independence

Leadership

Personal Growth

Resourcefulness

Life Skills

Self-pride

Wisdom

Work ethic

List 3 possible values you may want to write about (remember, try to pick 1 word or a short phrase):

Now, choose ONE of your top values and write about it for about 5 minutes. This is the last part of your activity! The exact style you write in is totally up to you – you can write an essay, compose some poetry, make a bullet point list – however you prefer to get out your thoughts and ideas! And remember, no one outside the research team will see what you write. When we look, we only want to see that you took the assignment seriously – your grammar, prose style, etc. is completely up to you! Just be sure to answer each of the 3 questions below.

Choose your value word/phrase and then describe:

1. What this value means, in your own words
2. Why this value is important to you, and
3. A time in your life when you had the opportunity to really express this value."

Activity 4. Best Possible Selves.

There are two components of the BPS condition, which take approximately 10 minutes in total to complete. All activity instructions were adapted from the prompts created by Layous et. al (2013). In part I, emerging adults are asked to think about their best possible selves in the future for five minutes, using four prompts. The exact wording of the prompt changed with each new activity to emphasize autonomy, relatedness, and competence. For example, below is the prompt for competence:

> "Today, take a moment to think about your hobbies, skills, and talents. Imagine that everything in your life has gone as well as it possibly could – you are the absolute best at whatever hobby or skill you would like to have – whether it's writing poetry, singing, playing basketball, being a good husband, becoming a lawyer, etc. You have worked hard and succeeded at having this hobby or skill in your life in exactly the ways you want it. Think of this as the realization of the best possible outcome that could happen relating to this hobby or skill. Take a moment to picture this in your mind in as much detail as possible.
>
> Now, for the next 5 minutes, please write continuously about what you imagined. When writing, be as creative and imaginative as you desire. Use whatever writing style you please, but remember to imagine your ideal life in the FUTURE (say, the next 10 years). Don't worry about perfect spelling or grammar and use as much detail as you want. Go for it!"

Second, emerging adults will be asked to write about the specific goals that could bridge the gap between where they are now and their best possible future for approximately three minutes. An example of the instructions for the competence activity session are below:

> "Awesome! Now, for part II of this activity, please write down a goal (or goals) you think you could reach that will help you achieve the best possible future future that you just described.

Remember, sometimes long-term goals, like how we might use our skills and talents, seem completely overwhelming or out of your reach. Think about taking baby steps towards your long-term goal(s). A baby step could be as simple as proactively seeking information you need, like looking up how much guitar lessons cost or trying to find a writer's group in your area. A baby step can be any small action that helps you work towards the future life you wrote about today.

Make sure this baby step(s) is something you feel you can complete before the next activity session. We will ask at your next activity session about whether you were able to reach your goal.

Keeping this in mind, what is a realistic goal that you can meet before the next activity session which will help you towards achieving your best possible future that includes the hobbies, skills, or talents you wrote about?"

Activity 5. Control.

Consistent with control conditions in other positive psychology intervention studies, control group participants were asked to write for 10 minutes total about what they did that day, leaving out emotions, feelings, or opinions (Sheldon & Lyubomirsky, 2007). First, participants completed a life detail prompt for five minutes, as seen below.

"Please take a moment to think about what you did during the last 24 hours. Create a mental outline of what you did during that time, from eating breakfast to going to sleep. For the next ten minutes, please write out these activities in a list format. Be as detail

oriented as possible, but try to leave out emotions, feelings, or opinions that relate to what you did. In other words, focus on listing out the exact tasks and activities you did."

Second, control participants were asked to go more in depth about their day for five minutes. Participants were given the following prompt and asked to write continuously for five minutes.

"You're almost through! Now, please choose one of the activities you listed previously and take a few minutes to write about it in even more detail (i.e. instead of just saying "I went to the grocery store," say "I went to the grocery store to purchase all the ingredients I needed to make tomato soup, including tomatoes, onions, and vegetable stock. Before I left the store, I called my mom to be sure all the ingredients matched our family recipe." Like before, you want to dissect the activity you previously listed into smaller pieces to describe exactly what you did."

Appendix B. Participant Email Correspondences

Participants in all five conditions received six emails over the course of the study, for a total of 30 email messages created for this study. For participants in experimental conditions, four out of six emails contained autonomy support and peer testimonials. Examples of these messages are provided below.

Autonomy Support.

At the beginning of the study, participants received a fake quote from what appears to be another emerging adult who has previously tried the activity that they are participating in. Participants in all experimental conditions received the same prompt in their first study email. This prompt was modified from the one used by researchers in the acts of kindness exercise (Nelson et al., 2015) and went as follows:

> "…Additionally, we've found that people get more out of these activities when they hear from someone who's already taken it. So in each email reminder we'll include a tip from a past participant – we hope it helps! Here's your first tip…"

Each autonomy support message focused on one of three important aspects of autonomy support – providing the participant with a sense of choice, a rationale for the activity, or acknowledging some aspect of study participation (Nelson et al., 2015). The autonomy support messages varied slightly, depending on the intervention condition the participant was in. For example, here is a prompt from the Self-affirmation activity, modified from autonomy support messages used in previous research (Nelson et al., 2015):

> "I think the biggest thing is just like, seriously you can write about whatever is actually important to you. And this isn't a class so like, go nuts. I didn't think I'd get anything out of this but It was actually really helpful to me to think about this stuff in the end."

Peer Testimonials.

The essence of each peer testimonial is that the participant's activity was previously effective, and helped the emerging adult peer feel more autonomous, competent, and/or socially related. These testimonials were modeled off of those used in previous research (Layous et al., 2013), but modified to emphasize language appropriate for emerging adults and the relevant aspect of need satisfaction. An example of a peer testimonial (combined with autonomy support) from the character strength condition is below:

> "Hey! Ok, so they asked me to give you a tip. So I actually used the activities as my own little personal self-growth thing. Like, I had no idea how to cook so I surprised my girlfriend by trying to make dinner once a week (and I used my character strengths, like bravery, to force myself to try dishes that I was NOT confident I could make). And another of my strengths is "sense of meaning" so I'd make sure the dishes I made were meaningful to us. Like I tried to recreate the tapas we had on our first date one week and another week I made her favorite Mexican dish, that kind of thing. But seriously you can do whatever you want! And spend as little or as much time as you feel like. Obviously making a meal took awhile, but I easily could have just like, sent a meaningful text or something easier, which I think I did for one of the sessions. Do whatever suits your life and definitely just make it work for you!"

Debrief.

Dear Study participant,

Thank you again for being a part of the well-being study!! Your participation in this study is complete, and we really REALLY appreciate your time. If you are interested, below are some more details about the study. If you have any questions, you can reply to this email. You may

also be contacted in 1-3 months to invite you to participate in an additional follow-up survey, which is voluntary, and for which you would be offered additional compensation. Thank you again for joining us!

Well-Being Study: Debrief Information

The purpose of this study was to learn more about how simple, online activities can affect your feelings, thoughts, mood, and overall well-being. You were asked to complete scales on your well-being, life satisfaction, emotion regulation, and motivation. By completing this survey you have increased our understanding of how effective different exercises are at improving different aspects of a person's well-being.

While research indicates that simple exercises, like writing about your best possible self (BPS) in the future can increase your well-being and help you create a life that is more fulfilling for you (King, 2001; Layous et al., 2013), it is not yet known which activities are the MOST helpful for young adults (18-30 years old). As a participant, you were either assigned to a) write about your best possible future self, b) complete acts of kindness, c) use your character strengths in new ways, d) complete self-affirmation statements, or e) be in a control group, where you focused on memorization strategies. We expected that all conditions, except the control condition, would improve your overall well-being.

If you were in the control condition and would like to try the well-being activities, or if you were in one of the other conditions and are interested in trying a new activity or continuing to use these types of happiness-boosting exercises on your own, we recommend this website: http://ggia.berkeley.edu/. Feel free to try out any activity that you think might suit you! Just like physical exercise, well-being researchers recommend doing multiple well-being

exercises each week - and variety is key! So feel free to mix it up and find activities that best work for you.

Finally, please note that some deception was used in this study. First, control group participants were lead to believe their activity may boost well-being. To control for the placebo affect, it was necessary that all groups received the same instructions and see the same study advertisements. Additionally, research (Layous et al., 2013) indicates that participants may receive greater benefits from these activities after reading a testimonial from a peer who has previously completed them. Because these activities are so new, we have not yet had time to collect true testimonials from past participants (you were the first to try these in our research lab!) Because of this, the tips and advice you read from past participants were written by young adult researchers who were not official participants in the study. If you have any questions about this, please let us know.

If you would like to receive a copy of the study results, please email us and we will send you our findings once they're available. Remember that all the information you provided will only be reported as a group average, your individual information remains confidential. Additionally, while we do not anticipate that the tasks involved in this study would cause any discomfort, we apologize if taking this survey or participating in this exercise caused any problems. Please feel free to contact us to clarify any remaining concerns you may have or to express comments and questions.

THANK YOU one more time for your participation – we know this study was time intensive. We truly appreciate you taking the valuable time out of your day to help us clarify the best strategies young adults can use to increase their everyday well-being!!! The information you provided was pivotal and we honestly cannot thank you enough.

Best wishes!

Susan Mangan, M.A.
Email: susan.mangan@cgu.edu

Appendix C. Survey Measures

Full surveys can be viewed using the following links:

Pretest: https://cgu.co1.qualtrics.com/jfe/form/SV_7WIoP107OQhsj77

Posttest: https://cgu.co1.qualtrics.com/jfe/form/SV_7ND59MN7u2gCQ1n

Need Satisfaction

Please read each of the following items carefully, thinking about how it relates to your life, and then indicate how true it is for you. Use the following scale to respond, from 1 (not at all true) to 7 (very true).

1. I feel like I am free to decide for myself how to live my life.

2. I really like the people I interact with.

3. Often, I do not feel very competent.

4. I feel pressured in my life.

5. People I know tell me I am good at what I do.

6. I get along with people I come into contact with.

7. I pretty much keep to myself and don't have a lot of social contacts.

8. I generally feel free to express my ideas and opinions.

9. I consider the people I regularly interact with to be my friends.

10. I have been able to learn interesting new skills recently.

11. In my daily life, I frequently have to do what I am told.

12. People in my life care about me.

13. Most days I feel a sense of accomplishment from what I do.

14. People I interact with on a daily basis tend to take my feelings into consideration.

15. In my life I do not get much of a chance to show how capable I am.

16. There are not many people that I am close to.

17. I feel like I can pretty much be myself in my daily situations.

18. The people I interact with regularly do not seem to like me much.

19. I often do not feel very capable.

20. There is not much opportunity for me to decide for myself how to do things in my daily life.

21. People are generally pretty friendly towards me

PANAS

This scale consists of a number of words that describe different feelings and emotions. Read each item and then list the number from the scale below next to each word. Indicate the extent to which you have felt this way over the past week (1-7 scale: Very Slightly or Not at All, A Little, Moderately, Quite a Bit, Extremely).

Positive Emotions:

1. Interested
2. Alert
3. Excited
4. Inspired
5. Strong
6. Determined
7. Attentive
8. Enthusiastic
9. Active
10. Proud

Negative Emotions:

1. Afraid
2. Distress
3. Guilty
4. Scared
5. Upset
6. Hostile
7. Irritable
8. Ashamed
9. Nervous
10. Jittery

Life satisfaction

Below are five statements that you may agree or disagree with. Using the 1 - 7 scale below, indicate your agreement with each item by placing the appropriate number on the line preceding that item. Please be open and honest in your responding. (Strongly disagree – Strongly agree, 7 point scale).

____ In most ways my life is close to my ideal.

____ The conditions of my life are excellent.

____ I am satisfied with my life.

____ So far I have gotten the important things I want in life.

____ If I could live my life over, I would change almost nothing.

Demographics

What is your age? _____

What is your gender?

_____ Female

_____ Male

_____ Other, please specify _____

What is your race/ethnicity? (Please check all that apply.)

_____ Black/African American

_____ Asian/Pacific Islander

_____ White/European American

_____ Middle Eastern/Arab

_____ Latino/Hispanic

_____ American Indian/Alaskan Native

_____ Multiracial

_____ Other

Implementation Fidelity (posttest only)

1. How engaged were you while participating in this activity series?
    a. Not at all engaged
    b. Somewhat engaged
    c. Very engaged
2. How closely do you feel you followed instructions for each activity?
    a. I did not follow instructions most of the time
    b. I followed instructions about 50% of the time
    c. I followed instructions most of the time
3. How much effort do you feel you put in while completing your activities?

a. I put in very little effort

b. I put in a medium amount of effort

c. I put in a lot of effort

4. (Peer testimonial): Did you read the initial quote "xx" before beginning these activities?

    a. Yes, I read the quote

    b. Yes, I partially read the quote/skimmed it

    c. No, I did not read the quote

5. (Peer testimonial): When you read the initial quote "xx" before beginning these activities, how did it make you feel?

    a. It felt good knowing someone else had had success with these activities

    b. It did not affect me to know someone else had completed these activities

    c. Other (please explain):

6. (Autonomy support): Did you read the messages from the student you were paired with?

    a. Yes, I read all the messages

    b. Yes, I read about half the messages

    c. No, I did not read the messages

7. (Autonomy support): How did it make you feel to be paired up with another student during these emails? (open-ended response)

8. (Attention Check): For this question, please select "neutral"

    a. Agree strongly

    b. Agree

    c. Neutral

    d. Disagree

e. Disagree strongly

9. (Implementation of psychological needs) Did “x activity” make you feel more (competent/autonomous/socially related)?
    a. Yes, it made me feel more “x”
    b. No, it did not make me feel more “x”
    c. Follow-up: “Why did it make you/not make you feel “x”?