WHO BENEFITS FROM A SUBJECTIVE WELL-BEING INTERVENTION? THE ROLE OF PERSONALITY, PSYCHOLOGICAL NEEDS, AND IMPLICIT THEORIES.

by

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Abstract

There is a large body of research supporting the significant benefits of subjective well-being (SWB) across several life domains. Not surprisingly, a substantial body of literature followed in developing and investigating effective ways to increase SWB through the implementation of SWB interventions. However, the majority of these interventions primarily use student populations and are often short with little contact. A newly developed SWB intervention (Enduring Happiness and Continued Self-Enhancement [ENHANCE]) was developed to address limitations in previously developed SWB interventions, and to update and expand literature in this area (Kushlev et al., 2017). Initial outcomes of the ENHANCE intervention revealed to be effective in increasing life satisfaction and positive affect and decreasing negative affect for up to six months (Heintzelman et al., 2019; Lutes et al., 2019). While the ENHANCE intervention has begun to demonstrate its effectiveness, the next essential step is to examine for whom it works best. Several individual difference factors have been associated with SWB, specifically, the Big Five personality traits, motivational factors such as psychological need satisfaction (autonomy, relatedness, and competence), and individual beliefs such as implicit theories of well-being (i.e., the degree to which one believes they can change their well-being). The current study investigated whether any of these factors predict the effectiveness of the ENHANCE intervention. Findings showed that while ENHANCE is effective at increasing SWB, specific individual differences, such as higher neuroticism and lower extraversion, predict greater benefits in some areas of SWB, but not others. These findings will inform researchers and practitioners developing and utilizing SWB interventions who share the same goal of maximizing ways to increase SWB among individuals and communities.
Lay Summary

Subjective Well-Being (SWB; frequent positive and less frequent negative emotions and life satisfaction) is associated with substantial benefits across several life domains. Consequently, many SWB interventions have been developed and shown to be effective; however, little is known about how individual factors such as personality, before starting an intervention, predicts the effectiveness of the intervention. The objective of the present study was to examine whether personality, baseline need satisfaction (autonomy, competence, relatedness), and the belief of whether or not one can change their well-being predicts the effectiveness of a newly developed SWB intervention – ENHANCE. The findings revealed that while, on average, everyone benefitted from ENHANCE, individuals higher on neuroticism, lower on extraversion, and low and moderate on baseline life satisfaction received greater benefits. These findings are critical in advancing both practical and theoretical knowledge of who benefits most from a SWB intervention.
Preface

This thesis is original, unpublished, and independent work by the author, Carmela A. White.
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Dedication

My husband and life partner, my friend, and my biggest believer – Dave, this work is dedicated to you - to us.

There are no words that can truly describe the recognition and gratitude you deserve in helping me achieve this goal. You have always believed in me, supported me, encouraged me, and generously dedicated yourself to our commitment to this goal – to the bigger picture.

I will forever be grateful for all of this and so much more. Love you, LAL.
Chapter 1 Introduction

The World Health Organization views health as “…a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity” (WHO, 2015). This perspective on health and well-being emphasizes the inherent importance of subjective well-being (SWB)—which includes the frequent presence of positive affect [PA], the relative absence of negative affect [NA], and perceived life satisfaction (Diener, Suh, Lucas, & Smith, 1999). Longitudinal studies demonstrate that SWB (often referred to simply as “happiness”) positively influences many life domains, including: personal/self, social, workplace, and physical and mental health (e.g., Lyubomirsky, Sheldon, & Schkade, 2005). Moreover, intentional activities and interventions effectively increase happiness in healthy community members, student populations, and in some cases, clinical populations (e.g., Sin & Lyubomirsky, 2009). Little is known, however, about the influence that individual differences and other baseline characteristics have on the effectiveness of SWB interventions. The proposed study will examine whether several individual baseline variables (Big Five personality traits, psychological need satisfaction, and implicit theories of well-being) predict increases in SWB in a recently developed SWB intervention (Enduring Happiness and Continued Self-Enhancement [ENHANCE]).

SWB interventions have ranged in duration from short—involving a single activity—to longer-term and including multiple happiness activities. While a majority of existing literature focuses on relatively brief interventions, a few longer-term programs exist (e.g., 14 Fundamentals for Happiness; Fordyce 1977, 1983; Well-Being Therapy; Fava, Rafanelli, Cazzaro, Conti, & Grandi, 1998; Fava & Ruini, 2003, and Positive Psychotherapy; Seligman, Rashid, & Parks, 2006). In the past decade, the knowledge base concerning SWB has grown
exponentially, resulting in the need for a comprehensive, up-to-date intervention, which is not limited to student or clinical populations. ENHANCE is a 6-month intervention (3-month active intervention, followed by a 3-month maintenance period) that introduces ten evidence-based positive psychology principles and integrated elements of cognitive behavioral therapy to increase SWB (Kushlev et al., 2017). The intervention consists of both intrapersonal and interpersonal skills and happiness principles. It was developed to be the “gold standard” intervention for increasing SWB in healthy community adults with effortful intention of producing lasting changes. The development of ENHANCE was primarily initiated to address limitations within the literature which will be discussed below.

The initial outcomes of ENHANCE, indeed, showed promising results, producing significant increases in life satisfaction and PA, and a significant decrease in NA (Heintzelman et al., 2019) compared to a wait-list control in a community-based population. Further, gains in life satisfaction and PA were found after the active 3-month intervention and at a 3-month follow-up period (6-month total intervention period). Significant decreases in NA were found after the active 3-month intervention; however, these gains were no longer significant at the 3-month follow-up, suggesting a difficulty maintaining gains. This initial study compared two administration formats of ENHANCE: (1) online and (2) in-person (i.e., 2-hour weekly groups). Interestingly, the format of administration did not moderate the effects of any of the primary outcomes (i.e., life satisfaction, PA and NA). In a subsequent modified replication and extension trial, researchers further examined the effectiveness of the ENHANCE intervention (Lutes et al., 2019). In ENHANCE 2.0, which consisted of a similar initial 3-month intervention and a bi-weekly 3-month follow-up intervention, participants produced similar significant gains on the same primary outcomes as the original ENHANCE (ENHANCE 1.0)
study. In this study however, the comparison group was an active intervention: a 3-month Mindfulness-Based Stress Reduction (MBSR) self-help workbook. While there were no significant between-group differences on the primary outcomes, there were significant within-group differences for both groups. The data revealed linear trends for SWB scores for individuals in the ENHANCE group, whereas a quadratic trend was found for some of the SWB measures for individuals in the MBSR group. In other words, while both groups similarly benefitted from their respective interventions, only those in the ENHANCE group maintained, or continued to gain, during the follow-up period.

Although the ENHANCE intervention has demonstrated its effectiveness in increasing SWB, a critical next step is to examine how to tailor the intervention to better suit individual differences and needs. The current study conducted a thorough examination of the ENHANCE intervention by explicitly investigating the role that individual differences and other baseline factors play in its effectiveness in increasing SWB. Specifically, the current study will consider the role of personality (using the Big Five personality traits) as well as baseline psychological need satisfaction and implicit theories of well-being. Not only will these findings increase our understanding of potential factors and variables that may differently impact the effectiveness of the ENHANCE intervention; more globally, this information will also inform future researchers and practitioners developing and utilizing SWB interventions.

1.1 Why is Subjective Well-Being Important?

The reason researchers and practitioners are interested in increasing SWB is because of the many benefits SWB produces for individuals and society at large. A life of happiness and well-being is a global desire (Diener, 2000), associated with significant beneficial life outcomes. Increased happiness and well-being more generally has been associated with
improved physical health (Diener & Chan, 2011; Howell, Kern, & Lyubomirsky, 2007; Veenhoven, 2008); longevity (Diener & Chan, 2011) and decreased risk of mortality (Lamers, Bolier, Westerhof, Smit, & Bohlmeijer, 2012), disease (Cohen, Doyle, Turner, Alper, & Skoner, 2003) and mental illness (Keyes, Dhingra, & Simoes, 2010; Wood & Joseph, 2010), as well as greater coping and resiliency (Fredrickson, 2001; Tugade & Fredrickson, 2004), increased prosocial behaviours (Lyubomirsky et al., 2005), and greater workplace satisfaction, productivity (Boehm & Lyubomirsky, 2009; Keyes & Grzywacz, 2005), and income (e.g., Diener & Seligman, 2002). Individuals who experience more positive emotions specifically, compared to those who experience fewer positive emotions, present with a variety of positive outcomes such as higher self-efficacy, prosocial behavior, gratifying relationships, higher income and work productivity, strengthened immune system, greater physical and mental health, and greater coping and resilience (see Lyubomirsky et al., 2005). Lyubomirsky and colleagues propose that the “…success of happy people rests on two main factors: First, because happy people experience frequent pleasant/positive moods, they have a greater likelihood of working actively toward new goals while experiencing those moods. Second, happy people are in possession of past skills and resources, which they have built over time during previous pleasant moods” (pg., 804). Thus, not only do positive moods assist individuals in striving toward their goals and achievements, they also provide individuals with a repertoire of skills and tools to utilize. Increasing happiness and well-being contributes to many lifelong benefits; consequently, learning ways to increase well-being is of tremendous individual and societal benefit.

1.1.1 How to increase subjective well-being? Having established that SWB is beneficial across nearly all life domains, the next step is to investigate how to foster and
increase it. The ENHANCE intervention was designed to do just that (Kushlev et al., 2017; Heintzelman et al., 2019). It was developed as a ‘gold standard’ SWB intervention that addressed previous limitations in the literature and has several unique strengths. First, ENHANCE is longer in duration and longer interventions have demonstrated increased efficacy in positive psychological interventions (Bolier et al., 2013; Sin & Lyubomirsky, 2009). Second, the ENHANCE intervention incorporates 10 “happiness principles,” avoiding the ‘one size fits all’ approach (Lyubomirsky & Layous, 2013) and increasing the likeliness to accommodate individual desires and subsequently increase engagement and treatment gains (Schueller, 2011). Third, in addition to incorporating a variety of happiness activities, the ENHANCE intervention encourages participants to reflect on new learned skills, perceived benefits, and new opportunities for implementation, all of which follow the Hedonic Adaptation Prevention Model and support sustainable change (Sheldon & Lyubomirsky, 2006a, 2012). Fourth, although the ENHANCE intervention incorporates evidence-based activities, its development was also theoretically driven from multiple approaches (e.g., cognitive-behavioural, psychological need satisfaction, goal attainment) that extends the intervention beyond the perspective of positive psychology alone. Fifth, ENHANCE was initially designed to increase SWB in healthy community adults, as opposed to university students or clinical populations. This was, in part, to help take preventative action on everyday people’s well-being, rather than intervening after problems arise. Finally, ENHANCE facilitates the introduction to each new happiness principle with the intention of developing a new ability or skill over time. Group discussion and assigned ‘homework’ is fostered around different individual perspectives. Accordingly, it is encouraged that each new skill be implemented in such a way that compliments the particular individual’s lifestyle, therefore increasing the utility, development,
and continued use of the skill (ergo, ongoing benefits). In summary, the ENHANCE intervention has several unique strengths that are reflected in its development, implementation, and testing.

Before the development of ENHANCE, there have been significant efforts made to develop SWB interventions, primarily consisting of brief, single happiness activities. Such interventions include best possible self (King, 2001), gratitude visits/journaling (Emmons & McCullough, 2003; Seligman, Steen, Park, & Peterson, 2005), identifying and using signature strengths (Seligman et al., 2005), loving-kindness meditation (Fredrickson, Cohn, Coffery, Pek, & Finkel, 2008), acts of kindness (Lyubomirsky et al., 2005), optimism (Sheldon & Lyubomirsky, 2006b), goal-training (Sheldon, Kasser, Smith, & Share, 2002), and mindfulness-based strength practices (Niemiec, Rashid, & Spinella, 2012). In addition, a handful of more comprehensive interventions have been developed, such as The 14 Fundamentals for Happiness (Fordyce 1977, 1983), Well-Being Therapy (Fava et al., 1998; Fava & Ruini, 2003), Hope Therapy (Cheavens, Feldman, Gum, Michael, & Snyder, 2006), and Positive Psychotherapy (Seligman et al., 2006). These comprehensive interventions, however, were examined either utilizing students and/or clinical populations, or did not test the intervention within a Randomized Controlled Trial (RCT) methodological design.

The plethora of newly developed and tested happiness interventions led researchers to conduct meta-analyses to review the overall effectiveness of such interventions on increasing well-being. Despite inconsistent findings of the size of the effect (ranging from \( r = .10 \) to \( r = .30 \); White, Uttl, & Holder, 2019), meta-analyses have shown that happiness interventions do increase happiness (Bolier et al., 2013; Hendriks, Schotanus-Dijkstra, Hassankhan, de Jong, & Bohlmeijer, 2019; Sin & Lyubomirsky, 2009; White et al., 2019).
1.1.3 Do subjective well-being interventions affect all people equally? Although SWB interventions have been shown to be effective, less is known about whether all individuals benefit equally. For example, the following factors have significant associations with SWB: (a) personality (specifically, the Big Five personality traits of extraversion, neuroticism, conscientiousness, agreeableness, and openness to experience); (b) psychological need satisfaction (autonomy, competence, and relatedness); and (c) implicit theories of well-being (incremental vs. entity beliefs). Therefore, the investigation of these factors on treatment gains of SWB interventions is an essential area of research. Personality traits such as extraversion and neuroticism are consistently correlated with SWB (Steel, Schmidt, & Shultz, 2008); nevertheless, it is unclear whether individuals with either personality trait would benefit the same from a happiness intervention. Similarly, individuals who are satisfied with their basic psychological needs experience higher levels of well-being (Sapmaz, Doğan, Sapmaz, Temizel, Tel, 2012); however, it is unknown whether one’s basic need satisfaction, prior to treatment uptake, predicts treatment gains in a longer-term happiness intervention. While individuals who believe they have control over their well-being (i.e., incremental belief) consistently report higher levels of well-being (Burnette, O’Boyle, VanEpps, Pollack, & Finkel, 2013) these findings do not tell us whether such individuals would benefit more (i.e., they may be more receptive to happiness interventions) or less (i.e., they may experience the impact of a ceiling effect) compared to their peers who do not hold the same beliefs prior to treatment. Last, are varying levels of baseline life satisfaction associated with changes in life satisfaction, positive affect, and negative affect after engaging in a SWB intervention. The current study hopes to elucidate these questions, particularly for the ENHANCE intervention, as findings can help inform future research in tailoring interventions to suit the needs of all individuals.
1.2 Individual Differences in Personality

One important and well-established individual difference that may influence a SWB intervention effectiveness is personality. It is well established that the Big Five personality traits are associated with well-being (e.g., DeNeve & Cooper, 1998; Steel et al., 2008), even after controlling for other individual differences, such as demographic variables (e.g., Diener & Lucas, 2000; Nes, Røysamb, Tambs, Harris, & Reichborn-Kjennerud, 2006). Support of the relationship between well-being and personality has also been identified within genetic research. Specifically, similar genetic structures overlap between areas associated with happiness and personality (Weiss, Bates, & Luciano, 2008); reared apart monozygotic twins report similar levels of SWB—and not significantly less than monozygotic twins who lived together (Tellegen et al., 1988). Patterns of stability exist for both personality (e.g., McCrae & Costa, 1994) and SWB (e.g., Costa, McCrae, & Zonderman, 1987; Magnus & Diener, 1991), whereby personality traits predict life satisfaction four years later, even after controlling for life events (Magnus & Diener, 1991). If personality and SWB are relatively stable, over and above life circumstances (e.g., Diener, Sandvik, Seidlitz, & Diener, 1993; Lucas, 2018; Magnus & Diener, 1991), could personality traits or baseline levels of life satisfaction predict the degree to which individuals benefit from interventions designed to increase SWB? While the relationship between personality (particularly with extraversion and neuroticism) and SWB is clear, the impact each personality trait plays on SWB intervention effectiveness is mixed and, to date, few studies have explored this area.

1.2.1 Extraversion. Extraversion has consistently been found to be positively associated with PA (e.g., DeNeve & Cooper, 1998; Emmons & Diener, 1985) and is one of the strongest predictors of SWB, regardless of which personality measure is used (Steel et al.,
Scoring higher on extraversion produces positive moderating effects on happiness after engaging in a humor-based happiness intervention (Wellenzohn, Proyer, & Ruch, 2018), a gratitude intervention (Schueller, 2012; Senf & Liau, 2013), and a savouring intervention (Schueller, 2012), but these moderating effects did not occur in a strength-based intervention (Senf & Liau, 2013). These findings suggest that when interventions consist of an external focus (i.e., expressing gratitude to someone, or savoring an enjoyable meal with friends) those higher on extraversion may benefit more, but when activities require more of an internal focus (i.e., self-reflection of personal strengths) the benefits may not be as powerful for those same individuals. Accordingly, the ENHANCE intervention consists of both ‘self’ and ‘other’ happiness activities and, therefore, it is unknown if the personality trait of extraversion predicts the intervention’s effectiveness.

More globally, and in settings outside of happiness interventions, there are significant positive associations between extraversion and engaging in ‘wellness’ health behaviours, such as exercising to stay healthy, eating healthier, and taking vitamins (e.g., Booth-Kewley & Vickers, 1994). In therapeutic settings, higher extraversion has been positively associated with stronger therapeutic alliances (Coleman, 2006), and improved outcomes in group therapy (Ogrodniczuk, Piper, Joyce, McCallum, & Rosie, 2003). To this end, higher extraversion is beneficial for enhancing the effects of some happiness interventions, but not others, although research in this area is limited. Additionally, extraversion is positively related to health behaviours and important therapeutic factors. Given that ENHANCE focuses on both internal and external factors that contribute to SWB, one may be less confident on whether those higher in extraversion would benefit more. If consistent positive relationships exist between extraversion and SWB, one may also question how much more room those higher on
extraversion have to improve their SWB. Perhaps these individuals are close to the ‘ceiling’ of their maximum SWB potential. Given that ENHANCE is also administered in a therapeutic way and in a group setting, it may be that those higher on extraversion will experience this added benefit (i.e., being in a social setting) and may benefit more. It is hypothesized that those higher in extraversion will receive greater benefits from engaging in the ENHANCE intervention.

1.2.2 Neuroticism. Neuroticism is consistently correlated with negative affect (e.g., DeNeve & Cooper, 1998; Emmons & Diener, 1985) and, similar to extraversion, is one of the strongest predictors of SWB, regardless of the personality measure used (Steel et al., 2008). Despite the consistency of the negative relationship between neuroticism and SWB, the moderating role neuroticism plays in the effectiveness of SWB interventions is anything but consistent. Individuals low on neuroticism benefitted more from a one-week gratitude or kindness intervention than those individuals high on neuroticism (Ng, 2016). In contrast, when individuals were provided with testimonials of the effectiveness of the best possible self intervention and asked to practice the intervention over three weeks, those high on neuroticism experienced significantly greater happiness at post-intervention assessments, compared to a control group. Moreover, there were no differences on happiness scores between the control group and participants low on neuroticism. In contrast to extraversion, interventions that focus on the self (e.g., best possible self) may produce larger positive effects for those higher on neuroticism, compared to interventions that focus on others (e.g., gratitude and acts of kindness). Consequently, with the variety of happiness activities in the ENHANCE intervention, it is less clear how neuroticism will impact treatment effectiveness for ENHANCE.
When examining health behaviours, higher neuroticism has been negatively associated with engagement in wellness health behaviours (e.g., Booth-Kewley & Vickers, 1994; Sutin et al., 2016), and success in depression treatment in individual (Dermody, Quilty, & Bagby, 2016) and group therapy (Ogrodniczuk et al., 2003). Higher neuroticism is associated with lower psychological functioning pre-treatment (Thalmayer, 2018). While this does not appear favorable for those higher in neuroticism, others argue that the unpleasant and unwanted (e.g., ego-dystonic) feelings associated with neuroticism may increase motivation for change (Widiger & Presnall, 2012), which can be a protective factor towards treatment commitment and gains. Those higher on neuroticism may benefit most from the ENHANCE intervention as their baseline levels of SWB are lower, and therefore they have more room for growth and improvement. Alternatively, it may be hypothesized that because a negative relationship between neuroticism and SWB exists, it may be that those individuals higher in neuroticism (who may also experience feelings of skepticism towards a SWB intervention) will need to put forth more effort while receiving the ENHANCE intervention, and therefore, more time and resources may be required to detect any improvements in SWB. While the ENHANCE intervention may produce improvements in SWB for individuals higher in neuroticism, the gains may be minimal, and perhaps not longstanding.

1.2.3 Conscientiousness. Conscientiousness is positively related to SWB in several studies (e.g., González Gutiérrez et al., 2005; Keyes, Shmotkin, & Ryff, 2002; Steel et al., 2008), but few studies have examined the role of conscientiousness on the effectiveness of SWB interventions. In a gratitude and strength-based happiness intervention, higher conscientiousness did not moderate effectiveness of increasing SWB (Senf & Liau, 2013). When investigating the role of conscientiousness on health behaviours, not surprisingly, higher
conscientiousness was positively associated with favourable health-related behaviours (e.g., diet and activity), and negatively associated with unfavorable health-related behaviours (e.g., tobacco and alcohol use, risky behaviours; Bogg & Roberts, 2004). Higher conscientiousness is positively related to a stronger therapeutic alliance (Coleman, 2006), increased attendance (Miller, Pilkonis, & Mulvey, 2006), more favorable group therapy outcomes (Dermody et al., 2016; Ogrodniczuk et al., 2003), and better medication compliance (Molloy, O’Carroll, & Ferguson, 2014). A degree of conscientiousness may be required to stimulate initial motivation (Bagby, Gralnick, Al-Dajani, & Uliaszek, 2016) and engagement early on (Widiger & Presnall, 2012) and throughout therapy (Samuel, Bucher, & Suzuki, 2018). Accordingly, while there is little evidence about the moderating role conscientiousness has on SWB interventions, I hypothesize that those higher in conscientiousness will benefit more from the ENHANCE program due to adherence, engagement, and commitment to the program and related tasks (i.e., homework).

1.2.4 Agreeableness. In a large-scale meta-analysis, agreeableness was significantly positively correlated with SWB (Steel et al., 2008); however, the relationship tends to be weaker compared to other personality factors (e.g., Diener & Lucas, 2000, González Gutiérrez et al., 2005; McCrae & Costa, 1991). To date, the only study that examined the role of all five personality factors on the effectiveness of a SWB intervention found no moderating effects of agreeableness (Senf & Liau, 2013). In more global health settings, there are significant positive associations between agreeableness and engaging in ‘wellness’ health behaviours, (i.e., exercising to stay healthy, eating healthier, and taking vitamins; Booth-Kewley & Vickers, 1994). In therapeutic settings, higher agreeableness is positively related to a stronger therapeutic alliance (Coleman, 2006). However, there is little to no relationship between
agreeableness and positive outcomes in short-term therapy (Ogrodniczuk et al., 2003). Although associations between agreeableness and SWB exist, there has been very little research examining the role of agreeableness and SWB interventions. Due to the weaker associations between SWB and agreeableness, I hypothesize that agreeableness will have negligible (if any) moderating effects on the effectiveness of the ENHANCE intervention.

1.2.5 Openness to Experience. In a large-scale meta-analysis, Openness to Experience was significantly positively related to various components of SWB, but not all (Steel et al., 2008). Specifically, positive relationships existed between openness and happiness and PA, but not life satisfaction or NA. These findings differed depending on which personality measures were used. This supports the notion that of the Big Five personality factors, openness has demonstrated the weakest associations with SWB (Keyes et al., 2002), and few studies have further examined the moderating role on SWB interventions. Nevertheless, openness favorably moderated the effectiveness of a gratitude intervention, but not a strength-based intervention (Senf & Liau, 2013). When investigating personality and treatment settings, openness has demonstrated positive associations with therapy attendance (Miller et al., 2006), predictive value for successful long-term therapy outcomes (Samuel et al., 2018) and is associated with favorable short-term therapy outcomes (Ogrodniczuk et al., 2003). Little research has examined the moderating role of openness on SWB gains from a SWB intervention; however, higher openness is associated with better treatment outcomes. While those higher on openness may benefit from therapeutic clinical settings and be more open and accepting of a non-traditional intervention (i.e., improving and maximizing positive symptoms as opposed to ameliorating negative symptoms) it is hypothesized that those higher on openness will experience greater
gains from the ENHANCE intervention due to therapy adherence and favorable therapy outcomes.

1.3 Psychological Need Satisfaction

While the Big Five personality traits are arguably the dominant contemporary perspective on individual differences, a second important theory—psychological needs satisfaction—is derived from self-determination theory (SDT). How might striving to meet basic psychological needs predict the effectiveness of SWB interventions? There are motivational states that inherently exist and drive individuals to engage in particular behaviours that lead to satisfying psychological needs, which subsequently lead to feelings of happiness. The theory posits that all humans have innate fundamental psychological needs that must be met to live a thriving and fulfilling life (Deci & Ryan, 2000). Specifically, these psychological needs include autonomy (needing to feel mastery, independence, and self-determined), relatedness (needing to feel belonged and connected with others), and competence (needing to feel able and adequate, while also believing in the ability to improve). Goal pursuit and attainment are influenced by the degree to which individuals can meet and satisfy these psychological needs as they work toward their desired outcome (Deci & Ryan, 2000). “In other words, human needs specify the necessary conditions for psychological health or well-being and their satisfaction is thus hypothesized to be associated with the most effective functioning” (pg. 229). That is, satisfying basic universal psychological needs should be positively associated with well-being.

Psychological need satisfaction is positively associated with SWB and well-being more globally (Reis, Sheldon, Gable, Roscoe, & Ryan, 2000; Sapmaz et al., 2012; Sheldon & Niemiec, 2006; Sheldon, Ryan, & Reis, 1996) and across different domains (Milyavskaya &
Findings from the Gallup World Poll study (including 155 countries from 2005 to 2010) revealed that across world regions, fulfilling a variety of basic needs (i.e., safety, respect, mastery, autonomy) accounted for 10 to 23 percent of variance in SWB (Tay & Diener, 2011). Individuals require a degree of need satisfaction in order to evaluate their life positively; however, need satisfaction alone is not sufficient (Tay & Diener, 2011). That is, other circumstances or experiences also contribute to higher life satisfaction (i.e., interventions). The three SDT psychological needs were more strongly associated with PA and NA and less so with life satisfaction. On a more individual level, daily diary research designs have demonstrated that psychological need satisfaction for all three needs are positively associated with measures of well-being, both at the within-person and between-person levels (Reis et al., 2000). Additionally, there is a positive relationship between need satisfaction and well-being in the workplace, whereby employees report higher self-esteem, greater overall health (Ilardi, Leone, Kasser, & Ryan, 1993), higher vitality (Baard, Deci, & Ryan, 2004), and positive job-related affect (Kamel & Hashish, 2015) when their psychological needs are met. While there is evidence supporting the relationship between need satisfaction and SWB, it is essential to determine whether need satisfaction contributes to changes in SWB. Does one require a certain degree of need satisfaction in order to benefit from a SWB intervention? Answering such questions will help inform whether prior levels of need satisfaction is associated with individual readiness and motivation to engage in, and consequently benefit from, a SWB intervention. Findings will also inform future modifications to SWB interventions while accounting for psychological need satisfaction.

1.3.1 Autonomy. Satisfying autonomy needs mediated the relationship between engaging in a gratitude and optimism intervention and an increase in SWB (Lyubomirsky et al.,
as cited in Sheldon et al., 2010). Additionally, participants who were instructed to engage in goals to increase their feelings of autonomy showed a greater increase in well-being than a comparison group that were instructed to set goals around positively changing ‘some life circumstance’ (Sheldon et al., 2010). While the literature is sparse, there is some evidence of the influence of the need satisfaction of autonomy and successfulness of SWB interventions, both as a moderating and mediating variable. When examining therapy engagement more generally, according to SDT theory, individuals who are experiencing feelings of autonomy in their motivation to engage in therapy will gain greater favorable outcomes (Ryan & Deci, 2008). Moreover, when individuals attribute behavioural change and treatment gains to their own internal locus of control, their gains are more likely to remain sustainable long-term (Ryan & Deci, 2008; Williams, Grow, Freedman, Ryan, & Deci, 1996). The more autonomously driven an individual feels about entering therapy, the more satisfied they feel about therapy, the more committed they are to the process, and the more satisfied they feel with their life (Pelletier, Tuson, & Haddad, 1997). Further, therapeutic contexts that foster autonomy, self-learning, and discovery are related to better engagement and therapy outcomes (e.g., Williams et al., 2006; Zuroff et al., 2007). Accordingly, it is hypothesized that those higher in autonomy at baseline will receive greater benefits from the ENHANCE intervention.

1.3.2 Relatedness. Similar to autonomy, satisfying the need for relatedness mediated the relationship between a gratitude and optimism happiness intervention and improved SWB (as cited in Sheldon et al., 2010). Additionally, initiating and pursuing goals associated with feelings of relatedness positively moderated increases in SWB compared to setting more general positive goals (Sheldon et al., 2010). According to SDT theory, the need of relatedness is also positively related to therapy motivation and commitment (Markland, Ryan, Tobin,
Rollnick, 2005). Consequently, if meeting the psychological need of relatedness is positively associated with SWB and therapy engagement, it is hypothesized that those higher in relatedness at baseline will receive greater benefits from the ENHANCE intervention.

1.3.3 Competence. The final psychological need of competence and its role on SWB interventions has received little attention. Moreover, it has demonstrated no moderating effects on increases in SWB whether engaged in a gratitude or an optimism happiness intervention (as cited in Sheldon et al., 2010). These findings may, in part, be due to the fact that expressing gratitude and optimism may be less skill driven and therefore, participants may not have felt as though they were gaining competency. Fulfilling the psychological need of competency may not have been met with these specific happiness interventions and, therefore, one would not expect to find a mediating effect. According to SDT theory, the psychological need of competence within a therapeutic context is associated with receiving valuable feedback on therapeutic work (e.g., skill development, goal setting; Ryan & Deci, 2008). Given that the ENHANCE intervention consists of specific skill development (i.e., mindfulness, goal setting, thought recording and restructuring, effective communication styles) and that every session of the ENHANCE intervention involves reviewing previous week’s homework and new learned skills (i.e., opportunity for feedback is ample), it is hypothesized that those higher on competence at baseline will receive greater benefits from the ENHANCE intervention.

1.4 Implicit Theories of Well-Being

While it has been demonstrated thus far that factors such as personality and psychological need satisfaction may affect the success of ENHANCE, a third individual difference that may contribute to the success of a SWB intervention is beliefs about the malleability of SWB, that is one’s mindset or implicit beliefs about well-being. Mindsets or
implicit theories are the cognitive schemas individuals develop in order to conceptualize their own beliefs about the stability of their traits and abilities, which in turn, influences their perceptions and responses to the external world (Dweck, Chiu, & Hong, 1995). The theory of implicit theories posits that individuals have personal beliefs about the extent to which specific characteristics and skills are either changeable or unchangeable and has been developed and researched for the last thirty years (Dweck, 1999, 2016; Dweck et al., 1995; Dweck & Leggett, 1988). Specifically, individuals typically hold one of two mindsets and they can vary depending on the referenced attribute. A growth/incremental mindset is the belief that a personal attribute or characteristic is changeable and dynamic, whereas, a fixed/entity mindset which is the belief that a personal characteristic is fixed and cannot be changed or developed (Dweck et al., 1995). These beliefs contribute to individual motivational drives and perceptions that can have significant consequences (e.g., Dweck & Molden, 2005). A fixed mindset of intelligence for example, was significantly positively associated with negative affect, not significantly associated with positive affect, and marginally negatively associated with life satisfaction (King, 2017). Dweck and colleagues (1995) provide a simplistic example (evidenced in prior research (e.g., Henderson & Dweck, 1990)) of how implicit theories help individuals understand behaviours: “those who hold an entity theory of intelligence are more likely to blame their intelligence for negative outcomes, whereas those who hold an incremental theory of intelligence are more likely to understand the same negative outcomes in terms of their effort or strategy.” (pp. 268). The latter, therefore, provides an explanation that could result in modifying an individual’s efforts and strategies for better outcomes in the future, whereas the former views the negative outcomes as attributable to their ‘trait’ of intelligence, a fixed aspect of who they are. These beliefs and interpretations are not limited to self-
perceptions, but perceptions of others, as well (Dweck, 2016; Dweck, Hong, & Chiu, 1993). Moreover, implicit theories and mindsets have been studied across several domains (e.g., personality, moral characteristics, emotions, relationships) with similar interpretations and consequences of behaviours (e.g., Dweck, Hong, & Chiu, 1993; Dweck & Molden, 2005). However, implicit theories and mindsets of well-being has only more recently been explored.

One’s implicit theory of well-being (ITWB) is a personal belief that well-being is malleable and dynamic (incremental/growth mindset) or fixed and unchangeable (entity/fixed mindset) and this concept has demonstrated to be a unique domain of implicit theories (Van Tongeren & Burnette, 2016). While this area of research has only more recently been studied within the area of well-being it has significant promise for continued research (see review by Howell, 2016).

Importantly, a growth mindset has more generally been associated with higher well-being (Bernecker, Herrmann, Brandstätter, & Job, 2017; Howell, Passmore, & Holder, 2016). Across their four studies, Passmore, Howell, and Holder (2018) meta-analytically calculated positive correlations between a growth mindset of ITWB and hedonic well-being ($r = .33$) and eudaimonic well-being ($r = .41$). Further, they found that a growth mindset of ITWB was positively associated with viewing life more positively and with other measures of well-being such as self-compassion, mindfulness, and harmony. A meta-analysis found that a growth mindset has been associated with more adaptive self-regulatory processes for goal achievement, such as favorable expectations ($r = .15$), learning-approach goals ($r = .19$) and goal mastery ($r = .23$; Burnette et al., 2013); whereas, a fixed mindset is associated with more negative emotions ($r = -.23$; Burnette et al., 2013) and mental distress in youth ($r = -.21$; Schleider, Abel, & Weisz, 2015). Moreover, a general belief that one has limited willpower (and consequently,
less drive and pursuit of goal achievement) is negatively correlated with life satisfaction and positive affect (Bernecker et al., 2017). These findings are similar for working adults and first-year college students (Bernecker et al., 2017). When examining implicit theories of life satisfaction, Busseri and Samani (2019) found that a growth mindset of life satisfaction was positively associated with perceived positive trajectories of life satisfaction over time. Specifically, a growth mindset of life satisfaction was positively associated with perceived increases in life satisfaction up until that point in participants’ lives. Moreover, a growth mindset of life satisfaction was positively associated with self-efficacy, hope, optimism, more frequent positive affect, and less frequent negative affect (Busseri & Samani, 2019).

Manipulating implicit theories more globally, has been effective in predicting relevant outcomes. For example, manipulating implicit theories of empathy in an undergraduate student population predicted empathetic responding (Schumann, Zaki, & Dweck, 2014). Students who were primed with a growth mindset of empathy reported a willingness to commit a higher number of volunteer hours to a peer support group for other students with cancer. Howell and colleagues (2016) specifically manipulated ITWB in their undergraduate student sample and found that those in the growth mindset condition were more willing to engage in 'therapeutic lifestyle changes' (e.g., exercising, eating a nutritious diet, engaging in self-care), compared to the fixed mindset condition. In a series of studies, manipulating a growth mindset of happiness was associated with an increase in well-being, which in turn, was positively associated with greater satisfaction across several life domains such as relationship, health, and career, and also led to a stronger growth mindset (Van Tongeren & Burnette, 2016). Last, the manipulation of a growth mindset of life satisfaction significantly produced greater perceived life satisfaction.
over time (e.g., assessing different ranges between past, current, and future; Busseri & Samani, 2019).

To this end, ITWB may indicate a willingness to engage in ENHANCE and, therefore, increase the degree to which one benefits. Accordingly, it is hypothesized that those with a growth mindset of ITWB at baseline will report greater SWB outcomes.

1.5 The Current Study

The current study involved examining secondary data from two RCTs investigating the effectiveness of the ENHANCE intervention on increasing SWB. The primary objective of the present study was to identify for whom the ENHANCE intervention is most effective, based on the baseline characteristics described above (i.e., Big Five personality traits, SDT psychological need satisfaction, and ITWB), and how these factors predict the effectiveness of the ENHANCE intervention. Can the ENHANCE intervention be even more effective for those individuals who exhibit specific personality characteristics, have met a certain degree of psychological needs, or believe in their ability to change their well-being? The results of this study will not only inform for whom the ENHANCE intervention works best, but it also expands our scientific knowledge and theoretical understanding of which baseline characteristics are associated with the effectiveness of SWB interventions more generally. Consequently, future researchers and practitioners will begin to explore how to modify SWB interventions to suit a variety of individual characteristics, thereby reaching a greater number of individuals and benefiting communities at large.

Despite there being evidence for significant relationships between the relevant individual factors and SWB, surprisingly, their influence on treatment gains in SWB interventions is sparse. The implications on the success of such interventions are profound.
First, effect sizes of SWB interventions (which are often compared among each other) may be attenuated due to baseline individual characteristics; therefore, meta-analytic findings may present inaccurate effects sizes of SWB interventions. Second, just as some clinical presentations may be contraindicated for certain evidence-based interventions (i.e., treatment for weight loss would be ineffective for individuals who have binge eating disorder), there could be specific individual characteristics at baseline that would demonstrate to be ineffective for specific SWB interventions. Third, present findings may suggest that individuals may require pre-intervention manipulations or behavioural changes to ensure maximal benefits from the ENHANCE intervention (or SWB interventions more generally). For example, an individual may need to satisfy a degree of psychological needs or shift their ITWB from an entity to an incremental mindset, before engaging in a SWB intervention. Finally, if the present findings determine that individual differences do play an influential role in the effectiveness of the ENHANCE intervention, it will expand the direction of future research. To this end, while it has been established that SWB interventions are effective at increasing SWB, the next critical step is to determine how to increase their efficacy and utility by ensuring all individuals can benefit. How can researchers and practitioners alike, provide evidence-based SWB interventions that can most optimally increase SWB in individuals and communities?

The current study hypothesizes that the following baseline variables will predict greater increase in SWB after engaging in the ENHANCE intervention: a) higher scores on extraversion; b) higher scores on neuroticism; c) higher scores on conscientiousness; d) higher scores on openness to experience; e) higher scores on the need satisfaction of autonomy; f) higher scores on the need satisfaction of competence; g) higher scores on the need satisfaction of relatedness; and h) higher scores on implicit theories of well-being. In addition, it was
hypothesized that the BFI trait of agreeableness will predict negligibly any increases in SWB after the ENHANCE intervention.
Chapter 2 Methodology

The data used for the current study is a secondary analysis of two RCTs (ENHANCE 1.0 and ENHANCE 2.0) that both examined the effectiveness of the ENHANCE intervention in increasing SWB. The current study examined only the data for those participants who received either of the ENHANCE interventions. ENHANCE 1.0 included participants from Kelowna, British Columbia, Canada, and Charlottesville, Virginia, USA. ENHANCE 2.0 included participants from Kelowna, British Columbia, Canada, only. The methodology for both studies is briefly described below; however, for a detailed review please see Heintzelman and colleagues (2019) and Lutes and colleagues (2019).

2.1 Participants

Participants were healthy community adults recruited through printed flyers, newspaper ads, community Facebook groups and social media, a Kelowna local news radio interview featuring the ENHANCE 2.0 study, internal newsletter sent to the local university faculty and staff, word-of-mouth, internal newsletters sent to the staff and volunteers associated with Interior Health of Kelowna area (ENHANCE 2.0 only), and printed flyers handed out after a distinguished speaker series talk hosted by the University of British Columbia in the community of Kelowna (ENHANCE 2.0 only).

Eligibility criteria included participant age range of 25-75 and not exhibiting significant depressive symptoms. An online self-report screening questionnaire - Patient Health Questionnaire (PHQ-9; Kroenke, Spitzer, & Williams, 2003) - was used to determine depressive symptoms and severity. Participants who scored higher than 15 were provided with a community resource sheet with alternative clinical services should they have been interested in other referral options.
The final data pool at baseline consisted of 113 participants that received the ENHANCE intervention (68 in ENHANCE 1.0 and 45 in ENHANCE 2.0) that included primarily middle-aged (\(M = 48.80, SD = 13.09\)), married/common-law (56.6%), European-Canadian (>90%), women (74.8%), who had received at least a college or university diploma (69%), were employed full-time (50.4%), and reported an annual household income of at least $70,000 (61.9%). There were no significant differences between the two groups of subjects used in ENHANCE 1.0 or 2.0 on any of these demographic variables.

2.2 Measures

While there were additional measures included in both studies, the current study examined the following measures: life satisfaction; PA and NA; personality (BFI); need satisfaction; and implicit theories of well-being (ITWB).

**Satisfaction with life.** The *Satisfaction with Life Scale* (SWLS; Diener, Emmons, Larsen, & Griffin, 1985) is a widely used 5-item self-report measure of global life satisfaction. Satisfaction is rated on a 7-point scale, ranging from 1 (*Strongly Disagree*) to 7 (*Strongly Agree*), with higher ratings indicating greater global life satisfaction. The SWLS has demonstrated excellent internal consistency (\(\alpha = .87\)) and test-retest reliability over a 2-month period (\(r = .82\); Diener et al., 1985). This measure was administered at all time points in both ENHANCE 1.0 and 2.0.

**Positive and negative affect.** The Scale of Positive and Negative Experience (SPANE; Diener et al., 2010) is a widely used 12-item questionnaire that asks participants to rate six positive and six negative feelings on a 5-point scale, ranging from 1 (*Very Rarely or Never*) to 5 (*Very Often or Always*). The SPANE has demonstrated good estimates of internal consistency (\(\alpha = .80\) to .88), test-retest reliability (\(r = .62\) to .68), and convergent validity with other well-
being measures (Diener et al., 2010). This measure was administered at all time points in both ENHANCE 1.0 and 2.0.

**Personality.** The Big Five Inventory (BFI; John, Donahue, & Kentle, 1991; John, Naumann, & Soto, 2008) is a 44-item questionnaire used to measure the Big Five dimensions of personality (Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism). Participants are asked their agreement on many characteristics using a 5-point scale ranging from *Disagree Strongly* to *Agree Strongly*. The BFI is widely used and has demonstrated adequate psychometric properties (e.g., $\alpha = .83$, John et al., 2008). This measure was only administered at baseline in both ENHANCE 1.0 and 2.0.

**Incremental vs entity theories of well-being.** The Implicit Theories of Well-being Scale (ITWB; taken from Howell et al., 2016) was originally adapted from Dweck’s (1999) entity (e.g., fixed, unchangeable) and incremental (e.g., changeable, malleable) theories of ability/intelligence, and is an 8-item questionnaire assessing entity and incremental theories of one’s own well-being. Four items measure entity theories of well-being and four items measure incremental theories of well-being. Items were rated on a 5-point scale ranging from 1 (*Strongly agree*) to 5 (*Strongly disagree*). The four entity theory items were reversed scored, and a total summed score is suggestive of incremental beliefs of well-being (e.g., higher summed scores suggest higher incremental beliefs of well-being). While this measure has only recently been developed and used, it has demonstrated adequate reliability ($\alpha = .83$, Howell, et al., 2016) and psychometric properties (Passmore et al., 2018). Further, the original scale measuring implicit theories of intelligence also demonstrated excellent psychometric properties (e.g., $\alpha = .94$ to .98 and 2-week test-retest reliability of $r = .80$, Dweck et al., 1995). This measure was only administered in ENHANCE 2.0 at each time point.
**Psychological need satisfaction.** The Need Satisfaction Scale (NSS; La Guardia, Ryan, Couchman, & Deci, 2000) is a 9-item self-report questionnaire asking participants the degree to which they felt several experiences in the past month (i.e., “I felt inadequate or incompetent.”) using a 5-point scale ranging from 1 (*Not at all*) to 5 (*Very much*). The measure is made up of three subscales: competence, autonomy, and relatedness and has demonstrated adequate reliability ($\alpha = .90 - .92$, La Guardia et al., 2000). This measure was administered at all time points in both ENHANCE 1.0 and 2.0.

**2.3 Procedures**

The ethics boards of each relevant university approved each study. Written informed consent was obtained from all participants at the time of baseline assessment, before collecting any data. Participants subsequently completed several measures (including primary and secondary outcomes). Immediately following completion of the baseline assessment, participants were randomly assigned to either the ENHANCE intervention or the control/comparison group. ENHANCE participants engaged in an initial 3-month active treatment period (consisting of 2-hour weekly group sessions), followed by the completion of a post-intervention assessment. For the next 3-months, the long-term follow-up phase, participants received bi-weekly treatment that consisted of a monthly 15-minute phone-call check-in and a booster group session. After this second 3-month period, participants returned for a final time to complete a follow-up assessment. At this final assessment, participants received $10.00 as a token of appreciation and compensation for their time and travel. In total, participants conducted three assessments: at baseline (T1), 3 months (T2; after completing the ‘active' 3-month program), and 6 months (T3; 3-months after the completion of the program).
**ENHANCE.** The ENHANCE intervention is a 3-month program which can be delivered weekly, in-person, in a group setting or delivered in an online self-driven format. The intervention consists of an in-person introductory session, followed by ten weekly sessions, either in an in-person group format, or online individual delivery (each week covering a separate happiness principle) followed by an in-person summary/conclusion session. Each of the happiness principles (see Table 1) are evidenced-based principles/activities that have been associated with increased happiness and well-being (see Kushlev et al., 2017 for a detailed review of the ENHANCE intervention (online and in-person formats). In the in-person format, each of the happiness principle sessions include a general check-in (asking participants to reflect on the previous week and the assigned homework) followed by an introduction to a new happiness principle and associated activities, discussions, and assigned homework, and finally, the sessions conclude with reviewing and setting goals around new homework. During the follow-up period, participants received one phone call check-in per month. These calls involved checking in on if/how the participants were incorporating their new learned happiness principles since ending the ‘active’ 3-month treatment program. Additionally, participants received one booster session a month that followed the same structure as all other sessions except the check-in component was longer, and the introduction of more general principles to help maintain their well-being were introduced (i.e., physical activity/exercise and well-being, problem-solving techniques, and a ‘stoplight guide' to well-being). The online format consisted of providing a website to participants where weekly instructions and materials were presented in the same timeline as the in-person format.

In-person group facilitators were doctoral clinical psychology students who had previous group therapy experience. Each group session was two hours in length (with a 15-
minute break halfway through) and was offered either from 10:00 am to 12:00 pm or 6:00 pm to 8:00 pm. In total, the study included five different groups with six doctoral student clinicians.
Chapter 3 Results

3.1 Statistical and Analytical Plan

The following steps were taken to analyze the current data. First, in order to collapse the data from ENHANCE 1.0 and 2.0, statistical comparisons on all baseline variables were necessary to determine any significant group differences prior to engaging in ENHANCE. Second, to determine whether ENHANCE impacted the groups differently, within group changes were compared between groups (ENHANCE 1.0 and 2.0) for all possible variables across all time points. For example, changes in PA from T1 to T2 in ENHANCE 1.0 was statistically compared to changes in PA from T1 to T2 in ENHANCE 2.0 to see if there were any between group differences. This was done to ensure that the groups were as equivalent as possible to collapse the data for further analyses. Third, after collapsing the data, within group differences in outcomes variables (SWLS, PA, and NA), across all time points, were analysed to ensure that ENHANCE continued to demonstrate significant increases in SWB, and to support the continuation of predictor analyses. Fourth, to predict changes in outcomes, difference scores (Thomas & Zumbo, 2012) were computed for T1 to T2 and from T1 to T3 and were used as the dependent variables in the subsequent predictor analyses.

To examine whether personality factors predict changes in SWB, a multiple regression was conducted entering all personality factors into the model at once, predicting changes separately for SWLS, PA, and NA and from T1 to T2 and T1 to T3. All personality factors were entered into the model at once as each personality trait falls on a continuum (low to high), in which all individuals fall on; consequently, entering all traits into the model at once would provide a more naturalistic representation, as opposed to a hierarchical model. Simple regressions were computed individually for each of the baseline psychological needs predicting
changes separately for SWLS, PA, and NA and from T1 to T2 and T1 to T3. Psychological needs were examined separately because the data was not the same for each of them (e.g., the psychological need of relatedness was only examined using ENHANCE 1.0 data. To keep consistency across the psychological needs analyses, each construct was examined separately. Additional simple regressions were computed for baseline ITWB predicting changes separately for SWLS, PA, and NA and from T1 to T2 and T1 to T3. Subsequently, all significant regression analyses were followed up with exploratory ANOVAs examining group differences between those low, moderate, and high on the outcome variable, with the exception of the psychological need of relatedness due to the already reduced sample size (i.e., using ENHANCE 1.0 data only). Low, moderate, and high groups were established using interquartile ranges. Exploratory simple main effects analyses between T2-T3 were also examined for all significant regressions to determine whether there were specific group differences in the maintenance period of the intervention. Finally, post hoc exploration of whether different baseline levels of life satisfaction influenced changes in SWLS, PA, and NA were conducted. Specifically, baseline SWLS was split into low, moderate, and high groups (using interquartile ranges) and subsequent ANOVAS were conducted to determine whether there were group differences in changes in SWLS, PA, and NA, from T1 to T2 and T1 to T3. Simple main effects between T2 to T3 for these groups were also examined.

3.2 Preliminary Data Examination

3.2.1 Missing and incomplete data. Of the 127 participants that were enrolled in either ENHANCE intervention, 14 were excluded as they only completed a baseline assessment and no subsequent assessments. The remaining 113 participants either completed baseline and post assessment and/or baseline and follow-up assessment and were, therefore, included in further
analyses. Varying sample sizes will be presented in relevant tables of analyses. When participants were missing individual data points (i.e., skipped an item on a questionnaire), a single imputation method was used by imputing an extrapolated mean for the missed item. This method was only used if the participant completed more than 80% of that questionnaire. The BFI data from ENHANCE 1.0 was missing one item (that belongs to the ‘Openness’ scale). Consequently, for all BFI data, means were calculated as opposed to totals.

3.2.2 Outliers. Fifteen outliers were identified (i.e., cases with standardized scores greater than $z = 3.29$). To examine how influential the outliers were to subsequent analyses, a winsorizing technique was used (i.e., changing outlier scores to be within 3 standard deviations from the mean), which has been shown to be an effective way of retaining potentially meaningful extreme scores while also reducing the degree of their influence (Field, 2013). Analyses were conducted before and after the winsorizing technique to determine the influence of the outliers. Findings did not change in statistically meaningful ways (i.e., $p$ value significance did not change) and consequently it was decided to retain the data in its original form.

3.2.3 Baseline descriptive data and correlations. Baseline descriptive statistics and correlations for all variables are presented in Table 2 and 3 respectively. Notably, ITWB was not significantly correlated with SWLS, PA, or NA, and highly significantly correlated with BFI-O ($r = .51, p < .001$).

3.3 Baseline differences between ENHANCE 1.0 and 2.0.

There were no significant group differences on ENHANCE outcomes for mode of intervention (in-person or online) for participants in ENHANCE 1.0, and therefore the two groups of data were collapsed (Heintzelman et al., 2019). At baseline, there were no significant
differences (at the alpha level of $p < .05$) between ENHANCE 1.0 and ENHANCE 2.0 participants on all outcome measures (e.g., SWLS, PA, NA, NSS-AUT, and NSS-COMP) except NSS-REL. These findings remained consistent even after applying Bonferroni corrections. Consequently, with the exception of NSS-REL, all data were collapsed and analyzed together for the rest of the analyses. In contrast, there were significant differences at baseline between the two groups on NSS-REL data. Consequently, going forward NSS-REL data was examined separately for ENHANCE 1.0 and ENHANCE 2.0 data. Additionally, ITWB was not assessed in ENHANCE 1.0, and therefore relevant analyses will only have participants from ENHANCE 2.0.

3.4 Within-Group Difference Between Time Points

To establish whether there were significant changes on the outcome variables across time, a series of t-tests were conducted comparing baseline assessment (T1) to post-assessment (T2) and to follow-up assessment (T3) as well as from post-assessment (T2) to follow-up assessment (T3) and are shown on Table 2. There were significant differences from T1 to T2 and from T1 to T3 for changes in SWLS, PA, NA, NSS-AUT and NSS-COMP. This remains the same even after considering a Bonferroni adjusted $p$-value. There were no significant differences from T2 to T3 for all variables except NA. Specifically, scores in NA significantly increased from T2 to T3, however, after considering a Bonferroni adjusted $p$-value correction, this change was no longer significant (i.e., $t(96) = -2.147, p = .034$, however after a Bonferroni correction, a significant $p$-value must be $p < .017$). Due to the initial finding of a decrease in gains during the maintenance period (T2 to T3) and that sustainable change is a consistent challenge in behavioural change research (Orleans, 2000; Polivy & Herman, 2002), simple
main effects were conducted post hoc to further explore the maintenance period and will be presented in subsequent related analyses.

For NSS-REL, analyses were done separately for ENHANCE 1.0 and ENHANCE 2.0. There were no significant differences between time points for ENHANCE 2.0. Consequently, no further analyses were conducted for NSS-REL and ENHANCE 2.0. There were, however, significant increases from T1 to T2 and from T1 to T3 on NSS-REL for ENHANCE 1.0 participants ($t(65) = -3.455, p = .001, d = 0.43$ and $t(61) = -3.831, p < .001, d = 0.49$, respectively). There were no significant differences from T2 to T3, $t(59) = 1.149, p = .255, d = 0.15$.

Only participants in ENHANCE 2.0 were given an ITWB measure. There were no significant differences between T1 and T2 or between T2 and T3. However, there were significant increases between T1 and T3 ($t(36) = -2.772, p = .009, d = 0.46$).

3.5 Predictor Analyses: Personality

Regression coefficients and standard errors for all personality regressions can be found in Table 4.

3.5.1 Personality predicting life satisfaction. Two multiple regressions were conducted to predict changes in SWLS (from T1 to T2 and from T1 to T3) from each of the Big Five personality factors. Neither model was statistically significant, $F(5, 105) = .984, p = .431$, $R^2_{adj.} = -.00$ and $F(5, 93) = .579, p = .716, R^2_{adj.} = -.02$, respectively.

3.5.2 Personality predicting positive affect. A multiple regression was run to predict changes in PA (from T1 to T2) from each of the Big Five personality factors. The regression model indicated that personality factors predict changes in positive affect from T1 to T2, $F(5,$
More specifically, it was found that higher neuroticism significantly predicted positive changes in PA ($\beta = 1.572$, $p = .021$).

Next, a multiple regression was run to predict long-term changes in PA (from T1 to T3) from each of the Big Five personality factors. The regression model indicated that personality factors predict changes in positive affect from T1 to T3, $F(5, 94) = 2.484$, $p = .037$, $R^2_{adj.} = .070$. More specifically, it was found that lower extraversion significantly predicted positive changes in PA ($\beta = -1.982$, $p = .005$).

For a further visual inspection of the data to better understand whether significant findings were in part due to ceiling and floor effects, the data were split into low, moderate, and high levels of the neuroticism and extraversion (calculated based on interquartile ranges) and plotted against time points. Figure 1 shows changes in PA across all timepoints for low, moderate, and high levels of neuroticism. As can be seen, no group was near the ceiling or floor, suggesting that all groups had room for improvement. Additionally, all groups appear to have similar trajectories from T1 to T2, however, a follow-up one-way ANOVA revealed significant differences on changes scores from T1 to T2 between groups (low, moderate, high neuroticism), $F(2, 107) = 5.123$, $p = .008$. A Tukey post hoc analysis revealed a significant mean difference score between those low and high on neuroticism, $M$ difference = 3.50, $p = .007$, with those high on neuroticism experiencing significantly greater gains. No other group differences were found for any other time points. Additionally, simple main effects analyses for T2 to T3 were conducted and produced no significant findings for any groups. Figure 2 shows changes in PA across all timepoints for low, moderate, and high levels of extraversion. As can be seen, no group was near the ceiling or floor. A follow-up one-way ANOVA revealed significant differences on change scores from T1 to T2 between groups (low, moderate, high
extraversion), $F(2, 107) = 3.627, p = .030$. A Tukey post hoc analysis revealed a significant mean difference score between those low and high on extraversion, $M$ difference = 3.20, $p = .022$, with those low on extraversion experiencing significantly greater gains. Similarly, significant differences were found on change scores from T1 to T3 between groups, $F(2, 97) = 4.802, p = .010$. Tukey post hoc analysis revealed a significant mean difference score between those low and high on extraversion, $M$ difference = 4.59, $p = .007$, with those low on extraversion experiencing significantly greater gains from T1 to T3. No other group differences were found. Simple main effects analyses for T2 to T3 were conducted and a significant effect was found for those high on extraversion exhibiting a decrease in PA, $M = -1.95, SD = 4.26$, $t(21) = 2.152, p = .043$.

### 3.5.3 Personality predicting negative affect

A multiple regression was run to predict changes in NA (from T1 to T2) from each of the Big Five personality factors. The regression model indicated that personality factors predict changes in NA from T1 to T2, $F(5, 104) = 3.049, p = .013, R^2_{adj.} = .086$. More specifically, it was found that higher neuroticism significantly predicted decreases in NA ($\beta = -2.455, p = .001$).

Next, a multiple regression was run to predict long-term changes in NA (from T1 to T3) from each of the Big Five personality factors. The regression model indicated that personality factors did not predict changes in NA from T1 to T3, $F(5, 94) = 1.406, p = .229, R^2_{adj.} = .020$.

Figure 3 shows changes in NA across all timepoints for low, moderate, and high levels of neuroticism. As can be seen, no group was near the ceiling or floor. A follow-up one-way ANOVA revealed significant differences on changes scores from T1 to T2 between groups (low, moderate, high neuroticism), $F(2, 107) = 5.382, p = .006$. A Tukey post hoc analysis revealed a significant mean difference score between those low and high on neuroticism, $M$
difference = -4.06, \( p = .004 \), with those high on neuroticism experiencing significantly greater decreases in NA. No other group differences were found for any other time points. Simple main effects analyses for T2 to T3 were conducted and a significant effect was found for those high on neuroticism exhibiting an increase in NA, \( M = 1.86, SD = 4.18, t(28) = 2.398, p = .023 \).

3.6 Predictor Analyses: Psychological Need Satisfaction of Autonomy and Competence

Regression coefficients and standard errors for need satisfaction of autonomy and competence regressions can be found in Table 5.

3.6.1 Psychological need satisfaction of autonomy predicting life satisfaction. A single regression was run to predict changes in SWLS (from T1 to T2) from the need satisfaction of autonomy. The regression model indicated that the need satisfaction of autonomy predicts changes in SWLS from T1 to T2, \( F(1, 109) = 6.774, p = .011, R^2_{\text{adj}} = .050 \). More specifically, lower autonomy significantly predicted increases in SWLS (\( \beta = -.369, p = .011 \)). Next, to predict long-term changes in SWLS from T1 to T3, another single regression was run. The model was significant \( F(1, 97) = 4.352, p = .040, R^2_{\text{adj}} = .033 \), with lower levels of autonomy at baseline significantly predicting increases in SWLS from T1 to T3 (\( \beta = -.320, p = .040 \)).

To better understand and explore baseline levels of autonomy and change in SWLS, the data were split into low, moderate, and high levels of baseline autonomy (calculated based on interquartile ranges) and plotted against time points. Figure 4 shows changes in SWLS across all timepoints for low, moderate, and high levels of autonomy. As can be seen, no group started off at the ceiling or floor and each group experienced gains from T1 to T2, however the trajectory of change appeared to differ. A follow-up one-way ANOVA revealed significant differences on change scores from T1 to T2 between groups (low, moderate, high autonomy),
A Tukey post hoc analysis revealed a significant mean difference score between those low and high on autonomy, \( M \) difference = 2.12, \( p = .043 \), with those low on autonomy experiencing significantly greater increases in SWLS. No other group differences were found for any other time points. Further, simple main effects analyses for T2 to T3 were conducted and produced no significant findings for any groups.

3.6.2 Psychological need satisfaction of competence predicting life satisfaction. Two multiple regressions were conducted to predict changes in SWLS (from T1 to T2 and from T1 to T3) from the need satisfaction of competence. Neither model was statistically significant, \( F(1, 109) = 2.302, p = .132, R^2_{adj.} = .012 \) and \( F(1, 97) = 2.571, p = .112, R^2_{adj.} = .016 \), respectively.

3.6.3 Psychological need satisfaction of autonomy predicting positive affect. A single regression was run to predict changes in PA (from T1 to T2) from the need satisfaction of autonomy. The regression model indicated that the need satisfaction of autonomy predicts changes in PA from T1 to T2, \( F(1, 108) = 15.063, p < .001, R^2_{adj.} = .114 \). More specifically, lower autonomy significantly predicted increases in PA (\( \beta = -.655, p < .001 \)). Next, to predict long-term changes in PA (T1 to T3), another single regression was run. The model was significant \( F(1, 98) = 6.746, p = .011, R^2_{adj.} = .055 \), with lower levels of autonomy at baseline significantly predicting increases in PA from T1 to T3 (\( \beta = -.612, p = .011 \)).

Figure 5 shows changes in PA across all timepoints for low, moderate, and high levels of autonomy. As can be seen, no group started at the ceiling or floor and each group experienced gains from T1 to T2, however these gains did not appear as prominent for those high on autonomy, compared to those low. A follow-up one-way ANOVA revealed significant differences on changes scores from T1 to T2 between groups (low, moderate, high autonomy),
$F(2, 107) = 6.226, p = .003$. A Tukey post hoc analysis revealed a significant mean difference score between those low and high on autonomy, $M$ difference = 3.70, $p = .002$, with those low on autonomy experiencing significantly greater increases in PA. No other group differences were found for any other time points. Additionally, simple main effects analyses for T2 to T3 were conducted and produced no significant findings for any groups.

### 3.6.4 Psychological need satisfaction of competence predicting positive affect

A single regression was run to predict changes in PA (from T1 to T2) from the need satisfaction of competence. The regression model indicated that the baseline need satisfaction of competence predicts increases in PA from T1 to T2, $F(1, 108) = 12.537, p = .001, R^2_{adj} = .096$. More specifically, lower competence at baseline significantly predicted increases in PA ($\beta = -.567, p = .001$). Next, to predict long-term changes in PA (from T1 to T3), another single regression was run. The model was significant $F(1, 98) = 7.533, p = .007, R^2_{adj} = .062$, with lower levels of competence at baseline significantly predicting increases in PA from T1 to T3 ($\beta = -.594, p = .007$).

To better understand and explore baseline levels of competence and change in PA, the data were split into low, moderate, and high levels of baseline competence (calculated based on interquartile ranges) and plotted against time points. Figure 6 shows changes in PA across all timepoints for low, moderate, and high levels of competence. As can be seen, no group was sitting at the ceiling or floor at baseline. A follow-up one-way ANOVA revealed significant differences on change scores from T1 to T2 between groups (low, moderate, high competence), $F(2, 107) = 5.276, p = .007$. A Tukey post hoc analysis revealed a significant mean difference score between those low and high on competence, $M$ difference = 3.44, $p = .005$, with those low on competence experiencing significantly greater increases in PA. Similarly, significant
differences were found on change scores from T1 to T3 between groups, \( F(2, 97) = 3.343, p = .039 \). Tukey post hoc analysis revealed a significant mean difference score between those low and high on competence, \( M \) difference = 3.58, \( p = .039 \), with those low on competence receiving greater increases in PA. Simple main effects analyses for T2 to T3 were conducted and produced no significant findings for any groups.

### 3.6.5 Psychological need satisfaction of autonomy predicting negative affect

A single regression was run to predict changes in NA (from T1 to T2) from the need satisfaction of autonomy. The regression model indicated that baseline need satisfaction of autonomy predicts decreases in NA from T1 to T2, \( F(1, 108) = 11.460, p = .001, R^2_{adj.} = .088 \). More specifically, higher autonomy at baseline significantly predicted decreases in NA (\( \beta = .637, p = .001 \)). Next, to predict long-term changes in PA (from T1 to T3), another single regression was run. The model was not significant \( F(1, 98) = 3.932, p = .050, R^2_{adj.} = .029 \).

Figure 7 shows changes in NA across all timepoints for low, moderate, and high levels of autonomy at baseline. As can be seen, no group was sitting at the ceiling or floor at baseline. A follow-up one-way ANOVA revealed significant differences on change scores from T1 to T2 between groups (low, moderate, high autonomy), \( F(2, 107) = 4.524, p = .013 \). A Tukey post hoc analysis revealed a significant mean difference score between those low and high on autonomy, \( M \) difference = -3.42, \( p = .011 \), with those high on autonomy experiencing significantly greater decreases in NA. No other group differences were found for any other time points. Further, simple main effects analyses for T2 to T3 were conducted and produced no significant findings for any groups.

### 3.6.6 Psychological need satisfaction of competence predicting negative affect

A single regression was run to predict changes in NA (from T1 to T2) from the need satisfaction
of competence. The regression model indicated that baseline need satisfaction of competence predicts decreases in NA from T1 to T2, $F(1, 108) = 10.147, p = .002, R^2_{adj.} = .077$. More specifically, higher competence at baseline significantly predicted decreases in NA ($\beta = .567, p = .002$). Next, to predict changes in NA from T1 to T3, another single regression was run. The model was statistically significant $F(1, 98) = 3.992, p = .048, R^2_{adj.} = .029$, with higher levels of competence at baseline significantly predicting decreases in NA from T1 to T3 ($\beta = .390, p = .048$).

Figure 8 shows changes in NA across all timepoints for low, moderate, and high levels of competence. As can be seen, at baseline, no group started at the ceiling or floor. A follow-up one-way ANOVA revealed significant differences on change scores from T1 to T2 between groups (low, moderate, high on competence), $F(2, 107) = 5.363, p = .006$. A Tukey post hoc analysis revealed a significant mean difference score between those low and high on competence, $M$ difference $= -3.36, p = .015$, with those high on competence experiencing significantly greater decreases in NA and between those low and moderate, $M$ difference $= -3.11, p = .015$, with those moderate on competence experiencing greater decreases in NA. No other group differences were found for any other time points. Simple main effects analyses for T2 to T3 were conducted and a significant finding was produced for those high on competence experiencing an increase in NA, $M = 1.11, SD = 2.69, t(26) = 2.143, p = .042$.

### 3.7 Predictor Analyses: Psychological Need Satisfaction of Relatedness

The following analyses were conducted using ENHANCE 1.0 data only as they were the only group of participants that gained significant changes on this outcome measure at the different time points. Table 6 displays all regression coefficients and standard errors for the need satisfaction of relatedness.
3.7.1 Psychological need satisfaction of relatedness predicting life satisfaction. Two single regressions were conducted to predict changes in SWLS (from T1 to T2 and from T1 to T3) from each the need satisfaction of relatedness. Neither model was statistically significant, \( F(1, 64) = .097, p = .757, R^2_{\text{adj.}} = .002 \) and \( F(1, 60) = 2.972, p = .090, R^2_{\text{adj.}} = .047 \), respectively.

3.7.2 Psychological need satisfaction of relatedness predicting positive affect. A single regression was run to predict changes in PA (from T1 to T2) from the need satisfaction of relatedness. The regression model indicated that baseline need satisfaction of relatedness predicts increases in PA from T1 to T2, \( F(1, 63) = 5.705, p = .020, R^2_{\text{adj.}} = .068 \). More specifically, lower relatedness at baseline significantly predicted increases in PA (\( \beta = -.497, p = .020 \)). Next, to predict long-term changes in PA (from T1 to T3), another single regression was run. The model was statistically significant \( F(1, 60) = 10.945, p = .002, R^2_{\text{adj.}} = .140 \), with lower levels of relatedness at baseline significantly predicting increases in PA from T1 to T3 (\( \beta = -.884, p = .002 \)).

3.7.3 Psychological need satisfaction of relatedness predicting negative affect. A single regression was run to predict changes in NA (from T1 to T2) from the need satisfaction of relatedness. The regression model was not statistically significant indicating that baseline need satisfaction of relatedness does not predict changes in NA from T1 to T2, \( F(1, 63) = .638, p = .427, R^2_{\text{adj.}} = 010 \). Next, to predict long-term changes in NA from T1 to T3, another single regression was run. The model was statistically significant \( F(1, 60) = 6.129, p = .016, R^2_{\text{adj.}} = .093 \), with higher levels of relatedness at baseline significantly predicting decreases in NA from T1 to T3 (\( \beta = .569, p = .016 \)).
3.8 Predictor Analyses: Implicit Theories of Well-Being

The following analyses were conducted using ENHANCE 2.0 data only as participant data on this variable was not collected in the original ENHANCE 1.0 study. Table 7 display all regression coefficients and standard errors for implicit theories of well-being.

3.8.1 Implicit theories of well-being predicting life satisfaction. A single regression was conducted to predict changes in SWLS (from T1 to T2) from baseline ITWB. The model was not statistically significant indicating that baseline ITWB does not predict changes in SWLS from T1 to T2, $F(1, 43) = .441, p = .510, R^2_{adj} = .013$. Another single regression was conducted to predict changes in SWLS (from T1 to T3) from baseline ITWB. The model was not statistically significant indicating that baseline ITWB did not predict changes in SWLS from T1 to T3, $F(1, 35) = .051, p = .823, R^2_{adj} = .027$.

3.8.2 Implicit Theories of Well-Being predicting positive affect. A single regression was conducted to predict changes in PA (from T1 to T2) from baseline ITWB. The regression model was not statistically significant indicating that baseline ITWB does not predicts changes in PA from T1 to T2, $F(1, 43) = .160, p = .691, R^2_{adj} = .019$. Another single regression was conducted to predict changes in PA (from T1 to T3) from baseline ITWB. The regression model was not statistically significant indicating that baseline ITWB did not predicts changes in PA from T1 to T3, $F(1, 36) = 1.462, p = .234, R^2_{adj} = .012$.

3.8.3 Implicit Theories of Well-Being predicting negative affect. A single regression was conducted to predict changes in NA (from T1 to T2) from baseline ITWB. The regression model was not statistically significant indicating that baseline ITWB does not predicts changes in NA from T1 to T2, $F(1, 43) = .306, p = .583, R^2_{adj} = .016$. Another single regression was conducted to predict changes in NA (from T1 to T3) from baseline ITWB. The regression
model was not statistically significant indicating that baseline ITWB did not predicts changes in NA from T1 to T3, \( F(1, 36) = 2.662, p = .112, R^2_{\text{adj.}} = .043. \)

3.9 Baseline Life Satisfaction and Changes in Subjective Well-Being Across Time

3.9.1 Life satisfaction. Since life satisfaction has been known to be a more stable trait, at post hoc, the data were visually examined to explore whether having a certain degree of life satisfaction at baseline made a difference to gains in SWLS, PA, and NA, across time. Accordingly, the data were split into low, moderate, and high levels of SWLS at baseline (calculated based on interquartile ranges) and plotted against time points for each outcome variable. Figure 9 shows changes in SWLS for each of the baseline levels of SWLS and as evidenced, no group displayed ceiling or floor effects. A follow-up one-way ANOVA revealed significant differences on change scores from T1 to T2 between groups (low, moderate, high baseline SWLS), \( F(2, 108) = 12.503, p < .001. \) A Tukey post hoc analysis revealed significant mean difference scores between those low and moderate on baseline SWLS, \( M \) difference = 2.01, \( p = .030, \) with those low experiencing significantly greater increases in SWLS; low and high, \( M \) difference = 4.260, \( p < .001, \) with those low experiencing significantly greater increases in SWLS; and moderate and high, \( M \) difference = 2.250, \( p < .012, \) with those moderate experiencing significantly greater increases in SWLS. Similarly, significant differences on change scores from T1 to T3 between groups were found, \( F(2, 96) = 12.494, p < .001. \) A Tukey post hoc analysis revealed significant mean difference scores between those low and high on baseline SWLS, \( M \) difference = 4.37, \( p < .001, \) with those low experiencing significantly greater increases in SWLS and between moderate and high, \( M \) difference = 2.79, \( p = .002, \) with those moderate experiencing greater increases in SWLS. No other group
differences were found for any other time points. Additionally, simple main effects analyses for T2 to T3 were conducted and produced no significant findings for any groups.

3.9.1 Positive affect. Figure 10 shows changes in PA for each of the baseline levels of SWLS and as can be seen, no groups started at the ceiling or floor at baseline. A follow-up one-way ANOVA revealed significant differences on change scores from T1 to T2 between groups (low, moderate, high baseline SWLS), $F(2, 107) = 7.652, p = .001$. A Tukey post hoc analysis revealed a significant mean difference score between those low and high on baseline SWLS, $M$ difference $= 3.78, p = .002$, with those low on baseline SWLS experiencing significantly greater increases in PA and between those moderate and high, $M$ difference $= 3.38, p = .003$, with those moderate experiencing greater gains. No other group differences were found for any other time points. Simple main effects analyses for T2 to T3 were conducted and produced no significant findings for any groups.

3.9.3 Negative affect. Figure 11 shows changes in NA for each of the baseline levels of SWLS and as can be seen, no groups started at the ceiling or floor at baseline. A follow-up one-way ANOVA revealed no significant differences between any groups at any time point. Simple main effects analyses for T2 to T3 were conducted and produced no significant findings for any groups.
Chapter 4 Discussion

The primary objective of the current study was to investigate whether any baseline individual characteristics predict increases in SWB after participating in the ENHANCE intervention. Specifically, personality, psychological need satisfaction, incremental vs. entity beliefs of well-being, and SWB at baseline were used as predictors of change in SWB after the initial 3-month intervention and 3-month long-term follow-up period. While it has been established that happiness interventions are effective, there has been a dearth of research and theoretical understanding of the role of individual differences, motivations, and beliefs on intervention effectiveness.

4.1 Within Group Differences

Overall, relative to baseline, positive affect, life satisfaction, and basic psychological need satisfaction (autonomy, competence, and relatedness) increased immediately following, and 3-months after, the ENHANCE intervention, while negative affect decreased. Implicit theories of well-being (ITWB) did not change immediately following the ENHANCE intervention but did increase after the 3-month follow-up, relative to baseline. Not surprisingly, there were no significant differences found between T2 to T3 as this was the follow up/maintenance intervention period (where maintenance of the gains was the target), except for NA. These findings suggest that ENHANCE is an effective program during its active phase, and generally during the long-term follow-up phase. Moreover, ENHANCE 1.0 did not find significant between group differences on changes in SWB between those that participated in ENHANCE in-person or individually online (Heintzelman et al., 2019). These findings are promising for the wide use and implementation of ENHANCE moving forward.
There were no significant increases in ITWB from T1 to T2, but there were from T1 to T3. These findings may suggest that changes in ITWB may take more time to shift, particularly for individuals who were already exhibiting incremental beliefs of well-being (i.e., higher scores at baseline). Moreover, participants voluntarily signed up for the research study advertised as increasing well-being; consequently, this may be a more selective group of individuals that hoped for changes in well-being and were more open to novel experiences (as shown with the strong relationship found between ITWB and BFI-O). Nevertheless, it is encouraging that ENHANCE produced increases in incremental beliefs over the long-term, even for those individuals who held such beliefs before starting the program.

4.2 Personality

It is well established that the Big Five personality traits are associated with SWB (e.g., DeNeve & Cooper, 1998; Diener & Lucas, 2000; Steel et al., 2008) and that extraversion and neuroticism are the two traits that are most consistently associated with SWB. Specifically, extraversion has been reliably positively associated with PA (e.g., DeNeve & Cooper, 1998; Emmons & Diener, 1985; Steel et al., 2008) and has played a moderating role in some happiness and well-being interventions (e.g., Schueller, 2012; Wellenzohn et al., 2018), but not all (Senf & Liau, 2013). Conversely, neuroticism has been reliably negatively associated with NA (e.g., DeNeve & Cooper, 1998; Emmons & Diener, 1985; Steel et al., 2008). However, the role of neuroticism and SWB interventions have been inconsistent. The current study sought to answer whether personality traits and other baseline factors predict the degree to which individuals benefit from ENHANCE.

4.2.1 Neuroticism. While it was hypothesized that from one perspective, those higher in neuroticism would receive greater benefits from ENHANCE, it has also been suggested that
those higher in neuroticism may require to put forth significantly more effort throughout the intervention and perhaps gains would be minimal, or not longstanding. Interestingly, in the current study, both perspectives were confirmed. The first perspective was supported by the finding that higher neuroticism significantly predicted increases in PA from T1 to T2, and compared to those low and moderate, those higher on neuroticism did in fact receive significantly greater gains than those low on neuroticism. From T2 to T3, however, there were no within or between group differences. Although those higher on neuroticism benefitted greater during the initial 3-month active phase of ENHANCE, different levels of neuroticism did not predict the ability to maintain gains received during the latter 3-month maintenance phase.

The second hypothesized perspective was supported by the finding that while higher neuroticism significantly predicted decreases in NA from T1 to T2 (and compared to those low on neuroticism did experience significantly greater decreases in NA) this was not the case for T1 to T3. More importantly, those higher on neuroticism exhibited significant increases in NA during the follow-up/maintenance period. These findings suggest that while those higher on neuroticism greatly benefitted from ENHANCE in the 3-month active period, they were quick to revert to their ‘old ways’ once treatment was decreased, even to bi-weekly. As hypothesized, it may be that individuals higher on neuroticism require more time to create and maintain new lifestyle changes and would benefit from a more involved maintenance period. Despite bi-weekly contact during the follow-up/maintenance period, it is clear this was not enough for individuals higher on neuroticism in order to maintain their initial decrease in NA. However, perhaps it was not just the frequency of contact, but also the form of communication during this period that may be important. The active period of ENHANCE consisted of weekly in-person
group sessions; whereas, the follow-up period consisted of alternating bi-weekly phone calls and groups sessions (for a total of three phone calls and three groups over three months). Perhaps individuals higher on neuroticism (who are more sensitive to the perceptual affect of others (Klammer et al., 2017)) particularly benefitted from the face-to-face group interaction that was offered weekly throughout the active phase. Future ENHANCE research could explore the role of both frequency and modality of long-term follow-up in order to determine which elements or combination are best for individuals higher on neuroticism to maintain their decreases in NA following initial treatment.

Lastly, the trait of neuroticism did not significantly predict changes in SWLS.

**4.2.2 Extraversion.** It was hypothesized that those with higher extraversion would receive greater benefits from engaging in ENHANCE as they may enjoy, seek out, and continuously engage in the activities in ENHANCE; however, the current study did not support this hypothesis. Extraversion was not predictive of changes in PA from T1 to T2, but lower extraversion significantly predicted increases in PA from T1 to T3. These findings suggest that while on average, everyone benefitted from ENHANCE during the active phase, those lower on extraversion experienced the most significant gains across the 6-month study. One possible explanation is that those with lower levels of extraversion had to apply more effort, time, and resources to participate in the ENHANCE intervention, and as a result, skills became more ingrained and longstanding. Alternatively, perhaps individuals higher in extraversion thrived from T1 to T2 due to the group format (i.e., the social interaction and bonding - otherwise known as the *instrumental* explanation (McCrae & Costa, 1991)) and once the weekly group ended their additional benefits ended too (explaining the significant decrease in PA from T2 to T3). Similar to future suggestions for those higher on neuroticism, perhaps future ENHANCE
research may want to examine the role of both frequency and modality of the long-term follow-up period in order to determine which elements or combination are best for individuals higher on extraversion to maintain their gains following initial treatment.

Extraversion did not significantly predict changes in NA across any time points, suggesting that regardless of where individuals score on the personality trait of extraversion, they will reap significant benefits of decreasing NA from participating in ENHANCE. This finding is important as there has been little research on how the role of extraversion plays on decreasing NA. It may be assumed that perhaps those lower on extraversion could gain greater benefits, but the current findings do not support that.

Lastly, the trait of extraversion did not significantly predict changes in SWLS. Contrary to the hypotheses, conscientiousness, openness to experience, and agreeableness did not predict changes in SWB. That is, changes in SWB after engaging in ENHANCE did not depend on the degree to which one was conscientious, open to new experiences, or agreeable.

In summary, there are three major conclusions about the personality findings. First, of all the personality factors, only higher neuroticism and lower extraversion predicted greater gains in increasing PA and decreasing NA. Second, in some cases (higher neuroticism and higher extraversion) gains significantly dropped during the maintenance phase, suggesting the critical challenges and importance of maintaining successful behavioural changes over the long-term. Third, personality did not predict the effectiveness of ENHANCE on increasing SWLS. Instead, on average, all participants experienced gains in SWLS.

4.3 Psychological Need Satisfaction

Derived from self-determination theory, autonomy, competence, and relatedness are three psychological needs that are inherently desired to be met in order to achieve a truly
fulfilling life (Deci & Ryan, 2000). Accordingly, individuals often engage in behaviours and set goals that would result in satisfying these needs (Deci & Ryan, 2000). Satisfying psychological needs can be seen as the motivators to continuing or changing behaviours. While need satisfaction has been associated with SWB (e.g., Reis et al., 2000; Sapmaz et al., 2012), until now, no research has examined the role of these psychological needs in changes to SWB after a SWB intervention.

4.3.1 Autonomy. While it was hypothesized that those higher on the need satisfaction of autonomy at baseline would receive greater benefits from ENHANCE, the current data supported this for one aspect of SWB, but not all. Specifically, in contrast to the hypothesis, lower autonomy at baseline, significantly predicted higher increases in SWLS and PA across all times points. Because ENHANCE promotes independent ideas and perspective, goal pursuit, and learning, these findings may indicate that those who are most in need of fulfilling their desire for autonomy, benefit significantly from the autonomy that ENHANCE fosters and instills within the intervention. The ENHANCE intervention may have provided individuals a sense of mastery, which then allowed them to experience more frequent positive emotions and as a result, view their life more favourably (i.e., increase SWL). This likely reinforced their continued involvement and participation throughout the intervention to continue to reap the benefits it offers. Fredrickson’s (2001) broaden-and-build theory of positive emotions is an excellent explanation for these findings. That is, when individuals experience more frequent PA they continue to seek out more opportunities to better their lives such as seeking out resources, strengthening their relationships, improving their health, etc, which in turn, has subsequent positive impacts on their lives.
The hypothesis was supported by the findings for NA; that is, higher levels of autonomy at baseline significantly predicted decreases in NA from T1 to T2. Given that higher autonomy is associated with greater well-being (i.e., more frequent positive emotions, less frequent negative emotions, and greater life satisfaction), it may be for this very reason that when faced with more painful or distressing emotions these individuals struggle because they do not experience them as often. Consequently, it may be that ENHANCE provided these individuals with skills, guidance, and practice in working through negative thoughts and emotions that they reaped more benefits. Regardless of where individual psychological needs for autonomy are at baseline, results from the present study showed that the ENHANCE intervention is effective. Those lower on autonomy at baseline significantly predict gains in SWLS and PA; whereas, those higher on autonomy at baseline predict significant decreases in NA. These findings are imperative because whether an individual is low or high on the psychological need satisfaction of autonomy at baseline, they are gaining from the ENHANCE intervention.

4.3.2 Competence. It was hypothesized that those higher in need satisfaction of competence at baseline would receive greater benefits from ENHANCE, and the current data supported the hypothesis for one aspect of SWB, but not all. Specifically, lower competence at baseline significantly predicted increases in PA across all time points, but higher competence significantly predicted decreases in NA across all time points. The ENHANCE intervention provided participants with evidenced-based skills that would likely contribute to one’s feelings of competency and growth. It is therefore, not surprising that those lower on this need satisfaction (i.e., with the desire to satisfy this need), would benefit from such an intervention and consequently reap increases in positive affect. Feeling competent feels good and feeling good leads individuals to seek out more opportunities to grow (Fredrickson, 2001).
Regarding NA, findings revealed that higher competence at baseline predicted significant decreases over time. The skills and activities in ENHANCE that specifically focus on negative emotions and thoughts can be more challenging to tackle. Consequently, those with higher perceptions of competency and skills at baseline may be better equipped to cope with these challenges and, therefore, experience more significant decreases in negative affect. During the maintenance phase, however, these same individuals experienced a significant increase in NA. It may be beneficial for researchers and clinicians alike to determine whether individuals have met their need of competency before trying to change their negative affect for most successful outcomes. However, similar to the personality findings, it is important to provide a more gradual or prolonged transition after the active intervention ends, while encouraging continued use of learned skills to maintain the gains they received in NA.

Lastly, baseline need satisfaction of competence did not predict any changes in SWLS between any time points.

4.3.3 Relatedness. While it was hypothesized that those higher in need satisfaction of relatedness at baseline would receive greater benefits from ENHANCE, the current data supported the hypothesis for one aspect of SWB, but not all. Whereas lower relatedness at baseline significantly predicted increases in PA across all time points, higher relatedness at baseline significantly predicted decreases in NA from baseline to follow-up. While these findings are similar to the other need satisfactions, they need to be interpreted with caution as the sample size was significantly smaller. While the in-person group format of ENHANCE is led by skilled clinicians that are trained to assist in forming a sense of community and belonging within the group, it may be that those lower on relatedness benefited the most and their ability to experience PA was maximized. However, importantly, there were no differences
in SWB outcomes for online and in-person formats of ENHANCE suggesting that the benefits of a group format (i.e., feeling validated and supported by others) cannot entirely explain these findings. In short, perhaps those lower on relatedness before starting ENHANCE needed a sense of connection and belonging (both of which are associated with SWB) and as these needs were being met (regardless of online or in-person involvement), their ability to engage in and benefit from happiness interventions was enhanced. On the other hand, those higher on relatedness before starting ENHANCE may have benefitted more from exploring the quality of their relationships and the negative emotions and thoughts that can accompany relationships.

Lastly, baseline need satisfaction of relatedness did not predict changes in SWLS.

The implication of these findings are that clinicians and researchers need not worry whether a certain amount of need satisfaction is required for this intervention to be effective because whether one’s needs are fulfilled or lacking, they will reap benefits from ENHANCE. Instead, it may be more of a question of what area the individual is striving to improve on (i.e., increasing frequency of their PA or decreasing frequency of their NA). Future research would benefit from taking these findings one step further by conducting an RCT explicitly investigating the effectiveness of ENHANCE on different baseline levels of psychological need satisfaction to elucidate and determine whether gains are significantly greater for some groups compared to others. Additionally, future research could examine whether changes in psychological needs mediate changes in SWB to further help illuminate the path and process by which changes occur after engaging in SWB interventions.

**4.4 Implicit Theories of Well-Being**

Individuals have personal beliefs about the extent to which specific characteristics are within their ability to change (growth/incremental mindset) or not change (entity mindset;
Dweck, 1999, 2016; Dweck et al., 1995; Dweck & Leggett, 1988). A growth mindset of well-being has been positively associated with well-being, whereas an entity mindset has been negatively associated with well-being (e.g., Bernecker et al., 2017). While experimentally manipulating ITWB has demonstrated effectiveness, no literature has examined whether there is an association between baseline ITWB and SWB intervention effectiveness. Accordingly, the current study examined whether baseline ITWB predicted changes in SWLS after participants engaged in the ENHANCE intervention.

The current study did not support the hypothesis that incremental beliefs of well-being would report greater SWB outcomes after ENHANCE. Prior beliefs of whether or not one can change their well-being did not significantly predict changes in SWB (i.e., PA, NA, or SWLS). These findings need to be interpreted with caution however, as the sample size was significantly smaller, using ENHANCE 2.0 data only, and lacked the range of scores to examine both entity and incremental beliefs. First, when conducting a pos hoc power analysis using GPower (Erdfelder, Faul, Buchner, 1996) with power set at 0.90 and $\alpha = .05$ (one-tailed) it was determined that a sample of $N = 88$ was necessary to detect effects. Second, descriptive and frequency statistics demonstrated a significant lack of range on the lower end of the scale, suggesting that the current sample had few individuals who endorsed an entity mindset. This further explains the small and non-significant correlations between ITWB and SWLS, PA, and NA, which is inconsistent with prior literature (Passmore et al., 2018). Additionally, participants in the current study voluntarily signed up for this study, intending to improve their well-being, further supporting their incremental mindsets. Importantly, however, ENHANCE was able to significantly increase their incremental beliefs in the longer-term (from T1 to T3). Last, both RCT’s used a depression screening tool to exclude individuals who may be
experiencing severe symptoms of depression, and more likely individuals who endorse an entity mindset.

While the current study sought out to include healthy community adults, future studies assessing different populations may be better able to answer whether baseline ITWB predicts changes in SWB after engaging in ENHANCE. Future research directions should explore more explicitly whether there are any well-being outcome differences between those who endorse an entity versus an incremental mindset. Such a study could truly answer whether groups of individuals based on entity vs. incremental mindsets influence the benefits received from ENHANCE. In addition to further exploring the moderating role of ITWB, it would also be beneficial to investigate the mediating role of ITWB on changes in SWB after participating in SWB interventions. To this end, research in ITWB is in its inception and the current study only sheds a glimmer of light into this prosperous area of research.

4.5 Influence of Baseline Satisfaction with Life on SWB

The graphical representation of low, moderate, and high levels of SWLS at baseline (Figures 9 through 11) and change across time in SWLS, PA, and NA displayed that no group was sitting at the floor or ceiling, and therefore had room for improvement. Further, ANOVA findings revealed that those with low and moderate levels of SWLS at baseline experienced greater gains in PA and SWLS (from T1 to T2 and T1 to T3) than those with high levels of SWLS at baseline. Interestingly, however, there were no group differences in outcomes for NA across any time points of the study. These findings tell us that although those lower on SWLS at baseline reap greater benefits in increasing PA and SWLS after engaging in ENHANCE, compared to those high on SWLS at baseline, these group differences did not exist for

56
decreasing NA. Consequently, for the most part, regardless of baseline life satisfaction, individuals benefited from ENHANCE, just in different ways.

It is worthwhile mentioning that individuals higher on SWLS at baseline still benefitted, as ENHANCE may have provided a setting and an opportunity to review, practice, and reintegrate skills in a way that may be consistent with how they were already living. Whether or not statistical significance would be found, clinical significance, utility, and quality of life may be the more important markers here. Overall, the ENHANCE intervention provided an additional reinforcing setting for them to practice and maintain their lifestyle – one that was already contributing to their high SWLS.

4.6 Strengths, Limitations, and Future Directions

There are several critical strengths of the current study. First, the findings are the first to shed light on the for whom a well-being intervention such as ENHANCE might work best. Second, is it one of the first studies to thoroughly examine the role of several baseline individual characteristics in predicting changes in SWB from a SWB intervention. Third, it included a longer intervention than typically seen in the positive psychology literature, a large sample of community participants, and assessed change over a longer period of time (6-months). Last, but certainly not least, ENHANCE 1.0 demonstrated that there were no significant differences on SWB between those who participated in an online format compared to an in-person format of ENHANCE. These findings are an important strength in not only understanding the current findings (i.e., the nature of group effects would not be an explanation of our findings), but also to the larger dissemination of ENHANCE in reaching and benefitting more individuals and communities, particularly underserved populations who may have
difficulty accessing interventions (e.g., physical or financial barriers, but also barriers associated with stigma of improving mental health and well-being).

Like any research, there are limitations of the current study that are important to consider and may inform future research. First, while ENHANCE 1.0 and 2.0 each included a control or comparison group, the current study did not include the control data as the form of control differed between the two studies. A control group would have provided more statistical options in addressing additional research questions such as the mediational role of any of these individual factors (i.e., having an independent variable – ENHANCE versus control – and assessing the way in which it impacted the dependent variable - SWB). Further, a control group would strengthen the current findings to ensure changes and explanations were likely specifically due to ENHANCE and no other third variable. Second, while the present study utilized a community adult sample vs. the typical student sample, the current sample was not a representative sample of the North American population at large. That is, participants in the present study had a higher SES (i.e., educated and higher income) group. Therefore, conclusions may be limited only to other similar groups. Importantly, however, few studies within this area of research seek out a non-student, healthy community population – a population that was the initial scope of interest in positive psychology (i.e., moving individuals from a ‘neutral/languishing’ state of being to a state of well-being and ‘flourishing’; Keyes, 2005). Moreover, the current sample provides a similar exemplar of the demographics in North America that is currently at greatest risk for mental illness and suicide (WHO, 2016), and consequently, the current research provides support for critical prevention implementation. Nevertheless, future research could explore the difference in outcomes by seeking out more variability among participant samples (including clinical populations) to better contribute to the
generalizability of findings or the potential moderating influence demographic variables contribute. Third, as previously mentioned, specifically seeking more variability or equality between entity vs. incremental mindsets of ITWB would have strengthened the current findings and therefore, recommended to pursue in future research.

While it is known that a proportion of SWB is stable (e.g., Lucas, 2018), measuring both state and trait well-being in future SWB intervention studies may help to elucidate whether findings are due to current life circumstances or a shift in trait well-being. Particularly examining this in a longer-term intervention such as ENHANCE, compared to a brief, single happiness intervention, would be more advantageous in determining state versus trait changes.

It is critical to recognize the pitfalls associated with creating arbitrary cut-offs on continuous variables (Dawson & Weiss, 2012) that was used in the present study to observe and analyze low, moderate, and high levels of any of the baseline characteristics. Nevertheless, as the first examination of this kind, it was critical to begin to explore both visual and statistical differences between group characteristics.

When it comes to mental health and well-being, quantitative data are not enough. Future research exploring the ENHANCE intervention should include qualitative assessments to better elucidate participants’ perceptions of gains and losses throughout the study. Participants could share which components of the intervention were most impactful, enjoyable, and challenging. Such rich data could not only inform researchers on ways to continue to improve ENHANCE but may also help expand the current findings on individual differences and the effectiveness of well-being interventions. If supported, adaptations of ENHANCE can be developed to suit groups of individuals, analogous to other well-established interventions aimed to decrease ill-being (e.g., cognitive-behavioural therapy).
Last, more researchers are encouraged to continue this line of research in identifying moderators that influence the effectiveness of well-being interventions using rigorous study designs. Current meta-analyses have concluded mixed findings (Bolier et al., 2013; Sin & Lyubomirsky, 2009) and while there have been some explanations for these differences (e.g., White et al., 2019), alternative explanations can be the differing effects interventions have on different groups of individuals.

4.7 Conclusion

A state of well-being has more recently been defined as not only a state free of illness and disability, but also one that consists of happiness, positive relationships, and life satisfaction (WHO, 2015). Consequently, more and more well-being interventions that have focused on increasing positive experiences have been developed and tested. However, despite the significant increase in newly developed interventions, little research has examined the potential influence and association of individual baseline characteristics (i.e., personality, need satisfaction, and entity vs. incremental beliefs of well-being) on the effectiveness of these interventions. Accordingly, the current study sought to examine whether these baseline characteristics predicted the effectiveness of ENHANCE, a 6-month SWB intervention (3-month active phase followed by a 3-month maintenance/follow-up phase; Heintzelman et al., 2019).

Findings revealed that both neuroticism and extraversion predicted changes in PA and NA. Specifically, higher neuroticism predicted increases in PA and decreases in NA, and lower extraversion predicted increases in PA. Given that personality and life satisfaction are more global and tend to be reasonably stable (Lucas, 2018; Magnus & Diener, 1991), personality did not play a predictive role in changing life satisfaction. What is particularly novel and
informative from the present study is the examination of the association of personality on a longer well-being intervention that consists of a variety of happiness activities. Importantly, regardless of whether an individual scored as low, moderate, or high on neuroticism or extraversion, on average, everyone benefitted from ENHANCE.

While both these personality traits displayed substantial benefits during the active phase of ENHANCE, those higher on neuroticism and higher on extraversion were unable to adequately maintain their gains in decreasing NA and increasing PA, respectively, after the intervention was completed during the follow-up maintenance period. This finding may suggest that a more gradual or consistent modality of transition may be required to help individuals with adjusting to no longer attending weekly group sessions. These findings speak to how critical it is to consider personality traits for well-being behavioural change interventions in the long term. Thus far, most well-being interventions are very brief and with infrequent contact (in comparison to the 6-month ENHANCE intervention); therefore, it is crucial to question how impactful such short interventions are in the longer term, particularly for individuals who are higher on neuroticism and higher on extraversion.

When exploring baseline psychological need satisfaction, lower need satisfaction at baseline (for autonomy, competence, and relatedness) predicted increases in PA from baseline to post and to follow-up. In contrast, higher baseline need satisfaction (for autonomy, competence, and relatedness) predicted decreases in NA across the same time points. Those higher on competence, however, experienced a significant increase in NA during the maintenance phase. Importantly, when visually examining low, moderate, and high levels of baseline needs, all groups benefited from the intervention. These findings indicate that ENHANCE is beneficial regardless of whether an individual’s psychological needs are satisfied
before the program. In fact, these findings suggest that ENHANCE is a well-rounded program that is meeting individuals needs differently (i.e., increasing PA or decreasing NA) and that everyone has opportunities to benefit. Nevertheless, maintaining gains in decreasing NA posed to be challenging for those higher on competence and consequently, they may require additional support during the transition between active and maintenance phases.

The research area of implicit theories of well-being is in its infancy, and the current exploratory findings only shed a glimmer of light in this area. Findings revealed that ITWB did not significantly predict changes in SWLS, PA, or NA. This would suggest that it does not matter whether individuals hold an entity or incremental mindset of well-being before starting ENHANCE, they will benefit. However, it is important to reiterate that the current sample held, on average, higher incremental mindsets, which reduces the variability and could be biasing the data. Nevertheless, this is one of the first studies to explore this question and helps inform future research directions. Within the specific objective of the current study, these findings are consistent with the other present findings that ENHANCE has demonstrated to be an effective intervention despite prior beliefs in changing one’s well-being before starting the intervention.

Lastly, when exploring low, moderate, and high levels of SWLS at baseline and the trajectory of change in SWLS, PA, and NA across time points, those low and moderate on SWLS at baseline gained significant increases in PA and SWLS when compared to those high on SWLS at baseline, however, these differences were not apparent when examining changes in NA. In fact, there were no group differences and therefore, regardless of different baseline levels of SWLS everyone experienced a decrease in NA. Consistent with previous findings throughout this study, ENHANCE showed to have beneficial effects on one SWB component or another, for most individuals.
Overall, ENHANCE was shown to be an effective intervention in increasing SWB, regardless of several baseline predictors. Notably, there was only one predictor of change in SWLS - need satisfaction of autonomy. Life satisfaction is a more global perspective on one’s life holistically. It is different from reflecting on emotions alone. Therefore, globally, personality factors, baseline need satisfaction, and baseline implicit theories of well-being did not predict the effectiveness of ENHANCE increasing SWLS. That is, ENHANCE is effective at increasing SWLS regardless of these baseline factors. Where these baseline factors do matter is on more significant changes in PA and NA. Our data showed that regardless of baseline levels (low, moderate, or high) there were benefits across the board; however, some baseline levels experienced greater benefits, such as those higher on neuroticism, in increasing PA and decreasing NA, and lower on extraversion, in increasing PA. Similarly, and just as important, there are some traits that although exhibited greater benefits during the active phase, they also experienced significant dips in their gains during the maintenance stage such as higher neuroticism experiencing an increase in NA, higher extraversion experiencing a decrease in PA, and higher need satisfaction of competency experiencing an increase in NA. These critical and original findings support the value and necessity in ensuring new learned skills are maintainable in the long-term, particularly the skills that reduce or better manage NA.

On a larger, more theoretical scale, the current novel findings indicate that there is a relationship between personality, baseline need satisfaction, and baseline levels of SWLS with SWB interventions. While it is well known within social and clinical psychology that ‘no one intervention or program fits all’ – the findings of the current study demonstrate that the ENHANCE intervention is a great exemplar, or could be considered the gold standard, of
successfully and effectively meeting several individual needs and differences in one way or another.
Table 1. ENHANCE happiness principles and treatment session order

<table>
<thead>
<tr>
<th>Session number</th>
<th>Session topic / Happiness principle</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction</td>
</tr>
<tr>
<td>2</td>
<td>Values and roles</td>
</tr>
<tr>
<td>3</td>
<td>Goals</td>
</tr>
<tr>
<td>4</td>
<td>Character strengths</td>
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<tr>
<td>5</td>
<td>Mindfulness</td>
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<tr>
<td>6</td>
<td>Dealing with negativity</td>
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<tr>
<td>7</td>
<td>Savoring</td>
</tr>
<tr>
<td>8</td>
<td>Close relationships</td>
</tr>
<tr>
<td>9</td>
<td>Gratitude</td>
</tr>
<tr>
<td>10</td>
<td>Social interactions</td>
</tr>
<tr>
<td>11</td>
<td>Prosocial behavior</td>
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<tr>
<td>12</td>
<td>Conclusions</td>
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Table 2.
Descriptives and paired t-test comparisons of outcome variables for each time point

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<tr>
<th>Variable</th>
<th>α</th>
<th>M(SD)</th>
<th>N</th>
<th>M(SD)</th>
<th>N</th>
<th>M(SD)</th>
<th>N</th>
<th>Paired t test T1 to T2</th>
<th>Paired t test T1 to T3</th>
<th>Paired t test T2 to T3</th>
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<tbody>
<tr>
<td>SWLS</td>
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<td>18.65(3.90)</td>
<td>111</td>
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<td>$t(96) = .642$</td>
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<td>10.86(4.18)</td>
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Note. * = p < .050; ** = p < .010; α = Cronbach’s alpha; BFI-A (Big Five Inventory – Agreeableness); BFI-C (Big Five Inventory – Conscientiousness); BFI-E (Big Five Inventory – Extraversion); BFI-N (Big Five Inventory – Neuroticism); BFI-O (Big Five Inventory – Openness); d = Cohen’s d effect size; ITWB (Implicit Theories of Well-Being – possible range of 1-40); NA (Negative Affect – possible range 6-30); NS-Aut (Need Satisfaction – Autonomy – possible range of 3-15); NS-Comp (Need Satisfaction – Competence – possible range of 3-15); NS-Rel (Need Satisfaction: Relatedness – possible range of 3-15); PA (Positive Affect – possible range of 5-35); SWLS (Satisfaction with Life Scale – possible range of 5-35).

a ENHANCE 1.0 data only. b ENHANCE 2.0 data only. c No longer significant after applying a Bonferroni correction.
Table 3.
Correlations between all baseline variables

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<th>PA</th>
<th>NA</th>
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<th>BFI-C</th>
<th>BFI-E</th>
<th>BFI-A</th>
<th>BFI-N</th>
<th>NS-Aut</th>
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<td>.522**</td>
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*Note. N = 113, p < .050; ** = p < .010. BFI-A (Big Five Inventory – Agreeableness); BFI-C (Big Five Inventory – Conscientiousness); BFI-E (Big Five Inventory – Extraversion); BFI-N (Big Five Inventory – Neuroticism); BFI-O (Big Five Inventory – Openness); ITWB (Implicit Theories of Well-Being); NA (Negative Affect); NS-Aut (Need Satisfaction – Autonomy); NS-Comp (Need Satisfaction); NS-Rel (Need Satisfaction: Relatedness); PA (Positive Affect); SWLS (Satisfaction with Life Scale).

*ENHANCE 2.0 data only (N = 45).
Table 4.
Predicting SWLS, PA, and NA from personality

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<td>Agreeableness</td>
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<td>.646</td>
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<tr>
<td>Neuroticism</td>
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<td>.575</td>
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</tbody>
</table>

| Predicting PA |      |     |     |      |     |     |
|----------------|      |     |     |      |     |     |
| Constant       | 3.269| 5.449| .550| 3.368| 7.185| .640 |
| Openness       | -.091| .716 | .013| .899 | .504 | .903 | .058 | .578 |
| Conscientiousness| .143 | .754 | .018| .850 | 1.010| .984 | .103 | .307 |
| Extraversion   | -.945| .546 | -.179| .087 | -1.982| .688 | -.314| .005**|
| Agreeableness  | -.672| .761 | -.089| .379 | -.539| 1.023| -.055| .599 |
| Neuroticism    | 1.572| .673 | .243| -.021| .692 | .889 | .085 | .438 |

| Predicting NA |      |     |     |      |     |     |
|----------------|      |     |     |      |     |     |
| Constant       | 5.652| 6.021| .350| 1.893| 6.543| .773 |
| Openness       | -.231| .792 | -.029| .771 | -.598| .822 | -.078| .469 |
| Conscientiousness| -.805| .833 | -.092| .336 | -1.727| .896 | -.199| .057 |
| Extraversion   | .078 | .604 | .013 | .898 | .379 | .626 | .068 | .547 |
| Agreeableness  | .486 | .841 | .058 | .565 | 1.388| .931 | .159 | .140 |
| Neuroticism    | -2.455| .743 | -.345| .001**| -.718| .809 | -.099| .378 |

Note. * = p < .050; ** = p < .010; NA (Negative Affect); PA (Positive Affect); SWLS (Satisfaction with Life Scale).
Table 5.

Predicting SWLS, PA, and NA from need satisfaction autonomy and competence

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<td>$\beta$</td>
<td>$p$</td>
<td>$\beta$</td>
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Note. * = $p < .050$; ** = $p < .010$; NA (Negative Affect); PA (Positive Affect); SWLS (Satisfaction with Life Scale).
Table 6.
Predicting SWLS, PA, and NA from need satisfaction relatedness

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Note. ENHANCE 1.0 data only (N = 61 – 65). * = p < .050; ** = p < .010; NA (Negative Affect); PA (Positive Affect); SWLS (Satisfaction with Life Scale).
Table 7.
Predicting SWLS, PA, and NA from implicit theories of well-being

<table>
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Note. ENHANCE 2.0 data only (N = 37-45). ITWB (Implicit Theories of Well-Being); NA (Negative Affect); PA (Positive Affect); SWLS (Satisfaction with Life Scale).
Figure 1. Positive affect across time for low, moderate, and high neuroticism.
Figure 2. Positive affect across time for low, moderate, and high extraversion.
Figure 3. Negative affect across time for low, moderate, and high neuroticism.
Figure 4. Life satisfaction across time for low, moderate, and high need satisfaction of autonomy at baseline.
Figure 5. Positive affect across time for low, moderate, and high need satisfaction of autonomy at baseline.
Figure 6. Positive affect across time for low, moderate, and high need satisfaction of competency at baseline.
Figure 7. Negative affect across time for low, moderate, and high need satisfaction of autonomy at baseline.
Figure 8. Negative affect across time for low, moderate, and high need satisfaction of competency at baseline.
Figure 9. Life satisfaction across time for low, moderate, and high life satisfaction at baseline.
Figure 10. Positive affect across time for low, moderate, and high life satisfaction at baseline
Figure 11. Negative affect across time for low, moderate, and high life satisfaction at baseline
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https://doi.org/10.1007/s10902-005-0868-8


