

## ENHANCE: Design and rationale of a randomized controlled trial for promoting enduring happiness & well-being



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### ABSTRACT

Individuals who are higher in subjective well-being not only *feel* happier, they are more likely have fulfilling relationships, increased work performance and income, better physical health, and longer lives. Over the past several decades, the science of subjective well-being has produced insights into these benefits of happiness, and—recognizing their importance—has begun to examine the factors that lead to greater well-being, from cultivating strong relationships to pursuing meaningful goals. However, studies to date have typically focused on improving subjective well-being by intervening with singular constructs, using primarily college student populations, and were short-term in nature. Moreover, little is understood about the impact of a well-being treatment delivered online vs. in-person. In the present article, we describe a comprehensive intervention program including 3-month initial treatment followed by a 3-month follow-up, ENHANCE: Enduring Happiness and Continued Self-Enhancement. One-hundred and sixty participants will be recruited from two different sites to participate in one of two versions of ENHANCE: in-person ( $n = 30$ ) vs. wait-list control ( $n = 30$ ); or online ( $n = 50$ ) vs. wait-list control ( $n = 50$ ). Assessments will be completed at baseline, three months and six months. Our primary outcome is change in subjective well-being across treatment (3 months) and follow-up (6 months). Secondary outcomes include self-report and objective measures of health, as well as a psychological mediators (e.g., psychological needs) and moderators (e.g., personality) of treatment outcomes. We hope to provide researchers, practitioners, and individuals with an evidence-based treatment to improve happiness and subjective well-being.

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### 1. Introduction

People across the globe view feeling happy as both important and valuable [1]—in fact, a majority rate it to be *extraordinarily* important. Many clinical interventions exist to alleviate the symptoms of a range of conditions that may prevent people from being happy—from obesity [2] to depression [3] and physical pain [4]. Yet, happiness is not simply the absence of unpleasant symptoms and negative affective states; rather, happiness requires the presence of positive emotions and satisfaction with one's life as well as feelings of meaning and fulfillment [1]. Happiness not only feels good, it also plays a causal role in producing benefits across multiple life domains, including relationships, income, work performance, and health and longevity [5–7], making happiness both a fundamental human goal [8] and also a state with both individually and societally important benefits. This raises the age-old question:

Can those who seek greater happiness intentionally increase it—and if so, how? This question has prompted the construction and validation of a number of positive psychology interventions (PPI). To date, however, randomized controlled trials testing the effectiveness of comprehensive PPIs in nonclinical community samples are limited.

Although the literature abounds with PPIs [9–11], such interventions have been limited in several important ways. First, most existing PPIs are restricted in conceptual breadth, most commonly focusing on only a single skill, such as expressing gratitude [12] or developing emotional regulation skills (e.g., [13–15]). Furthermore, the effectiveness of these one-shot approaches to happiness have typically been explored in brief one to two week interventions (for reviews, see [9–11]). In fact, even programs focusing on multi-construct approaches have employed brief one-week interventions [16]. Finally, many of these brief single-approach interventions have been conducted with college populations, limiting the generalizability of the findings (e.g., [15]).

In addition to the multitude of brief, single-modal PPIs, there are a few notable exceptions of more comprehensive programs, including Quality of Life Therapy [17], Hope Therapy [18], Well-Being Therapy [19], and Fordyce's program to “increase personal happiness” [20]. The

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science of happiness, however, is a dynamic and quickly developing field; since Diener's (1984) seminal paper on the topic [21], research in this area has increased exponentially. Many new insights about how people can cultivate happiness in their daily lives have accumulated since the development of previous comprehensive multi-construct PPIs. Recent research provides evidence suggesting that, for example, people feel happier after expressing gratitude [12], applying their character strengths [22], doing kind things for others [23,24], and cultivating mindfulness [25] (see also: [26–29]; for a recent comprehensive review, see [10]). These many advances in the science of happiness in recent years necessitate an updated approach to increasing happiness.

In the present research, we propose a multi-construct 12-week program based on the latest empirical findings on happiness: ENHANCE. The program is designed to develop knowledge and skills related to happiness through a 3-month initial treatment program followed by a 3-month follow-up maintenance phase. To test the effectiveness of ENHANCE, we will conduct a two-site randomized controlled trial with wait-list controls. Unlike some of the existing comprehensive programs (e.g., Well-Being Therapy, Hope Therapy; [18,30]), ENHANCE is designed for a nonclinical population interested in experiencing greater happiness, rather than the amelioration of clinical symptoms—our protocol specifically excludes people currently experiencing symptoms of depression. Our primary goal is to test the *initial efficacy* of the program and our primary outcome is subjective well-being (i.e., life satisfaction, positive affect, & negative affect) at post-treatment (3-months) and follow-up (6-months).

In addition to providing a unique multi-construct program based on contemporary empirical findings, our use of a high-fidelity randomized controlled trial to test program effects makes additional contributions to the existing PPI literature as well. First, building upon existing theory [31,32], we measure components of psychological well-being from a range of theoretical perspectives (e.g., psychological need satisfaction) in order to examine their role as mechanisms in predicting subjective well-being (e.g., positive emotions). Second, while a large body of research documents the beneficial effects of happiness for other important outcomes (e.g., health, relationships, and productivity [33–35]), limited research has directly examined the causal role of happiness intervention programs in producing those outcomes. We will directly test the causal role of happiness in affecting downstream outcomes across a wide-range of life domains. Finally, although both online and in-person PPIs exist, no randomized controlled trials have administered the same program via both formats. We will administer the ENHANCE program both online and in-person to examine whether each strategy is effective for increasing well-being, informing future dissemination strategies for empirically-based PPIs. Our central hypotheses are that participants randomized to the ENHANCE intervention will report and exhibit significant improvements in subjective well-being and on the secondary outcome measures.

## 2. Method

### 2.1. Study design

The initial test of the ENHANCE program consists of two parallel randomized clinical trials examining the impact of ENHANCE delivered either in-person or online (British Columbia, Canada, and Virginia, U.S.A., respectively). Both interventions will consist of a 3-month initial treatment program, delivered weekly, and followed by biweekly follow-up content for 3 additional months. Participants will be randomized to either an active treatment group or a wait-list control group, which will complete ENHANCE following the completion of the primary 6-month trial.

We chose a wait-list control over an active control group for two central reasons. First, there is no comparable treatment-as-usual or best practice for increasing happiness in a nonclinical community sample that would conform to the acknowledged standards of evidence-

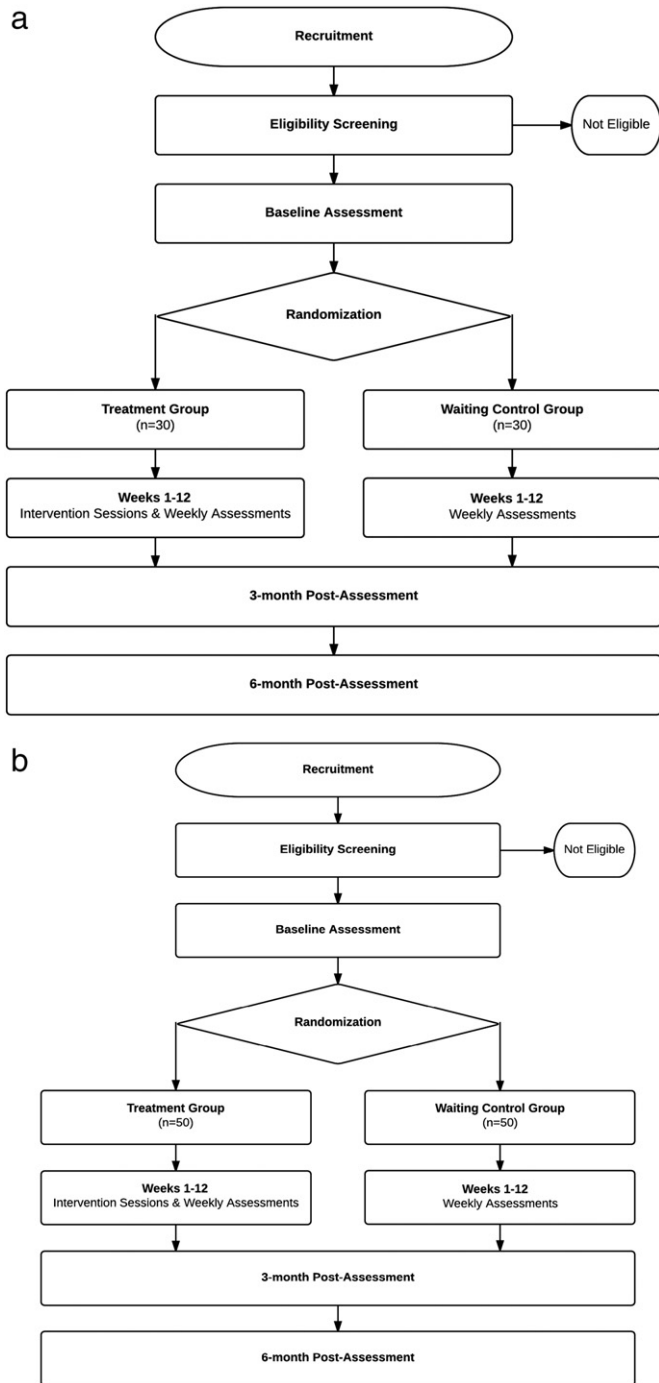
based practice (see APA Presidential Task Force on Evidence-Based Practice [36]). In the absence of a rigorous, evidence-based, CONSORT-consistent, manualized program to employ as a comparison group, another option would be to administer an inert treatment to the control condition. However, we feel ethically compelled to provide all participants with the happiness knowledge and skills they are seeking through enrollment in our study. Administering ENHANCE to a placebo control condition at the end of the study would require that control participants spend a great amount of time (i.e., every week for 6 months) on inert activities prior to beginning the 6-month active program. Because we are interested in recruiting a broad community sample to maximize the generalizability of our findings, we do not wish to constrain the sample to only individuals who could meet such demanding participation requirements.

Given the limitations of these alternate study designs, and our goal of demonstrating the initial efficacy, feasibility and acceptability [37] of ENHANCE against a control prior to exploring comparative or *pragmatic effectiveness*, we employ a wait-list control design (see [38], for nuanced discussion of control group choices). Still, to address the known limitations of a wait-list control design compared to a placebo control design, namely producing effects due to demand characteristics, we have taken care to include alternate measures of SWB (i.e., memory-based measures and informant-report measures) and downstream outcomes (e.g., blood pressure) that are less susceptible to biased responding than other self-report measures of SWB.

Assessments will take place at baseline, three months, and six months. The in-person version of the program will involve weekly group sessions (group size = 12–18 participants) 2 h in length, run by clinical psychology doctoral students supervised by a registered psychologist. The online version will follow a parallel structure with identical (but self-administered) session content—with the exception of the introductory and final sessions, which will be completed in-person at the host site. In the online group, each participant will create an account on a custom-designed integrated website, where they will be able to view the session content, complete exercises, and save their responses to those exercises. The content of each week's program sessions in the online group will become available on a week-by-week basis, ensuring a parallel structure, order, and time frame for completion to the in-person group. Following completion of the initial treatment program, participants across both modalities will receive a biweekly follow-up program to encourage goal monitoring and the continued application of the skills learned in the program.

### 2.2. Participants

Community adults ( $N = 160$ ), ages 25–75, will be recruited utilizing media outreach and advertising in local newspapers, community centers, local radio stations, social media, and other similar outlets. The target age of our participants is intended to primarily capture adult, non-student participants—a group typically underrepresented in prior well-being interventions. Individuals expressing interest in the study will be screened for depression. As the program is not intended or advertised as a treatment, any potential participants who meet criteria for severe depression (i.e., a Patient Health Questionnaire [PHQ-9] Score > 15 [39]) will be ineligible to participate in the trial and will be referred to appropriate clinical services. For the in-person ENHANCE arm, we will recruit 60 participants and randomly assign them to one of two conditions: the active program condition ( $n = 30$ ) or a wait-list control condition ( $n = 30$ ; see Fig. 1a). This sample size will allow us to detect between-subjects effects of size Cohen's  $d = 0.74$  ( $n = 60$ ) and within-subjects effects of Cohen's  $d = 0.53$  ( $n = 30$ ) with power of 80%,  $\alpha = 0.05$ , two-tailed. For the online ENHANCE arm, we will recruit 100 participants and randomly assign them to one of two conditions: active program ( $n = 50$ ) or a wait-list control condition ( $n = 50$ ; see Fig. 1b). This sample size will allow us to detect between-subjects effects of size Cohen's  $d = 0.54$  ( $n = 100$ ) and within-



**Fig. 1.** a. CONSORT diagram for in-person intervention. b. CONSORT diagram for online intervention.

subjects effects of Cohen's  $d = 0.40$  ( $n = 50$ ) with power of 80%,  $\alpha = 0.05$ , two-tailed.

The ENHANCE program will be advertised as free, with no direct monetary compensation for participating. To promote program completion, enrolled participants will be eligible to win a raffle prize (\$500) if they complete at least 9 of the 10 content sessions. Additionally, participants will be paid for completing the post-assessment questionnaires at end of the initial treatment program (\$10), as well as for completing the 6-month (\$15) post-program assessment. All monetary rewards will be outlined in the consent form.

### 2.3. Theoretical foundations

Although happiness is in part due to genes [40] and life circumstances, such as age, sex, income, race, education, and marital status [41], happiness is also a product of our daily activities and practices [42]. Unlike our genes and uncontrollable life circumstances, the behaviors that contribute to happiness can be learned, making meaningful increases in well-being theoretically achievable [9–11]. ENHANCE thus focuses on teaching participants how to incorporate specific social, behavioral and cognitive practices—those that have been demonstrated as effective for increasing happiness—into their daily lives, with the goal of producing sustainable, long-term changes to happiness. Importantly, ENHANCE takes a skill-building approach, encouraging participants to enact habitual social, cognitive, and behavioral practices that can be implemented ecologically in their daily lives. The program emphasizes that the skills developed in the program ought to be continually practiced over time rather than simply during the program sessions [43].

ENHANCE consists of ten *principles of happiness* that provide comprehensive coverage of a wide-range of important aspects of life. These principles and associated activities were selected based on the strength of past empirical evidence connecting them to subjective well-being [10]. They represent concepts typically considered to be grounded in both hedonic (e.g., savoring) and eudaimonic (e.g., values, goals) approaches to well-being. Given the expansive evidence suggesting that these two philosophical categories of happiness are intricately intertwined (e.g., [44,45]), a truly comprehensive happiness program must consist of principles drawn from both theoretical traditions of happiness.

We have organized these ten principles around three main theoretical themes: the *core self*, the *experiential self*, and the *social self*. In the first three sessions, participants develop core features of the self—their values, goals, and character strengths. In the next three sessions, participants focus on their experiential self by learning how to monitor and modify thoughts and actions through mindfulness, savoring, self-compassion, and cognitive restructuring. The remaining four sessions focus on the social self with participants learning to cultivate happiness through their social relationships and interactions with close others, acquaintances, and strangers.

A key theoretical feature of ENHANCE is its emphasis on activities that meet basic psychological needs, thus producing a stable foundation for sustainable happiness. Psychological and evolutionary models of human motivation have postulated that people feel happier when they satisfy social needs for affiliation, relatedness, belonging, and trust, as well as needs for competence, control over one's environment, and the ability to autonomously choose and pursue goals [46–48]. A great deal of research now confirms that satisfying these psychological needs leads to greater happiness [49].

A central obstacle to any attempt to attain greater happiness is *hedonic adaptation*: Gains in happiness are often temporary and are followed by a return to baseline levels. ENHANCE is designed to counteract hedonic adaptation. People adapt to even the most favorable life circumstances [50]. But people often do not anticipate this process and continue to expect enduring happiness will result from major life events—a new house, an increase in pay at work, or getting married. In addition to overestimating how happy such events will make them feel [51], people underestimate how quickly they adapt to new circumstances. Hedonic adaptation—and people's general unawareness of it—can lead individuals to pursue greater well-being through the attainment of outcomes that lead to only temporary gains in positive feelings—a perpetual state referred to as the “hedonic treadmill” [52, 53]. To inform the design of this program, we have drawn on the Hedonic Adaptation Prevention Model [43,54], which suggests that continued variety in change-related experiences is essential for maintaining changes to subjective well-being. The multi-construct design of ENHANCE builds a great deal of variety into this program. Beyond the

wide range of activities included across the program, variety is also emphasized within ENHANCE many of the session activities. By providing structures to enhance variety in the positive activities, ENHANCE is built to avoid adaptation and facilitate sustainable change. Finally, we have also drawn on the Positive-Activity Model [7] in designing ENHANCE. The Positive-Activity Model suggests, first, that the effects of positive activities on subjective well-being are mediated through positive emotions, positive thoughts, positive behaviors, and need satisfaction. Accordingly, ENHANCE contains activities designed to increase positive emotions, thoughts, and behaviors, and to satisfy psychological needs, as mentioned above. Additionally, this model posits that features of the activities (e.g., dosage), features of the persons (e.g., motivation and effort), and person-activity fit all moderate the effects of positive activities on subjective well-being. Accordingly, to maximize the effectiveness of the program, ENHANCE considers features of the activities themselves (e.g., variety), of participants (e.g., sustained effort), and of fit (e.g., personalized feedback).

#### 2.4. Intervention

ENHANCE is a 6-month cognitive behavioral intervention that includes 2 phases of treatment. The initial treatment phase is a 3-month (12 weeks) program that is delivered weekly and consists of an introductory session, 10 weekly core sessions focusing on different happiness principles, and a summary session. The second phase is a 3-month follow-up maintenance program consisting of biweekly contact, during which participants continue to focus on elements of ENHANCE to promote continued integration of these principles into their daily lives.

#### 2.5. Initial treatment phase

Each core session of ENHANCE addresses three central goals. First, participants will complete an active learning module targeting one of the ten overarching topics featured in this program: values, goals, character strengths, mindfulness, negative emotions and thought patterns, savoring, close relationships, gratitude, social interactions, and prosocial behavior. We refer to those topics as the *principles of happiness*—each having been linked with happiness and well-being in the empirical literature. Second, participants will engage in activities that put these principles into practice. These activities were drawn from experimental work that has shown them to produce positive changes in happiness [10]. Third, the program is designed to encourage a skill-building mindset by helping participants develop habits to integrate these principles into maintainable activity in their daily lives [24]. To build these habits, based on work from the small changes model (SCM) of behavior change [55], participants will engage in regular goal setting. They will self-select small and manageable goals regarding both implementing the session activities and integrating the developed skills into the lives. Thus, participants will not only gain insight into the latest scientific research on increasing well-being, but also practical experience in incorporating this knowledge into their lives. The initial 3-month (12 session) treatment phase of ENHANCE is summarized in Table 1 and described in detail below.

##### 2.5.1. Session 1: introduction to ENHANCE

During the introductory session, participants will learn about the main goal of the program: to enhance happiness and well-being through daily intentional activities. Session 1 will highlight that during each of the next 10 sessions, participants will learn one major principle of happiness and will practice related happiness activities. Session 1 will also identify the theoretical organization of the content sessions—starting with a focus on the core self (e.g., values, goals), moving through topics on the experiential self (e.g., mindfulness, savoring), and finishing with a focus on the social self (e.g., gratitude, close relationships). Last, we will highlight that we have organized the sessions

so that preceding sessions build the foundations for subsequent sessions.

##### 2.5.2. Session 2: values and roles

In Session 2 (the first core session), participants will learn about their most important values based on Schwartz's values circumplex (e.g., achievement, benevolence) [56,57]; they will then write about their most important roles in life (e.g., being a parent, being a friend). Affirming important values and roles has been shown to serve protective function against life stressors [58,59]. By starting the intervention with an affirmation of who they are, participants should be better equipped to cope with stressors throughout the intervention and beyond [60].

##### 2.5.3. Session 3: goal setting

In Session 3, we will move from broad values to more specific goals, as goal progress is associated with enhanced well-being [61]. Participants will learn about the importance for well-being of selecting goals that are intrinsically motivated [62–64], self-concordant [65,66], and approach-orientated [67]. They will set goals following these criteria and will formulate implementation intentions [68] to facilitate progress on these goals. In addition, participants will engage in an exercise in which they write about their best possible selves [54,69,70] in order to articulate their personal visions of an optimal level of functioning. This activity has been shown to improve subjective well-being [54,70] and even decrease incidence of physical illness over the course of five months [69].

##### 2.5.4. Session 4: character strengths

In Session 4, participants will complete an assessment [71] to identify their own top five character strengths. They will be asked to use these strengths in new ways throughout the week, an activity that has been shown to have fairly long-standing (tested at 6 months) benefits for well-being [22].

##### 2.5.5. Session 5: mindfulness

In Session 5, participants will become familiar with the concept of mindfulness—a nonjudgmental awareness of the present [72,73]. In addition to learning about mindfulness through exercises and examples, participants will be guided through several pre-recorded meditations focusing on developing breath/body awareness and cultivating acceptance and compassion. A robust body of evidence has now established the benefits of mindfulness for happiness, stress reduction, and developing beneficial mental qualities associated with happiness, such as emotion regulation and self-control [74–78]. Importantly, even brief mindfulness interventions have been shown to be effective in promoting such outcomes [79–81].

##### 2.5.6. Session 6: negative thoughts and self-compassion

In Session 6, participants will draw on their understanding of mindfulness and focus on dealing with negative thought patterns. First, participants will work to develop and practice self-compassion in the face of negative events and feelings [82–84]. Self-compassion is related to increased subjective well-being and can buffer against anxiety [83]. Next, participants will learn to challenge their automatic negative thoughts through cognitive restructuring strategies. Cognitive restructuring was first developed for the treatment of depression and was established as the first evidence-based treatment with wide-spread impact and replication [85,86]. Albert Ellis also used cognitive restructuring as a part of Rational Emotive Behavioral Therapy [87]. While initially used to treat mental health disorders, more contemporary approaches have looked at cognitive restructuring as an important element for increasing well-being [88,89]. Finally, participants will engage in an activity in which they write about the potential benefits of negative past experiences—an activity linked with psychological and physical benefits [90].

**Table 1**  
Description of Sessions for ENHANCE.

Week	Organizing principle	Happiness principle	Description
1		Introduction	Participants will
2	Core self	Values and roles	<ul style="list-style-type: none"> <li>• be introduced to the structure of the program;</li> <li>• learn that happiness can be increased through daily intentional activities.</li> </ul> Participants will
3	Core self	Goals	<ul style="list-style-type: none"> <li>• learn about their most important values based on Schwartz's values circumplex;</li> <li>• identify and reflect on their most important roles in life (e.g., being a parent, being a friend);</li> <li>• make a plan to engage in activities that are in line with their most important roles.</li> </ul> Participants will
4	Core self	Character strengths	<ul style="list-style-type: none"> <li>• learn how to select goals that are intrinsically motivated, self-concordant, and approach orientated;</li> <li>• formulate implementation intentions;</li> <li>• engage in a writing exercise in which they write about their best possible selves.</li> </ul> Participants will
5	Experiential self	Mindfulness	<ul style="list-style-type: none"> <li>• learn about character strengths;</li> <li>• complete an assessment to identify their own top five character strengths;</li> <li>• use these top strengths in new ways throughout the week.</li> </ul> Participant will
6	Experiential self	Dealing with negativity	<ul style="list-style-type: none"> <li>• become familiar with the concept of mindfulness—a nonjudgmental awareness of the present;</li> <li>• complete guided meditations in order to cultivate present focus, acceptance, and compassion.</li> </ul> Participants will
7	Experiential self	Savoring	<ul style="list-style-type: none"> <li>• work to develop and practice self-compassion in the face of negative events and feelings;</li> <li>• learn to challenge their automatic negative thoughts through cognitive restructuring strategies;</li> <li>• write about the potential benefits of negative past experiences.</li> </ul> Participants will
8	Social self	Close relationships	<ul style="list-style-type: none"> <li>• savor pleasurable activities in the present;</li> <li>• reminisce about pleasant past experiences.</li> </ul> Participants will
9	Social self	Gratitude	<ul style="list-style-type: none"> <li>• work to maximize their positivity ratio—the ratio of positive to negative interactions—in their close relationships;</li> <li>• learn about the benefits of capitalization (i.e., sharing joys with others) and purposefully apply capitalization in their interactions throughout the week;</li> <li>• learn about what response styles to employ—and those to avoid—when sharing in the joys of others.</li> </ul> Participants will
10	Social self	Social interactions	<ul style="list-style-type: none"> <li>• learn about the value of cultivating and expressing gratitude;</li> <li>• write a letter of gratitude and share it with someone they want to thank;</li> <li>• count their blessings at the end of each day throughout the week.</li> </ul> Participants will
11	Social self	Prosocial behavior	<ul style="list-style-type: none"> <li>• explore new ways in which they can cultivate happiness through casual social interactions;</li> <li>• engage in five friendly casual social interactions with acquaintances, neighbors, colleagues, or strangers.</li> </ul> Participants will
12		Conclusion	<ul style="list-style-type: none"> <li>• learn about the benefits of helping others to one's own well-being;</li> <li>• practice being kind to others, volunteering, or giving back to their community.</li> </ul> Participants will
			<ul style="list-style-type: none"> <li>• receive feedback on the sessions they rated as most enjoyable and useful throughout the intervention;</li> <li>• formulate plans for incorporating the happiness skills from these sessions into their lives in the future.</li> </ul>

### 2.5.7. Session 7: savoring

In Session 7, participants will further draw on the concept of mindfulness by applying its principles—such as an emphasis on the present moment—to increase their enjoyment of pleasurable activities (i.e., *savoring*) [91]. Savoring has been linked to experiencing more positive emotions as a result of pleasant experiences [91], and intervention research suggests that people can intentionally increase their ability to savor present experiences [92]. In addition to focusing on savoring

current experiences, participants will also complete a reminiscence activity by vividly recollecting a positive memory. This reminiscence activity has been shown to elevate positive emotions [93,94].

### 2.5.8. Session 8: close relationships

For the remaining sessions of the intervention, we will switch the focus from the intrapersonal to the interpersonal—that is, the importance of social relations for promoting happiness [95]. In Session 8,

participants will focus on their closest and most important personal relationships and work to maximize the ratio of positive to negative interactions in these relationships [96,97]. They will also learn about the benefits of *capitalization*—sharing joys with others—for the well-being of oneself, others, and their relationship. Participants will purposefully increase their use of this strategy and practice beneficial responses to hearing about others' positive experiences [98–100].

#### 2.5.9. Session 9: gratitude

In Session 9, participants will continue to focus on important relationships by exploring the value that expressing gratitude for others' kindness can have on well-being and on the quality of one's relationships [101,102]. They will write a letter of gratitude to someone they want to thank and share the letter with this person—an exercise that has been shown to improve subjective well-being [103,104].

#### 2.5.10. Session 10: social relationships

In Session 10, participants will shift their focus from cultivating happiness through their close relationships to social interactions more broadly. They will learn about cutting-edge research showing that people feel happy when they interact with acquaintances and even strangers [105]; they will then explore new ways in which they can cultivate happiness through casual social interactions (e.g., being friendly with neighbors, colleagues, or complete strangers [106]).

#### 2.5.11. Session 11: prosocial behavior

In Session 11 (the final core content session), participants will learn about the emerging science of prosocial behavior and its positive effects on well-being [23,107]. In particular, participants will practice being kind to others, volunteering, or giving back to their community—prosocial acts that known to lead to greater happiness [108–110].

#### 2.5.12. Session 12: progress to date and moving forward

This final session in the initial treatment phase will focus on integration of the happiness principles practiced throughout the program. Participants will receive feedback on their best fitting happiness principles and make specific plans for continuing to enact these principles in their lives.

### 2.6. Follow-up/maintenance phase

Participants in both the in-person and online versions of the program will receive biweekly follow-up contact. For this maintenance phase of treatment participants will not be introduced to any new principles for improving happiness and well-being. Rather, they will receive additional information on a subset of the program principles to promote continued practice and integration into their daily lives.

For the in-person group, participants will decide as a group (through a vote) the three most important constructs they would like to continue focusing on during the monthly group follow-up meetings. Then, participants will each choose three additional elements they would like to focus on in their monthly individual phone calls with the program leaders. For the online program, participants will be sent biweekly emails containing additional information focused on six program elements, representing the breadth of the original program. By focusing on the same six principles for participants in the online program, we maintain the scalability of this modality for future applications.

### 2.7. Assessments

We will collect a variety of outcome and psychological process measures, including self-reports, cognitive tasks, and peer reports of well-being, to assess the effectiveness of the ENHANCE program. We will also measure a host of relevant psychological, cognitive, and physiological variables to comprehensively evaluate the impact of the program on positive outcomes associated with happiness (e.g., health). Additional

scale information, internal reliability estimates, and administration schedules for each scale can be found in Table 2.

### 2.8. Prescreening

Prior to enrolling in the study, interested individuals will complete a prescreening process. First, they will complete the Patient Health Questionnaire-9 [39]. This measure demonstrates construct validity, sharing correlations with longer measures of depression as well as a variety of alternate symptom metrics [39]. As ENHANCE is not designed as a treatment for psychopathology, those scoring 15 or higher will not be eligible to participate in the study and will be referred to the University Psychological Clinic or other appropriate psychological services. Second, only individuals who explicitly indicate their willingness and availability to complete the program activities and assessments will be eligible to participate in the study.

### 2.9. Baseline and post-assessments

Participants will be asked to complete the following assessments in person: *baseline* (prior to Session 1), *3-month post-assessment* (following Session 12), and *6-month post-assessment* (following the maintenance phase). Next, we describe the measures completed by participants at each program assessment.

#### 2.9.1. Well-being

First, we describe the outcome variables we will measure to determine the effectiveness of the intervention to increase subjective well-being. We will take a multi-faceted approach to the measurement of well-being and will administer self-report, cognitive task, and peer report measures. In addition, we address the potential for response biases with two measures for detecting positivity bias and scale use tendencies.

#### 2.9.2. Subjective well-being

Participants will complete self-report measures of four aspects of subjective well-being. These are the primary outcomes of this trial. First, the Scale of Positive and Negative Experience (SPANE; [111]) will be used to measure both positive and negative affect. This measure shows convergent validity with other measures of subjective well-being [111,112] and incremental validity, capturing unique variance beyond another frequently used measure of affect: PANAS [102]. Second, life satisfaction will be measured using the well-validated and widely used Satisfaction with Life Scale (SWLS; [113]). Third, the Meaning in Life Questionnaire (MLQ; [114]) will be used to measure the presence and search for meaning in life. The MLQ scales show convergent and discriminant validity with a host of variables in a predicted manner [114] and earned the highest scores in a systematic review of meaning in life measures [115]. Because self-reports can be subject to biases (e.g., demand characteristics), we also employ alternative methods to assess participants' happiness as secondary outcomes, including a memory task and peer reports as described below.

#### 2.9.3. Memory-based assessment of well-being

Participants will also complete the Positive and Negative Memory Task. In a counterbalanced order, participants will list as many positive and negative life events as they can in 3 min [116–118]. Each participant, however, will complete the task in the same order for each assessment across the study. The relative quantities of positive to negative life events that are listed demonstrate accessibility of positive and negative memories, which has been shown to relate to self-reported subjective well-being. That is, people who are generally happier are more likely to remember positive events and this tendency is stable across test-retest analyses [118]. This indirect measure of well-being, based on memory accessibility, is less prone to participant biases and demand characteristics, thus complementing self-report measures.

**Table 2**  
Scale information and administration schedule for ENHANCE.

	Item # subscales	Scale & anchors	Original reliability	Screen	Baseline	Weekly	Post-test	6-month follow-up
Patient Health Questionnaire-9	9	1( <i>not at all</i> )-4( <i>nearly every day</i> )	0.86–0.89	X	X		X	X
<b>Scale of Positive and Negative Experience</b>	12	1( <i>very rarely or never</i> )-5( <i>very often or always</i> )	PA: 0.87 NA: 0.81		X	X	X	X
	Positive: 6 Negative: 6							
<b>Satisfaction with Life Scale</b>	5	1( <i>strongly disagree</i> )-5( <i>strongly agree</i> )	0.87		X		X	X
<b>Meaning in Life Questionnaire</b>	10	1( <i>absolutely untrue</i> )-7( <i>absolutely true</i> )	Presence: 0.86 Search: 0.87		X		X	X
	Presence: 5 Search: 5							
Positive and Negative Memory Task	2	3 min recall each for positive and negative events, difference score used			X		X	X
Peer Reports					X		X	X
Positivity Bias	7	1( <i>extremely dissatisfied</i> )-7( <i>extremely satisfied</i> )			X		X	X
Life Satisfaction Anchoring Vignettes	2	1( <i>very dissatisfied</i> )-5( <i>very satisfied</i> )			X		X	X
Need Satisfaction Scale	9	1( <i>not at all</i> )- 5( <i>very much</i> )			X	X	X	X
	Autonomy: 3 Relatedness: 3 Competence: 3							
Rosenberg Self-Esteem Scale	10	1( <i>strongly disagree</i> )-4( <i>strongly agree</i> )	0.77		X		X	X
Perceived Stress Scale	14	1( <i>never</i> )-5( <i>very often</i> )	0.84–0.86		X		X	X
Social Convoy Questionnaire	3	# of people in each of three categories			X		X	X
Comprehensive Inventory of Thriving	18	1( <i>strongly disagree</i> )-5( <i>strongly agree</i> )	Support: 0.83 Community: 0.78 Trust: 0.76 Respect: 0.69 Loneliness: 0.71 Belongingness: 0.71		X		X	X
	Support: 3 Community: 3 Trust: 3 Respect: 3 Loneliness: 3 Belongingness: 3							
Paffenberger Physical Activity Questionnaire	8, with sub-items depending on responses	Varies by item			X		X	X
Behavioral Risk Factor Surveillance System	11	Varies by item			X		X	X
Basic Symptom Checklist	10	Check all that apply			X		X	X
Height		Inches			X		X	X
Weight		Pounds			X		X	X
Blood Pressure					X		X	X
Multidimensional Personality Questionnaire, Achievement	18	True/False	0.84		X		X	X
Big Five Inventory	44	1( <i>strongly disagree</i> )-5( <i>strongly agree</i> )	0.75–0.90		X		X	X
	Neuroticism: 8 Extraversion: 8 Openness: 10 Conscientiousness: 9 Agreeableness: 9							
Self-Integrity Scale	8	1( <i>strongly disagree</i> )-7( <i>strongly agree</i> )	0.84		X	2	X	X
Hope-Agency Scale items	2	1( <i>definitely false</i> )-5( <i>definitely true</i> )			X	3	X	X
Strengths Use Scale	14	1( <i>strongly disagree</i> )-7( <i>strongly agree</i> )	0.95		X	4	X	X
Cognitive and Affective Mindfulness Scale-Revised	12	1( <i>rarely/not at all</i> )-4( <i>almost always</i> )	0.74–0.77		X	5	X	X
Self-Compassion Scale	12	1( <i>almost never</i> )-5( <i>almost always</i> )	0.87		X	6	X	X
Savoring Beliefs Inventory	16	1( <i>strongly disagree</i> )-7( <i>strongly agree</i> )	Savoring: 0.68–0.89 Reminiscing: 0.75–0.84		X	7	X	X
	8: Savoring the Moment 8: Reminiscing							
Capitalization Scale	3	1( <i>not at all</i> )-5( <i>very much</i> )			X	8	X	X
Gratitude Questionnaire	6	1( <i>strongly disagree</i> )-7( <i>strongly agree</i> )	0.87		X	9	X	X
Sense of Community Scale	8	1( <i>strongly disagree</i> )-7( <i>strongly agree</i> )	0.92		X	10	X	X
Perceived Prosocial Impact	4	1( <i>strongly disagree</i> )-7( <i>strongly agree</i> )	0.70		X	11	X	X
Demographics	Age gender	Varies by item			X			

Table 2 (continued)

Item # subscales	Scale & anchors	Original reliability	Screen	Baseline	Weekly	Post-test	6-month follow-up
race/ethnicity marital status education level employment status occupation household income total wealth							

Notes. Reliability estimates taken from development samples cited in the main text. Scales with a number noted in the weekly assessment column will be administered in that week only and will be completed by participants in the active intervention group only. Scales denoted in bold lettering are the primary intervention outcome variable.

#### 2.9.4. Peer reports of well-being

For each participant, we will also collect peer reports of well-being from three close others at all three assessment time points. Peers will be asked to evaluate the participant on how frequently they engaged in a series of affect-related displays over the past week: smiling, laughing, crying, frowning, complaining, and criticizing. They will also rate the target using versions of the SPANE and SWLS adapted for peer use. These peers will undergo a separate informed consent process.

#### 2.9.5. Positivity bias

To assess for the potential of positivity bias, we will measure global satisfaction with oneself, and satisfaction in specific domains of the self, namely one's physical attractiveness, abilities, morality, health, self-discipline, and role-fulfillment [119,120]. People with a positivity bias tend to evaluate themselves more positively in general but not necessarily within specific domains; divergence between general evaluations of the self and evaluations of specific domains thus indicates positivity bias.

#### 2.9.6. Anchoring vignettes

Participants will read two vignettes describing the lives of two individuals and rate how satisfied each of these individuals is with their lives [121]. We will thus be able to assess participants' reporting styles on well-being questions. This measure will allow us to examine whether our intervention truly influences well-being rather than simply changing the way people use the self-report scales.

#### 2.9.7. Psychological correlates of well-being

In addition to measuring well-being directly, we will also assess a number of related, psychologically relevant variables including psychological need satisfaction, self-esteem, depression, and perceived stress using well-validated and field-standard measures of each construct.

#### 2.9.8. Psychological need satisfaction

The degree to which an individual's psychological needs are satisfied positively relates to subjective well-being [122]. Satisfaction of the basic psychological needs of autonomy, relatedness, and competence will be measured using the Need Satisfaction Scale [123].

#### 2.9.9. Self-esteem

Subjective well-being is moderately positively correlated with self-esteem (e.g., [124]). We will assess self-esteem using the Rosenberg Self-Esteem Scale (RSE; [125]).

#### 2.9.10. Depression

The Patient Health Questionnaire-9 (PHQ-9; [39]), also used to initially screen participants, will be used to measure depression, which is negatively related to well-being [126].

#### 2.9.11. Perceived stress

Scores on the Perceived Stress Scale (PSS) are expected to negatively relate to well-being. The PSS is correlated with life-event scores and has

demonstrated superior predictive power compared to these life-event scores [127].

#### 2.9.12. Outcomes associated with well-being

Well-being is causally associated with positive functioning within a host of life domains, including social outcomes, physical health, and achievement [6]. Thus, to test whether the ENHANCE program affects these outcomes, we will assess each of these domains.

#### 2.9.13. Social thriving

Social relationships are both a cause [95] and consequence [128] of subjective well-being. The size of participants' social networks will be assessed with items from the Social Convoy Questionnaire [129]. Specifically, participants will estimate the number of very close friends, close friends, and distant friends that they have [130]. In addition, we will assess sociality more broadly using the relationship-relevant subscale items from the Comprehensive Inventory of Thriving, including subscales for support, community, trust, respect, loneliness, and belongingness [131]. These scales show convergent validity with measures of subjective well-being and predictive validity in the health domain [131].

#### 2.9.14. Achievement

Subjective well-being is also related to success in achievement domains [6]. To measure the general achievement orientation of participants, we will administer the Achievement Subscale from the Multidimensional Personality Questionnaire [132].

#### 2.9.15. Health and healthy behaviors

High subjective well-being is associated with, and leads to, better health, increased health behaviors, and ultimately, a longer life [6,34]. We will assess the health of participants using items from the Behavioral Risk Factor Surveillance System [133], which assesses general health status, health related quality of life, presence of medical conditions, level of physical functioning, and health behaviors. Finally, we will collect physiological measures relevant to health—participant height and weight (to calculate Body Mass Index [BMI]), and blood pressure will be measured using an automated cuff.

#### 2.9.16. Individual differences

We will also assess demographic and personality variables to examine whether the effects of the intervention are moderated by individual differences.

#### 2.9.17. Personality traits

Subjective well-being has been found to relate to several personality traits—most notably, extraversion, neuroticism, and agreeableness [134]. We will assess each of these—plus openness to experience and conscientiousness—with the Big Five Inventory, a brief measure of personality that demonstrates reliability, validity, and a clear factor structure [135].



### 2.9.18. Demographics

At baseline, participants will provide demographic information including age, gender, ethnicity, socioeconomic status, and education level.

### 2.9.19. Manipulation checks and content-specific mediators

In each of the three main assessments, we will include a series of questionnaires specifically related to program session content. The Self-Integrity Scale [136] will measure the effect of learning about one's values (Session 2), and two items from the Hope-Agency Scale [137] will assess the effects of setting goals (Session 3). The Strengths Use Scale [138] will assess application of character strengths (Session 4), whereas the Cognitive and Affective Mindfulness Scale-Revised [139] will measure mindfulness (Session 5). We will employ the short form of the Self-Compassion Scale [140] to measure a central technique that participants will learn to deal with negative thoughts, feelings and events (Session 6). We will use the Savoring Beliefs Inventory [141] to assess savoring (Session 7) and adapt items from the capitalization scale [99] to measure the degree to which participants share good news with others (Session 8). The Gratitude Questionnaire [142] will assess the tendency to appreciate others (Session 9), and the Sense of Community Scale [143] will assess the effects of cultivating positive social interactions in daily life (Session 10). Finally, for the prosocial session (Session 11), we will measure Perceived Prosocial Impact [144], as well as the degree to which the weekly activities were motivated by benefiting oneself and by benefiting others.

In addition to completing these content-specific measures at each of the three major assessments, active treatment participants will complete measures corresponding to the session content that had been covered in the previous week (when used in the weekly measures, these scales will be adapted to refer specifically to the past week).

### 2.10. Weekly assessments

In addition to administering one content-specific manipulation check to the active treatment group each week, we will also assess program adherence for these participants. Importantly, we will evaluate participant-activity fit with a series of questions about each principle [145]; during Session 12 of the program, these questions will be used to make recommendations for incorporating the best fitting principles in each participant's life. Furthermore, participants in *both* the treatment and wait-list control conditions will complete short weekly assessments of focal outcomes. To measure weekly subjective well-being, we will include the same measures of subjective well-being as in the major assessments while using modified, shorter scales. As a measure of positive and negative affect, participants will complete the SPANE with modified instructions to report how they felt "in the past week." Participants will also answer one item tapping satisfaction with life ("In the past week, how satisfied were you with things in your life?") and one item measuring meaning in life ("In the past week, to what extent did you feel a sense of meaning and purpose in your life?"). Participants will also complete the Need Satisfaction Scale

[123] but with reference only to their experience over the past week. Additionally, we will evaluate self-reported health and healthy behavior each week with two single-items: "How many days during the past week did you engage in physical activity for exercise (e.g., jogging, biking, brisk walking) for 30 minutes or longer?" and "Now thinking about your physical health, which includes physical illness and injury, for how many days during the past week was your physical health not good?"

### 2.11. Planned data analyses

We will analyze the data in order to test the proposed theoretical model as shown in Fig. 2. We will employ both between-subjects analyses, comparing outcomes between treatment and control, and within-subjects analyses, measuring change in the treatment group over time. First, we will test the effect of the ENHANCE program delivered in person or online on the primary outcomes of subjective well-being: satisfaction of life, positive and negative affect, and meaning in life. We will employ independent-samples *t*-tests to compare the subjective well-being of participants in the treatment group with the subjective well-being of participants in the control group at 3 months and then again at 6 months. We will also test for differences in subjective well-being between treatment and control groups at baseline, and control for these differences in the comparisons at 3 and 6 months using ANOVAs. As shown in Fig. 2, we will also test for moderation by personality traits as well as demographics, such as age and gender. We will also conduct a series of within-subjects analyses to explore change in the treatment group from baseline to three- and six-month post assessments. In addition to *t*-tests and ANOVAs, we will employ multigroup growth curve analyses to explore change across all time points.

Second, we will examine whether the program had effects on the proposed content-specific mediators, such as self-integrity, mindfulness, gratitude and other outcomes that directly correspond to the happiness skills targeted during program sessions (see Fig. 2). We will explore whether these content-specific outcomes mediated the effects on subjective well-being using bootstrapping analyses. We also will explore the effect of the intervention on psychological need satisfaction and test whether need satisfaction mediates the effects of the intervention on subjective well-being (Fig. 2).

Finally, we will examine the effects of the intervention on the theorized downstream consequences of subjective well-being, including social thriving, achievement, healthy behaviors, and health. Using mediational analyses, we will also seek to establish whether there are reciprocal relationships between these outcomes and subjective well-being, forming a positive feedback loop.

## 3. Discussion

Since its beginnings >30 years ago [21], the study of happiness and subjective well-being has grown to include thousands of publications each year across disciplines from psychology to economics and sociology. Governments and organizations across the globe have taken notice. Many have advocated or pursued a holistic assessment of people's

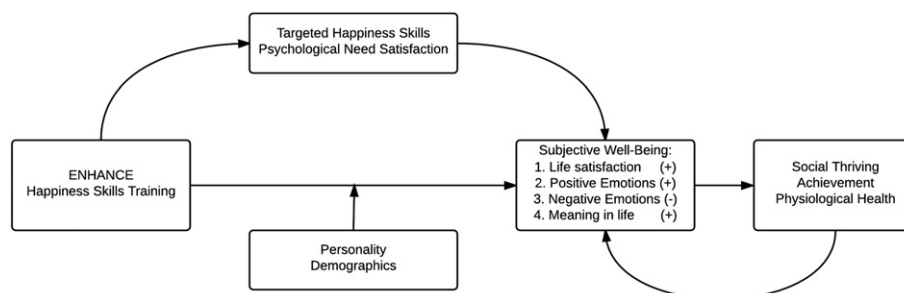


Fig. 2. Theoretical model of outcomes for ENHANCE.

quality of life that extends beyond traditional measures (e.g., Gross Domestic Product; GDP) to include measuring people's overall sense of well-being [5]. Not only do such efforts reflect a growing interest in the value of well-being for its own sake, they also implicitly reflect the understanding that happiness has broad societal benefits. A critical question for researchers, practitioners, and policy makers is how people's subjective well-being can be fostered. In this context, programs or interventions that can positively impact life satisfaction, positive emotions, and meaning are an important focus for research. Integrating the best research and theory that the science of happiness has produced in the past 30 years, we have designed ENHANCE precisely as such a tool—to help people learn the skills necessary to attain greater happiness and—stepping off the hedonic treadmill—to maintain increased well-being over the long term.

Beyond providing a practical tool to improve the well-being of individuals, ENHANCE can also help answer critical scientific questions about happiness. In our approach to developing the ENHANCE program, we have conceptualized individual happiness as responsive to cognitive, social, affective, and behavioral skills and practices. As a result, we have proposed that by engaging people in program sessions with informational, interactive, and goal-setting components that target patterns of thinking, feeling, and acting with established effects on subjective well-being, people can gain enduring increases in their happiness. Although past research suggests that happiness may indeed be increased through training [24], no research has directly tested this possibility by conducting a randomized controlled trial and assessing happiness at multiple time points after the end of the program. In short, our clinical trial can help answer the theoretical and practical question of whether people can deliberately increase their happiness in the long term.

Our clinical trial can also help to elucidate the causal relationship between happiness and beneficial outcomes. A large body of research suggests that happiness can have positive effects on health, relationships, and work. A recent review of longitudinal studies, for example, concluded that happiness predicts better health and longevity even after controlling for health at baseline [34]. Moreover, across three separate nations, people who were more satisfied with their lives were later more likely to get married, less likely to get divorced, and less likely to be unemployed [35]. Although such longitudinal studies provide initial evidence for the causal effect of happiness on important life outcomes, ENHANCE can help definitively ascertain the direction of the relationship between increased subjective well-being and important outcomes in these domains.

### 3.1. Modality

Beyond testing the effects of the ENHANCE program on subjective well-being and positive downstream outcomes, our two-modality approach will also allow us to compare the strength of effects for the online and in-person administration strategies. There are potential advantages to both approaches. Whereas the in-person format allows for direct interactions and provides a scheduled structure for focusing on the intervention [146], the online self-administration is more convenient, cost-effective, anonymous, and potentially empowering [70].

Previous research provides mixed evidence regarding the efficacy of more resource-efficient online treatments compared to more traditional in-person group session treatments. Online treatments do seem to be effective compared to no treatment controls in many domains including binge eating disorder [147], alcohol use and related problems [148], and depression and social functioning [149]. Less work has compared online treatments to in-person treatments. While research has shown that the online format is a viable treatment modality in areas such as weight loss [2,150], the results are typically less powerful compared to in-person treatments [151]. Similarly, meta-analytic results suggest that brief positive activity interventions lead to better outcomes when they are administered one-on-one or in group settings than when they are self-administered [11]. Yet, in perhaps the most closely related past study

to our program, researchers found no effect of treatment modality [70]. In this study, participants engaged in a four-week positive activity intervention (consisting of the best possible self activity) either online or in-person. Following these mixed findings in previous relevant research and the potential advantages that each modality offers, we will include tests for treatment modality differences in all analyses, without making any strong predictions for the effect of modality.

### 3.2. Strengths

As a randomized clinical trial, ENHANCE goes beyond prior attempts to increase individuals' experiences of positive emotions, life satisfaction and meaning in life, which have focused largely on short-term experimental studies with college students. Building upon these seminal investigations, we designed ENHANCE as a comprehensive, multi-construct trial, incorporating ten of the most empirically-supported strategies for increasing happiness. Adding to the breadth and comprehensiveness of the program, these principles focus on three theoretically distinct aspects of the self: the core self, the experiential self, and the social self. The initial phase of ENHANCE is 3 months, with one session delivered per week. Following the intensive initial phase, we maintain contact with participants for 3 additional months, including follow-up on program sessions, participants' use of the principles, and assessment of primary and secondary program outcomes.

The range of assessments is another strength of the program. We assess both subjective (e.g., life satisfaction, meaning in life, positive and negative affect) and physiological (e.g., blood pressure, body mass index) measures. We also include fidelity checks and measures of potential mediating and moderating variables.

Another strength of the program is the variety of administration. We will recruit community samples at two sites across North America (British Columbia and Virginia). In addition, we will examine two treatment modalities: in-person group-based sessions and online sessions. Our study will thus be able to examine the important question of whether a well-being intervention delivered either in person or online produces different effects—a finding with potential implications regarding scalability of ENHANCE and other similar programs.

### 3.3. Limitations

In addition to its strengths, the present clinical trial has several notable limitations. First, while our proposed samples have the advantage of being community-based and represent a broader range of ages compared with past happiness interventions, they remain relatively small and are intended primarily for the purpose of carrying out an initial evaluation of our program to effect participants' happiness and well-being. Second, while the 3-month initial treatment program is notable for its duration and scope relative to past happiness interventions, it remains possible that a longer initial program would produce greater change in participant well-being. Finally, while the frequency and scope of assessments conducted in ENHANCE allow a detailed examination of our outcomes, moderators, and mediators, it is possible that participants will view such assessments as a burden.

### 3.4. Future directions

As a test of the initial efficacy of the newly-developed ENHANCE program, the current trial cannot, of course, address the full range of research questions that arise surrounding a comprehensive intervention program. We highlight two key future directions following this initial trial to establish ENHANCE as an efficacious program for increasing happiness.

First, while evidence-based practice standards suggest that our use of the wait-list control design is appropriate for an initial test of the effectiveness of ENHANCE, future work will be needed to expand upon this work. Although there is no comparable treatment-as-usual for

increasing happiness in a nonclinical sample that meets the rigorous standards of an accepted, evidence-based practice (APA Task Force on Evidence-Based Practice [36]), future pragmatic effectiveness trials can compare ENHANCE to semi-relevant evidence-based interventions with good or moderate support. Additionally, subsequent research could test the effectiveness of the multi-construct ENHANCE program against existing single-approach, one-shot PPIs that are prominent in the psychological literature.

Future work could also build on this initial trial by further working to identify the “active ingredients” of this program in promoting sustainable happiness. The weekly surveys included in the current trial will provide some preliminary information regarding the effect of each session on participants' happiness. Drawing on these findings, subsequent research can test the effectiveness of different combinations, orders of administration, and various personalization techniques of the program modules to expound further on this important question and work towards the optimal happiness intervention program.

#### 4. Conclusion

The ENHANCE trial develops and assesses the initial efficacy of a novel, manualized and CONSORT-adherent intervention program for increasing well-being and happiness that has the potential to reach large populations of clinicians, patients, and individuals. ENHANCE thus responds to the need for an empirically effective tool to promote optimal individual functioning and its many benefits. Through a multi-construct program delivered across two modalities, the ENHANCE trial represents both a culmination of decades of scientific research on happiness as well as a critical step forward in the direct application of that research in improving people's lives.

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