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ENHANCE: Evidence for the Efficacy of a Comprehensive Intervention Program to Promote Subjective Well-Being

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Building from the growing empirical science of happiness, or subjective well-being (SWB), we have developed a 12-week comprehensive intervention program—Enduring Happiness and Continued Self-Enhancement (ENHANCE)—to increase SWB and enable a thorough examination of the mechanistic processes of program content and administrative structure for SWB change over time. In a randomized controlled trial, participants ($N = 155$; 55 using the in-person format, 100 online format) were randomly assigned to participate in ENHANCE or to a waitlist control condition. All participants completed assessments of SWB, including non-self-report measures, and process variables at baseline, posttest, and follow-up (3 months). We found evidence supporting the efficacy of ENHANCE for increasing SWB, whether administered in-person or online. Furthermore, development of the skills targeted in the program (e.g., gratitude, mindfulness) accounted for SWB improvements. This study provides initial evidence that ENHANCE can promote SWB and offers insights regarding the processes involved in these changes. To bolster these findings, we present additional data ($n = 74$) from a fourth assessment showing within-person maintenance of SWB gains over 6 months in the original treatment condition ($n = 39$) and a replication of the immediate ENHANCE treatment effects in the waitlist condition ($n = 36$). We discuss potential avenues for the utilization of ENHANCE in basic research and applied disseminations.

Public Significance Statement
What features of happiness interventions produce durable improvements in subjective well-being over time? We find evidence that ENHANCE, a comprehensive happiness intervention program administered either in-person or online, can increase SWB across time and that improvement in the skills targeted in this program (e.g., gratitude, mindfulness) account for these broader changes.

Keywords: subjective well-being, life satisfaction, intervention, happiness, randomized controlled trial

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Being happy is rated as "extraordinarily important" by a majority of people across the globe (Diener, 2000). Recent decades have ushered in an era of the pursuit of happiness permeating personal life and cultural practices. The importance of happiness has been increasingly emphasized by national governments (e.g., United Kingdom, France, Bhutan, and the United States) and international organizations (e.g., OECD, United Nations) that have supplemented economic measures of national prosperity (e.g., Gross Domestic Product) with assessments of their citizens' happiness (Diener & Seligman, 2004; Tay, Chan, & Diener, 2014). Within

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the scientific community, publications regarding happiness have ballooned from a few hundred in the 1980s to hundreds of thousands of articles now (Diener et al., 2017). Despite efforts to gauge and increase happiness, the percentage of people in the United States who describe themselves as "very happy" has remained stable in the 30% range over the last 50 years (Myers, 2009). Put simply, the swell of happiness resources has not coincided with greater happiness over time.

How can the scientific study of happiness be best leveraged to promote this experience? In this article, we present a newly developed comprehensive intervention program, Enduring Happiness and Continued Self-Enhancement (ENHANCE), built on research findings regarding the nature of happiness, its antecedent sources, and pitfalls common in its pursuit. We employ gold standard randomized controlled trial (RCT) methodology to test the efficacy of this program in increasing happiness and maintaining these gains over 3 months. In addition, we use this intervention to address several key questions for the science of happiness intervention. First, are happiness changes through intervention merely a reflection of biased self-reporting of desired or anticipated improvements or are these changes representative of "true" growth? We employ a multimethod assessment strategy measuring happiness with both self-report and alternative non-self-report measures to circumvent reporting biases inherent in happiness intervention research. Second, what cognitive and behavioral strategies developed in happiness intervention programs account for observed happiness changes? To test this question, we include measures of each of the skill domains targeted in the ENHANCE program (e.g., gratitude, mindfulness) to enable tests of the mechanistic processes accounting for happiness change over time. Third, does the administration format of a happiness intervention lead to differential outcomes? Given the growing popularity of online intervention administration, we administer ENHANCE materials both in-person and online to directly assess the comparative efficacy of these administration strategies.

What Is Happiness and What Are the Benefits of Being Happy?

Happiness is a colloquial term used to describe a cluster of constructs referred to within the scientific literature as subjective well-being (SWB). SWB represents the overall evaluation a person makes about his or her life and emotional experience. SWB is a higher order term to describe three facets: (a) life satisfaction, or a broad cognitive life appraisal; (b) positive affect, or maximal positive feelings; and (c) negative affect, or minimal negative feelings (Diener, 1984).

In addition to simply feeling good, happiness has profound benefits for individuals and for societies (De Neve, Diener, Tay, & Xuereb, 2013; Lyubomirsky, King, & Diener, 2005). For one, happiness is related to better health and longevity (see reviews by Chida & Steptoe, 2008; Diener & Chan, 2011; Diener, Pressman, Hunter, & Delgadillo-Chase, 2017; Lyubomirsky et al., 2005; Pressman & Cohen, 2005). Happiness is also associated with strong relationships (Diener & Seligman, 2002; Pinquart & Sörensen, 2000); for instance, longitudinal research suggests that happier people are more likely to become married (e.g., Lucas, Clark, Georgellis, & Diener, 2003). Furthermore, happiness promotes positive prosocial outcomes, predicting activities such as volunteer participation (Oishi, Diener, & Lucas, 2007; Thoits & Hewitt, 2001) and blood donation (Priller & Schupp, 2011). In the workplace, happier people are more likely to hold better jobs (Staw, Sutton, & Pelled, 1994), to receive stronger performance reviews (Peterson, Luthans, Avolio, Walumbwa, & Zhang, 2011), to have lower work absenteeism (Pelled & Xin, 1999), and to have higher income (Judge, Piccolo, Podsakoff, Shaw, & Rich, 2010) and future income (De Neve & Oswald, 2012; Diener, Nickerson, Lucas, & Sandvik, 2002). Happiness fosters a wide array of beneficial outcomes valuable personally, interpersonally, and societally.

The Science of Increasing Happiness

The range of benefits associated with happiness makes its promotion a valuable endeavor for individuals, organizations, and societies. Can happiness be sustainably increased through intervention, like other aspects of personality (Roberts et al., 2017)? Some evidence suggests that perhaps not. For instance, while changes in one's life circumstances (e.g., marriage; Diener, Gohm, Suh, & Oishi, 2000) relate to SWB, humans readily adapt to these circumstances (Clark, Diener, Georgellis, & Lucas, 2008; Luhmann, Hofmann, Eid, & Lucas, 2012) in a process referred to as hedonic adaption (Brickman & Campbell, 1971). However, life circumstances only account for a portion of one's overall SWB. Research suggests that SWB depends, as well, on a person's everyday thoughts, behaviors, and choices (Lyubomirsky, Sheldon, & Schkade, 2005). These aspects of a person's life are much more malleable, suggesting a potential pathway for increasing happiness.

The science of SWB has identified patterns of thoughts and actions that promote happiness. There is now evidence that many different brief, single activity interventions can increase happiness, at least in the short term (for reviews see Parks & Schueller, 2014; Quoidbach, Mikolajczak, & Gross, 2015). Independent bodies of research have grown around various techniques for increasing happiness, including practices such as gratitude journaling (Emmons & McCullough, 2003), performing acts of kindness (Lyubomirsky et al., 2005), and practicing mindfulness (Brown & Ryan, 2003). Condensing across these different strategies, two meta-analyses have found support for the general efficacy of positive activity interventions for increasing SWB, meta-analytic effects = .34 and .29 (Bolier et al., 2013; Sin & Lyubomirsky, 2009).

While the development of brief activities to increase happiness is invaluable in serving to identify activities that causally affect SWB, these brief positive activities are limited in important ways. Namely, this approach lacks variety, which is essential for enduring changes in SWB (Sheldon & Lyubomirsky, 2012), and does not take into account the importance of person–activity fit for successful positive activity intervention (Lyubomirsky & Layous, 2013). Rather, to maximize the opportunity for person–activity fit by offering an array of activities rather than only one, more exhaustive multimodal positive psychological intervention (PPI) programs have been developed as well. Most of these programs were designed for use in clinical populations including Fordyce's program for personal happiness (Fordyce, 1977), hope therapy (Snyder, 1994), well-being therapy (Fava, 1999), and quality of life therapy (Frisch, 2006). Researchers have also begun to explore

the effectiveness of PPIs designed to upregulate positive affect in the treatment of psychological ailments of the negative affect system, such as depression and anxiety (Taylor, Lyubomirsky, & Stein, 2017). Another cluster of PPIs are designed for use in particular health populations with a focus on the efficacy of such programs to reduce disease-related outcomes, including individuals newly diagnosed with HIV (Moskowitz et al., 2017), Type 2 diabetes (Cohn, Pietrucha, Saslow, Hult, & Moskowitz, 2014), bodily pain (Hausmann, Parks, Youk, & Kwoh, 2014), and metastatic breast cancer (Cheung et al., 2017).

Increasingly, both single-activity and multimodal PPIs have been developed for online or mobile app administration as a cheaper, more resource-efficient, and more broadly available alternative to in-person PPIs (for a review, see Bolier & Abello, 2014). The design and testing of existing online PPIs has been focused on clinical populations and the treatment of depression (Schueller & Parks, 2012; Seligman, Steen, Park, & Peterson, 2005; Seligman, Rashid, & Parks, 2006). The empirical evidence for the effectiveness of such comprehensive online interventions for promoting SWB is, however, relatively scant (Bolier & Abello, 2014; Carpenter et al., 2016; Parks, 2015). Initial within-person evidence has suggested that users of an app-based PPI experience changes to well-being with those who engage with the app-suggested exercises more experiencing greater benefits (Parks, 2015; Parks, Della Porta, Pierce, Zilca, & Lyubomirsky, 2012). Furthermore, one RCT was recently published examining the effects of an app-based PPI on depression, anxiety, and resilience, which also briefly reports (in a footnote) improvements in life satisfaction in treatment participants compared to controls (Parks et al., 2018) providing growing confidence in the efficacy of online PPIs for affecting SWB. Online PPI research also suffers from much larger attrition rates than in offline PPIs, sometimes reaching more than two thirds of the sample (Mitchell, Stanimirovic, Klein, & Vella-Brodrick, 2009) even in programs as short as 1 week (Gander, Proyer, Ruch, & Wyss, 2013). Overall, while there is preliminary evidence for efficacy of PPIs administered online or via mobile apps to increase happiness, most existing studies do not meet conventional standards for intervention research.

In sum, existing PPI research offers many important advances for understanding happiness change. However, there is limited work bringing together these features of strong intervention research simultaneously, namely a multimodal PPI program tested with RCT methodology focusing on SWB change in a nonclinical adult population. Additionally, there are also several key questions regarding SWB change through PPI participation that continue to plague this literature that require direct scientific attention, as we will now discuss.

Open Questions for Subjective Well-Being Intervention

Do Happiness Changes Through Intervention Merely Reflect Reporting Biases?

SWB is most frequently (and arguably most appropriately, given the internal personal nature of satisfaction judgments and affective experiences) measured with well-validated self-report measures. However, the use of this assessment strategy may be particularly problematic in the intervention context as participants both desire and expect that their participation in such a program will make them happier. Alternate measurement strategies have been devised to circumvent such reporting biases. One such strategy is collecting informant reports from individuals who interact closely with a target. Informant reports capture summary information regarding the emotions expressed by a target over time and are less vulnerable to reporting biases than self-report measures of SWB (Sandvik, Diener, & Seidlitz, 1993). Another strategy for measuring SWB is to examine the ease with which participants recall positive versus negative events as happiness is associated with the tendency to recall more positive than negative life events (Diener, Sandvik, Pavot, & Gallagher, 1991; Pavot, Diener, Colvin, & Sandvik, 1991; Seidlitz & Diener, 1993). These alternative measurement strategies can be employed to bolster confidence that SWB intervention effects are indicative of "true" SWB changes rather than reflective of reporting biases.

Do Trained Cognitive and Behavioral Skills Drive Happiness Changes?

While there exists evidence that PPIs can increase SWB, there is limited information regarding the mechanisms driving these effects. Does the content included in a PPI (e.g., mindfulness meditation training) actually account for SWB changes across treatment or could the observed improvements simply be an artifact of the treatment process without any unique contribution of the specific content? For instance, does becoming more mindful actually account for well-being improvements through intervention? One way to test this question is to identify the skills targeted in a given PPI and assess competence in each of those skill areas (e.g., mindfulness) specifically alongside the broader SWB measures. Mediational analyses can then be employed to test whether participants improve in SWB to the extent that they develop competence in a given skill area (e.g., mindfulness).

Are In-Person and Online Intervention Formats Comparably Efficacious?

With the increasing popularity of online PPIs, a rigorous examination of their viability directly compared to PPIs is essential. Indeed, this approach of comparing multiple interventions in the same study has been recommended as the most productive approach toward developing and discovering effective interventions (Mohr, Cheung, Schueller, Hendricks Brown, & Duan, 2013), and as one of the optimal methods of testing the effectiveness of online PPIs in particular (Parks, 2014). Such comparisons between online and in-person modes of administration exist in more established intervention literatures, such as with Cognitive Behavior Therapy interventions for depression (Wagner, Horn, & Maercker, 2014). Yes, these direct tests are missing from PPI research. We aim to test each of these questions using the ENHANCE program which is designed for nonclinical adult populations using RCT methodology.

ENHANCE Intervention Program

Thorough tests of these questions demand a PPI program that is both broad and flexible. Specifically, testing specific content me-

diators requires a program that includes training in a wider selection of content areas than are represented in existing PPIs. Additionally, to test the potential effects of administrative format, we needed a program flexible to both in-person and online administration. To address these needs, we developed the ENHANCE intervention program. ENHANCE is a 12-week program featuring topics with strong empirical links to happiness (Quoidbach et al., 2015) representing the areas of central focus with the strongest empirical grounding that we identified across diverse SWB research perspectives. The broad goals guiding this program are to have participants (a) learn about principles of happiness (b) engage in activities that apply these principles, and (c) develop habits that integrate these principles into daily life. To do so, ENHANCE incorporates lessons from across the scientific literatures of happiness, broader human psychology, and psychological intervention. For one, in developing ENHANCE, we drew upon a model forwarded by Lyubomirsky and Layous (2013) that outlines activity-level features of effective SWB interventions (e.g., longer duration, variety, habit development). Accordingly, we lengthened the duration of ENHANCE compared to alternate PPIs (e.g., 6 weeks, Schueller & Parks, 2012), which also aligns with meta-analytic findings that PPIs of a longer duration are typically more efficacious (Bolier et al., 2013; Sin & Lyubomirsky, 2009). To provide variety, which promotes stronger positive activity intervention effects (Hausmann et al., 2014), effectively combats hedonic adaptation (Sheldon & Lyubomirsky, 2012), and maximizes the opportunity for person–activity fit, which is an important predictor of positive activity engagement (Schueller, 2010) and successful positive activity interventions (Lyubomirsky & Layous, 2013), ENHANCE includes coverage of a wide assortment of content areas and activities. We also leveraged lessons from the science of habit formation including implementation intentions and goal monitoring (Gollwitzer & Sheeran, 2006) to encourage habit development for practicing the activities central to the intervention.

The ENHANCE program was designed to function as an integrated whole with each of 10 core modules, or principles of happiness, building and expanding on the previous modules for an integrated skill-based learning experience with the goal of providing sustained increases in well-being. ENHANCE begins with an introductory module followed by three modules focusing on the core self—helping participants identify who they are and what they want out of life. The second portion of ENHANCE emphasizes the experiential self—helping participants in their interactions with their internal and external experiences. Third, ENHANCE contains four modules that focus on the social self, covering aspects important to maintaining healthy close relationships as well as connections with more distant acquaintances and strangers. The final module of the ENHANCE focuses on program reflection, person–activity fit, and habit development. Further details regarding the content and activities included in each module can be found in Table 1 and in Kushlev et al. (2017), additionally, a plain text version of core intervention materials is available online at https://eddiener.com/enhance.

Each module follows a three-part format with (a) a didactic learning component, (b) an activity to put the principle into practice, and (c) companion writing activities. Each of the included activities has its own body of experimental evidence supporting its role in increasing happiness. This performance-based portion of the intervention program is emphasized as the most essential route to change. ENHANCE encourages a skills-building mindset and provides support for participants to integrate the targeted happiness principles in active ways that are maintainable in their daily lives (Lyubomirsky et al., 2005). To do so, we draw on the small changes model of behavior change (Lutes & Steinbaugh, 2010) to guide participants through regular goal setting and monitoring activities with a focus on self-selected small and manageable goals regarding both their implementation of the module activities and for integrating a personalized version of skill-based activities into their lives moving forward from the program.

Overview of Current Randomized Controlled Trial

To test the efficacy of ENHANCE for producing durable changes in SWB in a healthy adult sample we leveraged the best practices strategy for intervention research—the RCT design. Within the field of medicine, several organizations including the U.S. Preventive Services Task Force (1996) and the Oxford Centre for Evidence-Based Medicine (Howick, Phillips, Ball, Sackett, & Badenoch, 2009) place RCTs at the highest levels of evidence strength classification systems. In addition to the key randomization component of RCTs, we also leverage intention-to-treat analyses (Fisher et al., 1990), including data from all randomized participants regardless of their level of treatment adherence to minimize effect overestimations that can stem from natural treatment noncompliance (Heritier, Gebski, & Keech, 2003). Further, we follow the CONSORT (i.e., Consolidated Standards of Reporting Trials) guidelines for transparent and complete reporting of clinical trials (Moher et al., 2012). These practices, unfortunately, are not well represented within the PPI literature focusing on SWB outcomes and especially not in samples of healthy adults. We chose a waitlist control over an active control group in fitting with norms for the efficacy testing of new interventions. As we aimed to test the efficacy of ENHANCE regardless of the administration mode, we included waitlist control groups for both the online and in-person arms of the RCT. Furthermore, we capitalized on the use of the waitlist control design by continuing assessment in a subset of participants following the administration of the ENHANCE program to the waitlist control condition, which allows for an internal replication test of the baseline to immediate posttest treatment effects. The RCT methodology also enabled key tests of our open process questions regarding reporting biases, content mediators, and administration methods.

Multimethod Assessment Strategy

Within PPI research, SWB has been exclusively assessed with self-report measures leaving open the possibility that intervention effects are simply reflections of reporting biases inherent to the intervention context. To examine this possibility, we will supplement self-report measures of SWB with non-self-report techniques including informant reports and a memory bias task.

Targeted Skills Measurements

Assessments of the mechanisms driving changes in well-being following intervention are rarely present in existing PPI research. To address this gap, we included measures of each of the 10

Table 1
Module Descriptions and Targeted Skills Measures

Modules and sessions	Description of activities	Target skills	Scale	Sample item(s)
Introduction	Introduced to the structure of the program and learn how happiness can be increased through daily intentional activities			
Core self				
1. Values	Identify their core values based on Schwartz's values circumplex (Schwartz & Boehnke, 2004); Complete a self-affirmation exercise (Cohen & Sherman, 2014) and engage in activities in line with their core values/roles (Sherman, Bunyan, Creswell, & Jaremka, 2009).	Alignment of behavior with core values	Self-Integrity Scale (Sherman, Cohen, et al., 2009) 1 (*strongly disagree*) 7 (*strongly agree*)	"I am comfortable with who I am."
2. Goals	Set goals that are intrinsically motivated (Kasser & Ryan, 1993), self-concordant (Sheldon & Elliot, 1999), and approach-oriented (Elliot & Sheldon, 1997), and formulate implementation intentions (Sheeran, Webb, & Gollwitzer, 2005) Write about their best possible selves (King, 2001)	Goal pursuit and attainment	Hope–Agency Scale (Snyder et al., 1991) 1 (*definitely false*) 5 *(definitely true*)	"I meet the goals that I set for myself." "I energetically pursue my goals."
3. Character strengths	Identify their top five character strengths (Seligman, Steen, Park, & Peterson, 2005) Use these top strengths in new ways throughout the week (Seligman et al., 2005)	Use of top character strengths	Strengths Use Scale (Govindji & Linley, 2007) 1 (*strongly disagree*) 7 (*strongly agree*)	"I use my strengths to get what I want out of life."
Experiential self				
4. Mindfulness	Become familiar with the concept of mindfulness (Brown & Ryan, 2003; Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007) and learn related emotion regulation techniques, such as labeling (Hölzel et al., 2011; Kabat-Zinn, 2003) Complete guided meditations to cultivate present focus, acceptance, and compassion (Birnie, Speca, & Carlson, 2010)	Present focus and mindfulness of feelings, thoughts, and behavior	Cognitive and Affective Mindfulness Scale–Revised (Feldman et al., 2007) 1 (*rarely/not at all*) 4 (*almost always*)	"I am able to focus on the present moment." "I try to notice my thoughts without judging them." "I am able to accept the thoughts and feelings I have."
5. Dealing with negativity	Practice self-compassion in response to negative events and feelings (Neff, 2003; Neff, Rude, & Kirkpatrick, 2007) Learn to challenge automatic negative thoughts through cognitive restructuring (Beck, 1970; Fava, 1999) Reconstruct personal narratives by writing about negative past experiences (King & Miner, 2000)	Development of self-compassion and restructuring of automatic negative thinking	Self-Compassion Scale (Raes, Pommier, Neff, & Van Gucht, 2011) 1 (*almost never*) 5 (*almost always*)	"I try to be understanding and patient towards those aspects of my personality I don't like."
6. Savoring	*Savor* pleasurable activities in the present (Bryant & Veroff, 2007) Reminisce about pleasant past experiences (Bryant, Smart, & King, 2005; Lyubomirsky, Sousa, & Dickerhoof, 2006)	Maximizing of positive experiences through savoring and reminiscence	Savoring Beliefs Inventory: Savoring the moment and reminiscing subscales (Bryant, 2003) 1 (*strongly disagree*) 7 (*strongly agree*)	"I can prolong enjoyment by own effort." "I can feel good by remembering the past."

(*table continues*)

Table 1 (*continued*)

Modules and sessions	Description of activities	Target skills	Scale	Sample item(s)
Social self				
7. Close relations	Maximize positivity ratio—the ratio of positive to negative interactions—in their close relationships (Fredrickson, 2013; Gottman & Levenson, 1992) Practice capitalization (i.e., sharing joys with others) in their interactions with close others (Gable, Reis, Impett, & Asher, 2004) Learn about response styles when sharing in the joys of others (Reis et al., 2010)	Cultivation of positive interactions with family and friends	Capitalization Scale (Gable et al., 2004) 1 (*not at all*) 5 (*very much*)	"I felt that I had close others with whom I could share my joys and sorrows."
8. Gratitude	Express gratitude in daily interactions (Algoe, Fredrickson, & Gable, 2013) Count blessings at the end of the day (Emmons & McCullough, 2003) Write a letter of gratitude and share it (Toepfer, Cichy, & Peters, 2012)	Cultivation and expression of gratitude	Gratitude Questionnaire (McCullough, Emmons, & Tsang, 2002) 1 (*strongly disagree*) 7 (*strongly agree*)	"I have so much in life to be thankful for."
9. Social interactions	Explore new ways to engage in casual social interactions (Sandstrom & Dunn, 2014a) Engage in five friendly casual social interactions with acquaintances, neighbors, colleagues, or strangers (Sandstrom & Dunn, 2014b)	Cultivation of positive social interactions with members of the community	Sense of Community Scale (Peterson, Speer, & McMillan, 2008) 1 (*strongly disagree*) 7 (*strongly agree*)	"I feel like a member of this town."
10. Prosocial behavior	Learn about how to select meaningful ways to help others (Weinstein & Ryan, 2010) Practice being kind to others, volunteering, or giving back to their community (Borgonovi, 2008; Dunn, Aknin, & Norton, 2014)	Engagement in regular prosocial activities with meaningful impact	Perceived Prosocial Impact Scale (Grant et al., 2007) 1 (*strongly disagree*) 7 (*strongly agree*)	"I make a positive impact."
Conclusion	Formulate plans for incorporating their best fitting happiness skills into their lives in the future			

targeted skills central to ENHANCE at every assessment. These measures will enable mediation analyses regarding the mechanisms driving treatment-related SWB improvements.

Method of Administration: In-Person and Online Formats

We tested the efficacy of ENHANCE intervention materials across both in-person and online formats. Participants were randomly assigned to an active intervention condition or a waitlist control at two-sites. At one site, all modules of the ENHANCE program were administered via in-person group therapy format, as a comprehensive well-being treatment program, whereas at the other site the core modules were administered online as a web-based online PPI. By simultaneously examining online and in-person modes of administering an otherwise identical program, we can directly test for the viability of online PPIs as an alternative to traditional PPI administration.

Assessments and Predictions

Participants completed three major assessments at baseline, at posttest immediately following completion of the program, and at follow-up 3 months after completion of the program; we will refer to these assessments as baseline, posttest, and follow-up, respectively. Next, we offered the ENHANCE treatment to the waitlist participants. Following the waitlist treatment phase, participants in the online administration format group completed an additional fourth assessment (6 months after program completion).

We predicted that those participants randomly assigned to the active ENHANCE condition would report greater SWB (positive affect and life satisfaction, lower negative affect) compared to their own baseline reports and control participants at posttest and follow-up. Additionally, we expected parallel improvements on indicators of negative psychological health, namely depression and perceived stress. Next, we predicted that the ENHANCE condition would demonstrate stronger gains in each of the targeted happiness skill areas and that improvements in these skills would account for their improvements in SWB. Finally, we also tested for moderation of the method of administration (i.e., in-person vs. online). These outcome variables and associated predictions were preregistered in a design and rationale article (Kushlev et al., 2017) and via ClinicalTrials.gov (https://clinicaltrials.gov/ct2/show/NCT02782611).

Summary of Contributions

The current study, then, aims to advance the PPI literature in several important ways using RCT methodology to test the efficacy of the broad ENHANCE intervention for increasing SWB in a sample of healthy adults. In addition to immediate posttest assessment at the conclusion of the program, we also include a 3-month follow-up assessment to test the durability of any observed effects. To address key open questions in PPI research, we employ (a) a multimethod measurement strategy, targeting SWB outcomes with both self-report and non-self-report measures, (b) measures of targeted skills to uniquely examine the mechanisms of SWB changes resulting from ENHANCE, and (c) both in-person and online administration of identical content. Finally, with an additional fourth assessment following waitlist treatment completion, we provide an internal replication test of the immediate efficacy of ENHANCE among the original waitlist control participants as well as a test of the durability of treatment effects on SWB over 6 months among the original ENHANCE participants.

Method

Participants

Participants were 155 community adults recruited via radio interviews, social media, community flyers, newspaper ads, employee presentations, e-mails to university staff listservs, and word of mouth (see Table 2 for demographic characteristics). Of them, 55 individuals were recruited from Kelowna, British Columbia (waitlist control: $n = 28$; ENHANCE in-person program: $n = 27$), and 100 individuals were recruited from Charlottesville, Virginia (waitlist control: $n = 50$; ENHANCE online program: $n = 50$) While all participants completed a baseline assessment, 133 (85.8%) completed a posttest assessment at the conclusion of the program, and 127 (81.9%) completed a follow-up assessment 3 months from program completion. These retention rates were comparable across modalities. The progress of participants through each stage of the study is presented using the CONSORT guidelines for the in-person (see Figure 1) and online (see Figure 2) modalities.

Procedure

The study was conducted between the spring and fall of 2016. Procedures for the study were approved by ethics boards at the University of Virginia (2016–0044-00) and the University of British Columbia (H16-00397) and are outlined next.

Prescreening of eligibility. Interested participants were prescreened using the nine-item Patient Health Questionnaire (PHQ-9; Kroenke, Spitzer, & Williams, 2001), a screening tool to assess depressed mood over the past 2 weeks. Items are rated on a scale from 0 (*not at all*) to 3 (*nearly every day*). A cut-score of ≤ 14 (indicative of mild to moderate depression) was used to determine eligibility; participants with scores of 15 or greater (indicative of severe depression) were instead referred to appropriate services in their local community. Eligible participants included those between the ages of 25 and 75 years. Further, eligible participants consented to being randomized into either the waitlist control group or ENHANCE (in-person or online) program and were willing to maintain participation for the full 6-month duration of the study.

Participation schedule. All participants completed an in-person baseline assessment regardless of program modality (in-person vs. online), at which time consent was reviewed and initial study measures were completed. Participants were then randomized into the waitlist control group or into the 12-week ENHANCE program. We used a stratified randomization procedure to ensure an equal number of participants with depression scores on the prescreening questionnaire >10, as well as an equal number of men, in each condition at each site. The posttest assessment was completed immediately after completion of treatment, and the follow-up assessment was completed 3 months after completion of treatment. The survey administered at posttest and follow-up was identical to the baseline survey. Compensation for participation was given at posttest ($10) and follow-up ($15) assessments. We

Table 2
Sample Demographics Reported at Baseline Assessment

Demographic	In-person (n = 55)	Online (n = 100)	Full sample (N = 155)
Age			
Range	25–65	25–75	25–75
M (*SD*)	49.15 (11.91)	43.28 (13.95)	45.36 (13.52)
Gender			
Woman	41	80	121
Man	14	17	31
Nonbinary	0	1	1
Not reported	0	2	2
Marital status			
Single/never married	6	26	32
Married/civil union	32	52	84
Living with partner	10	4	14
Divorced	7	17	24
Not reported	0	1	1
Education			
Some high school or less	1	0	1
High school diploma/equivalent	3	0	3
Some college/university	17	6	23
College/university degree	24	25	49
Some graduate school	2	11	13
Graduate degree	8	58	66
Employment status			
Employed full time	26	68	94
Employed part time	4	12	16
Self-employed	8	5	13
Unemployed	5	0	5
Retired	12	3	15
Student	0	12	12
Income			
≤$10,000	1	0	1
$10,001–20,000	2	2	4
$20,001–30,000	2	10	12
$30,001–40,000	2	6	8
$40,001–50,000	7	13	20
$50,001–60,000	2	10	12
$60,001–70,000	3	7	10
$70,001–80,000	4	4	8
$80,001–90,000	6	5	11
$90,001–100,000	2	5	7
$100,001–110,000	3	10	13
$110,001–120,000	5	5	10
$120,001–130,000	4	1	5
$130,001–140,000	2	2	4
$140,001–150,000	1	3	4
≥$150,001	6	16	22
Not reported	3	1	4

Note. All data are presented as *n* unless otherwise noted.

chose this compensation strategy to incentivize continued retention for the assessment sessions while reducing the possibility of undermining intrinsic motivation for completing the intervention materials with an additional extrinsic incentive directly tied to those activities (Deci, Koestner, & Ryan, 1999).

In-person and online ENHANCE program modalities. For consistency across sites/modalities, participants received a program manual containing the core material for the 12 weekly sessions, and a companion manual with supporting information and activities. Participants completing ENHANCE in-person received these materials in a printed workbook format, while the manual was integrated into a custom website for online participants. For the in-person group, we also developed a program facilitator manual. As a result, regardless of modality, the ENHANCE program was developed as a manualized treatment program with the potential for dissemination as an evidence-based intervention, one of the key aims of the present study.

In-person. ENHANCE was delivered weekly by two graduate-level clinicians (one male, one female). Participants attended 2-hr, in-person group sessions over 12 weeks. Sessions followed a general structure: completing a weekly survey; reviewing the core principle of the previous week; introducing a new core principle; planning weekly activities to engage the new principle; and summarizing/reflecting on the weekly session. Participants unable to attend one of the two scheduled group sessions offered each week were provided a 1-hr make-up session via telephone or in-person, prior to the next weekly session. All group sessions were audio recorded for fidelity assessment.

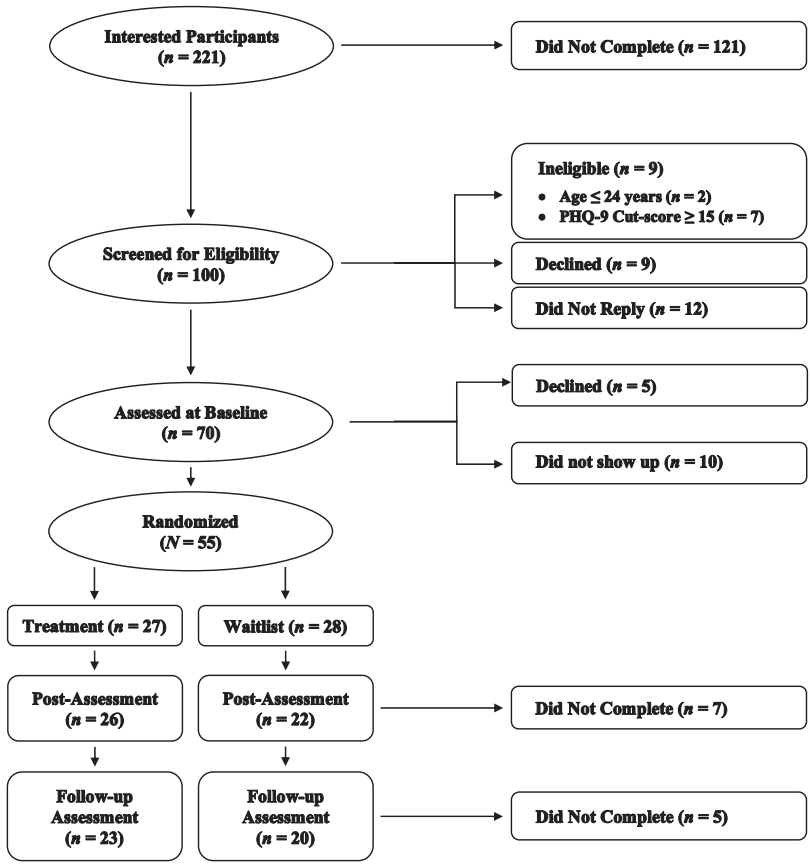

Figure 1. CONSORT diagram: In-person ENHANCE program. PHQ-9 = Patient Health Questionnaire-9; ENHANCE = Enduring Happiness and Continued Self-Enhancement.

Online. Participants recruited to the online ENHANCE program attended an in-person introductory session (in groups of two to eight participants). The core principles of the program were then administered online over 10 sessions via a customized website matching the content and layout of the hardcopy manuals for in-person participants. New content was released weekly to pace participants over the course of the program. If the content had not been accessed within 3 days of its release, participants were sent a personalized e-mail reminder. Example materials from the online administration of ENHANCE can be found in Supplementary Appendix A in the online supplemental materials. Participants were then invited to attend a final session in-person in small groups.

Maintenance phase. Following program completion, participants continued into a 3-month maintenance phase with continued support in practicing and integrating the ENHANCE core principles into their daily lives. There were no new principles introduced during this phase.

In-person. Biweekly contact (alternating between telephone and in-person) was provided, including (a) individual 10–15 min telephone check-ins, during which group facilitators assisted participants in problem-solving and continued use of the program principles, and (b) 2-hr group maintenance sessions that encouraged autonomous development and ongoing practice of the ENHANCE program principles in participants' daily routines.

Online. Participants in the online program received six biweekly e-mails that reinforced the continued practice of one or more core principle(s) from the program. Some e-mails contained brief videos informing the function of a core principle and the benefits of its habitual practice.

Waitlist Treatment and Additional Assessment

After the completion of the study, we invited the waitlist condition to participate in the ENHANCE program. In the in-person arm of the study, only four waitlist participants returned for treatment and so no further data was collected from either condition. In the online arm of the study, following the waitlist treatment phase, all participants from both conditions were invited back for a fourth assessment, identical to the previous major assessments ($N = 39$ original ENHANCE condition and $N = 36$ waitlist control condition, paid $20). The data from this additional assessment will serve two purposes. First, we will use these data to extend our examination of the duration of intervention effects in the original ENHANCE participants, 6 months following treatment completion. Second, assessments of the original waitlist control participants after they receive the treatment will allow for a test of the replicability of the initial efficacy of ENHANCE.

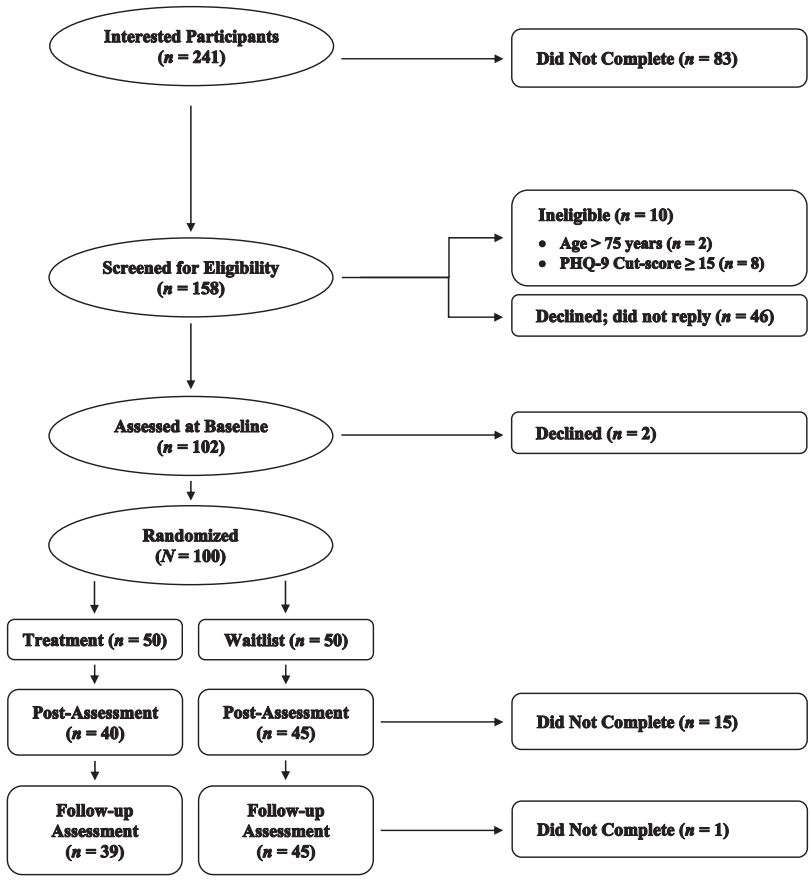

Figure 2. CONSORT diagram: Online ENHANCE program. PHQ-9 = Patient Health Questionnaire-9; ENHANCE = Enduring Happiness and Continued Self-Enhancement.

Measures

Subjective well-being. A multimethod strategy was used to evaluate the efficacy of the ENHANCE program in increasing SWB. In addition to traditional self-report measures of SWB, we also included alternate measures (i.e., cognitive tasks and peer reports) designed to be less susceptible to demand characteristics inherent in SWB intervention research.

Self-report measures of SWB. Life satisfaction was measured by the five-item Satisfaction With Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985) rated from 1 (*strongly disagree*) to 5 (*strongly agree*). The SWLS has demonstrated temporal stability and sensitivity to changes across time (Diener, Inglehart, & Tay, 2013). The 12-item Scale of Positive and Negative Experience (SPANE; Diener et al., 2010) was used to assess positive and negative affect, each item rated from 1 (*very rarely or never*) to 5 (*very often or always*). The SPANE was designed to capture discrete emotions (positive: good, pleasant, happy, joyful, and contented; negative: bad, unpleasant, sad, afraid, and angry) at various arousal levels and across different cultural situations (Silva & Caetano, 2013; Sumi, 2014). See Table S1 in the online supplemental materials for reliability estimates for all measures.

Memory-based measures of SWB. Participants completed the Positive and Negative Memory Task (Sandvik et al., 1993; Seidlitz & Diener, 1993), in which they were asked to recall as many positive (and then negative) life events as they could in 3 min. The relative number of positive to negative events recalled was used as an indirect measure of SWB (based on memory accessibility). That is, participants who recalled more positive than negative events were assumed to endorse greater levels of SWB—a relationship that tends to be stable across time. The recall of positive and negative events was counterbalanced across participants at baseline assessment with each participant's random order held constant across subsequent assessments to facilitate within-person comparisons.

Peer reports of SWB. Participants' SWB was further assessed via reports provided by close peers (e.g., a partner, friends, family, coworkers, etc.). This method of assessment was used to address possible bias in participants' self-reports of SWB in a research setting (Sandvik et al., 1993). Participants provided contact information for up to three of their close peers. Peers who provided their informed consent then completed a questionnaire via e-mail at the three main assessment periods and were instructed to complete the questionnaire independently. Items in the questionnaire assessed frequency in verbal and facially expressive behaviors (e.g., laughing, crying, frowning, etc.), as well as items from the SPANE and SWLS to assess participant affect and life satisfaction from the perspective of their peers. Overall, 939 (67%) of the peer reports were completed across the study. There was at

least one peer report per participant in 88% of cases at baseline (n = 136), 83% at posttest (n = 129), and 73% of cases at follow-up (n = 113).

Domain specificity. As a complement to global life satisfaction, we also included a measure of satisfaction with specific life domains, each rated on a 1 (*extremely dissatisfied*) to 7 (*extremely satisfied*) scale. These domains—self, physical attractiveness, abilities, morality, health, self-discipline, and role-fulfillment—vary in relevance to the changes we would expect to follow from the program. For example, physical attractiveness is a positive domain that is irrelevant to the ENHANCE program. This measure will allow us to examine whether participants are inappropriately inflating positive self-reports in program-irrelevant domains.

Target specificity. Next, participants read two vignettes, each describing someone's life and rated how satisfied they believed this person is with his or her life (Angelini, Cavapozzi, Corazzini, & Paccagnella, 2014) on a scale from 1 (*very dissatisfied*) to 5 (*very satisfied*). Responses to these items serve as anchors to assess participants' reporting styles on well-being questionnaires. Because participation in ENHANCE should not increase ratings of another person's well-being, condition differences on this measure would indicate inflated reporting of happiness in general, whereas the absence of differences on this measure would suggest that intervention effects on personal well-being are not simply artifacts of a change in the manner in which participants use well-being scales.

Negative psychological health. While ENHANCE was designed as an intervention for increasing SWB in a nonclinical population, we sought to evaluate the potential influence of this positive treatment program on negative indicators of psychological health. First, we used the PHQ-9 (Kroenke et al., 2001) once more to assess for depressed mood. Other PPIs targeting clinical populations have decreased depression (Sin & Lyubomirsky, 2009) and our inclusion of this variable will allow a test of whether ENHANCE can similarly lower depressive symptoms in a subclinical sample. Additionally, participants' perceived stress in the last month was measured with the 14-item Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983) rated on a scale from 1 (*never*) to 5 (*very often*). Stress is negatively related to SWB (Schiffrin & Nelson, 2010) and, according to reports from the American Psychological Association (2017), 75% of Americans had experienced at least one symptom of stress (e.g., sleeplessness, irritability) in the past month making it a pervasive well-being concern among nonclinical adults. We also included measures to assess alternate indicators of positive psychological health including meaning in life, basic needs satisfaction, and self-esteem, which are included in the online supplemental materials.

Target skills. Content-specific measures were employed to evaluate the skills and related outcomes targeted in each session of the program (e.g., mindfulness, gratitude, etc.; see Table 1).

Additional measures. Participants also completed measures of physical health, mental health, and social functioning at each assessment, as well as weekly measures of SWB, content-specific skills, and health for the initial 12 weeks of the study. These measures are beyond the current scope of examining the effects of the ENHANCE program on primary SWB outcomes, and are presented in a parallel article (Kushlev, Heintzelman, & Diener, 2019).

Results

Fidelity of the In-Person ENHANCE Program

Fidelity of the in-person ENHANCE program was assessed using the 16-item ENHANCE Fidelity Checklist (EFC), adapted from the 19-item ASPIRE Coaching Fidelity Checklist (Damschroder et al., 2016). Thirteen items were retained from the ASPIRE Coaching Fidelity Checklist; three items were modified to better reflect the delivery model of the ENHANCE program. Items of the EFC were organized under six domains: (a) review of the previous week, (b) personalization of content, (c) goal setting and session summary, (d) session management, (e) session focus, and (f) person-centered therapeutic style. Raters evaluated items of the EFC on a 3-point scale, with anchors of 0 (*did not cover/demonstrate*), 1 (*partially covered/demonstrated*), and 2 (*fully covered/demonstrated*). Two graduate-level raters randomly selected three audio-recorded sessions (25% of the sessions) and independently evaluated fidelity with 98.66% agreement. The mean fidelity score was 1.93 (SD = 0.23) for Sessions 5 (Mindfulness), 8 (Close Relationships), and 11 (Contributing to the Happiness of Others), indicating strong levels of program fidelity.

Analytic Strategy

Our central goal in the current RCT is to test the efficacy of the ENHANCE program in increasing SWB. Using current best practices in RCT research (DeLucia & Pitts, 2006), we used conditional growth models as omnibus tests of treatment efficacy, comparing changes in each outcome between the experimental and control conditions from baseline to posttest and follow-up. The conditional growth models allowed us to use all available data from each participant (rather than deleting cases listwise as in mixed analysis of variance [ANOVA]), while being robust to missing data (Gibbons, Hedeker, & DuToit, 2010); in fact, we used robust estimation maximum likelihood, which is particularly robust to missing data. Unlike mixed ANOVAs, these multilevel models also allowed us to model variance due to administration method (online vs. in-person).

For each outcome, we use a conditional growth model (*nlme*, R package Version 3.1–131.1; Pinheiro, Bates, DebRoy, Sarkar, & R Core Team, 2018) with Condition (ENHANCE vs. control), Time (baseline, posttest, and follow-up assessments), and their interaction term as predictors. The interaction provides the critical test of the efficacy of the intervention, that is the change in the ENHANCE participants versus controls over time. To model differences in baseline scores between participants, we included the random, in addition to the fixed, intercepts. Time was also modeled as both a fixed effect and a random effect, allowing different condition trends over time for each participant. For most precise estimation of the quadratic effects, we used orthogonal polynomials (function *poly* in R Version 3.4.3). We preregistered a plan to detect d = .40 with 80% power in a design and rationale article (Kushlev et al., 2017). Using package *powerlmm* Version 0.4.0 in R, we estimated power more precisely for a range of effects across our multilevel growth models. We specified n_1 = 3 measurements per n_2 = 155 with a subject-level random intercept = 1, within-subjects residual = 0.5, and a random slope = 0.2, accounting for a dropout rate of 15% at posttest and 20% by follow-up. These

models indicated that we have 87% power to detect differences between conditions equivalent to $d = .40$, where d is the effect size at last measurement standardized based on the standard deviation of the outcome variable at baseline. We had 80% power to detect effects of $d = .36$; power reached 97% for Cohen's $d = .5$ and approximated 100% for Cohen's $d = .8$.

To aide in the interpretation of the omnibus tests described above, we used mixed ANOVAs to examine (a) differences between conditions from baseline to posttest and (b) differences between conditions from baseline to follow-up (to test for the sustainability of treatment effects after program completion). Particularly in the presence of quadratic omnibus interactions, we will use these tests to inform our conclusions about whether scores at the follow-up assessment continue to represent improvements compared to baseline. A power sensitivity analysis conducted with G*Power 3.1 (Faul, Erdfelder, Lang, & Buchner, 2007) demonstrates that we could detect an effect of $F = 3.90$ at 80% power given the sample size and the parameters included in these models. All analyses were conducted on the combined sample across both the online and in-person administration unless otherwise noted. Data used in analyses are openly accessible on the Open Science Framework, https://osf.io/texm2/?view_only=fd8c915dcf69476f99f3fde5e8c931b8.

Primary Well-Being Outcomes

Life satisfaction. The ENHANCE program produced increased life satisfaction across time, compared with the waitlist control, confirmed by the three-level growth model: linear, $b(SE) = .17(.08)$, $\beta = .08$, $t(258) = 2.02$, $p = .044$; and quadratic, $b(SE) = -1.23(.77)$, $t(256) = -1.59$, $p = .113$. While the conditions were indistinguishable in life satisfaction at baseline (Figure 3a), ENHANCE participants reported greater life satisfaction than controls after the program, reflected in a Time (baseline vs. posttest) × Condition (ENHANCE vs. control) interaction, $F(1, 131) = 6.61$, $p = .01$, $\eta_p^2 = .05$. Notably, ENHANCE participants' increases in life satisfaction were maintained for 3 months, relative to controls—an effect illustrated by a second Time (baseline vs. follow-up) × Condition interaction, $F(1, 125) = 6.15$, $p = .01$, $\eta_p^2 = .05$ (see Table 3 for means).

Positive affect. Participants in the ENHANCE condition (vs. control) also demonstrated gains in positive affect: linear, $b(SE) = .16(.07)$, $\beta = .07$, $t(257) = 2.18$, $p = .030$; quadratic, $b(SE) = -3.54(1.02)$, $t(255) = -3.48$, $p < .001$. ENHANCE participants reported greater positive affect than controls after the program (Figure 3b), confirmed by the Time (baseline vs. posttest) × Condition (ENHANCE vs. control) interaction, $F(1, 130) = 17.51$, $p = .01$, $\eta_p^2 = .12$. Participants in the ENHANCE condition also showed greater increases in positive affect from baseline to follow-up compared to the controls: Time (baseline vs. follow-up) × Condition interaction, $F(1, 125) = 3.84$, $p = .05$, $\eta_p^2 = .03$. Unlike with life satisfaction, however, positive affect was lower for ENHANCE participants at follow-up than immediately after the intervention (see Table 3).

Negative affect. ENHANCE also lowered negative affect relative to the control group from baseline to posttest, though these reductions in negative affect diminished at follow-up as evidenced by the absence of a linear effect, $b(SE) = -.07(.07)$, $\beta = -.03$, $t(257) = -0.98$, $p > .250$, and the presence of a quadratic effect, $b(SE) = 2.98(.99)$, $t(255) = 3.01$, $p = .003$ (Figure 3c). Like life satisfaction and positive affect, participants in the ENHANCE program experienced a greater decline in negative affect than controls from baseline to posttest, confirmed by a Time (baseline vs. posttest) × Condition (ENHANCE vs. control) interaction, $F(1, 130) = 9.74$, $p = .002$, $\eta_p^2 = .07$. This improvement, however, was not maintained at follow-up, Time (baseline vs. follow-up) × Condition interaction, $F(1, 125) = 0.81$, $p = .37$, $\eta_p^2 = .006$ (see Table 3).

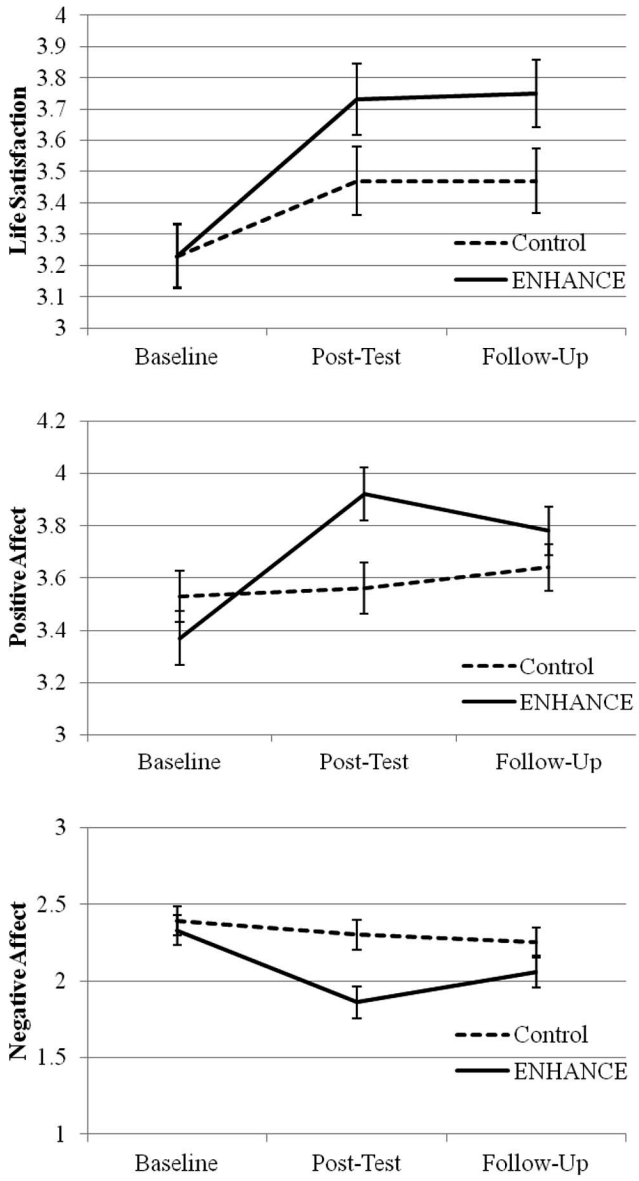

Figure 3. Subjective well-being across waves and conditions with standard error bars. ENHANCE = Enduring Happiness and Continued Self-Enhancement.

In sum, ENHANCE participants reported greater life satisfaction and positive affect, and lower negative affect, relative to waitlist controls, at the conclusion of the 12-week program. Moreover, at the 3-month follow-up, ENHANCE participants' positive

Table 3
Subjective Well-Being and Negative Psychological Health Within Conditions and Assessments

Outcome	Baseline *M* (*SD*)	Posttest *M* (*SD*)	Follow-up *M* (*SD*)
Life satisfaction			
Control	3.23 (.84)	3.47 (.97)	3.47 (.86)
ENHANCE	3.23 (.75)	3.73 (.78)	3.75 (.81)
Cohen's *d*	.00	.30	.34
Positive affect			
Control	3.53 (.70)	3.56 (.84)	3.64 (.63)
ENHANCE	3.37 (.90)	3.92 (.72)	3.78 (.79)
Cohen's *d*	−.20	.46	.20
Negative affect			
Control	2.39 (.74)	2.30 (.82)	2.25 (.76)
ENHANCE	2.34 (.74)	1.86 (.76)	2.06 (.83)
Cohen's *d*	−.07	−.56	−.24
Depression			
Control	6.28 (4.30)	5.06 (3.62)	5.57 (3.75)
ENHANCE	6.58 (3.94)	4.10 (3.72)	4.58 (4.43)
Cohen's *d*	.07	−.26	−.24
Perceived stress			
Control	2.81 (.55)	2.72 (.58)	2.76 (.56)
ENHANCE	2.70 (.56)	2.41 (.55)	2.31 (.58)
Cohen's *d*	−.20	−.55	−.79

Note. ENHANCE = Enduring Happiness and Continued Self-Enhancement.

affect waned from the immediate posttest, yet continued to represent an improvement from baseline, while the initial life satisfaction gains were fully maintained 3 months after treatment.

Moderation by mode of administration: In-person versus online. Did modality of participation—in-person versus online—lead to reliable differences in these primary outcomes? To test this we entered mode of administration as an additional term in our multilevel growth curve model, allowing us to explore the three-way interaction between Condition, Time, and Mode.[1] We found no evidence that Mode significantly moderated the effects of the program, for life satisfaction, $b(SE) = .10(.12)$, $t(256) = .85$, $p > .250$, positive affect, $b(SE) = .06(.15)$, $t(255) = .42$, $p > .250$, or negative affect, $b(SE) = .10(.15)$, $t(255) = .66$, $p > .250$. Thus, despite requiring minimal contact with participants, the online mode produced similar improvements in our primary SWB outcomes to the more traditional in-person intervention. In light of these results, all subsequent analyses combine across both samples.

Positive-to-negative memory ratio. To complement our self-report measures of SWB, we computed a positive-to-negative memory score for each participant based on the timed recall task. The number of positive to negative memories correlated with positive affect, $r = .31$ to $.43$, $ps < .001$, and negative affect ($r = -.21$ to $-.28$, $ps \leq .01$) at each of the three assessments. ENHANCE participants increased their positive-to-negative memory ratio over time, relative to controls, indicated by a linear interaction, $b(SE) = .89(.39)$, $\beta = -.09$, $t(251) = 2.30$, $p = .022$, with no quadratic interaction, $b(SE) = -5.76(5.69)$, $t(249) = -1.02$, $p > .250$. ENHANCE program participants had a smaller positive-to-negative memory ratio than controls at baseline, but surpassed controls at the end of the program, Time (baseline vs. posttest) × Condition (ENHANCE vs. control) interaction, $F(1, 127) = 5.23$, $p = .02$, $\eta_p^2 = .04$ (see Figure S1 in the online supplemental materials). Moreover, this difference was maintained at follow-up, Time (baseline vs. follow-up) × Condition interaction, $F(1, 120) = 4.21$, $p = .04$, $\eta_p^2 = .03$.

Peer perceptions of well-being. Peer reports indicated greater perceived participant life satisfaction for ENHANCE (vs. control) participants across time, as reflected in the linear growth model, $b(SE) = .12(.05)$, $\beta = .09$, $t(237) = 2.15$, $p = .033$. However, this overall difference did not emerge in either of the subsequent pairwise time by condition interactions: Time (baseline vs. posttest) × Condition (ENHANCE vs. control) interaction, $F(1, 124) = 2.67$, $p = .11$, $\eta_p^2 = .02$; Time (baseline vs. follow-up) × Condition interaction, $F(1, 109) = 3.18$, $p = .08$, $\eta_p^2 = .03$. Unlike life satisfaction, we did not find effects on the peer reports of positive affect, $b(SE) = .05(.06)$, $\beta = .03$, $t(236) = 0.87$, $p > .250$, negative affect, $b(SE) = .01(.06)$, $\beta = .00$, $t(236) = 0.09$, $p > .250$, positive behaviors, $b(SE) = -.02(.06)$, $\beta = -.02$, $t(237) = -0.42$, $p > .250$, or negative behaviors, $b(SE) = -.06(.05)$, $\beta = -.04$, $t(237) = -1.17$, $p = .243$. Notably, the peer reports of life satisfaction were strong indicators of how satisfied participants actually felt about their lives at each assessment (rs = .60, .52, and .52), whereas the peer reports of positive affect ($r = .42$, .33, and .38) and negative affect ($r = .20$, .26, and .25) did not demonstrate the same convergent validity with self-reports.

Domain specificity. We next tested for effects on satisfaction within specific life domains. As these were measured with single-item measures, we used models unnested in mode of administration.[2] As shown in Table 4, the nonnested tests, which are akin to regular mixed ANOVA, showed omnibus linear effects of condition over time on satisfaction with one's self, self-discipline, abilities, and role fulfillment. These effects map well on the domains targeted by the ENHANCE program (e.g., role fulfillment in values and roles). In contrast, morality, physical health, and physical attractiveness, which were not targeted in the program, were not affected. For consistency, results from the nested models are also presented in Table 4.

Target specificity. We next conducted similar analyses to assess participants' assessments of life satisfaction for irrelevant others. There was no evidence for a linear interaction of Condition × Time, $b(SE) = .01(.06)$, $\beta = .01$, $t(258) = .17$, $p > .250$, or for a quadratic effect, $b(SE) = -1.40(.84)$, $t(256) = -1.67$, $p = .097$. Furthermore, none of the follow-up interactions reached statistical significance (means for the control and ENHANCE conditions, respectively: $M_{\text{baseline}} = 3.36$ vs. 3.32; $M_{\text{posttest}} = 3.42$ vs. 3.50; $M_{\text{follow-up}} = 3.62$ vs. 3.58). Detected ENHANCE effects were restricted to self-referential scales, as intended.

[1] These models were not nested within mode to avoid attributing meaningful variance in the Mode × Condition × Time interaction to nesting, providing a stronger test of the Moderation × Mode hypothesis.

[2] The models nested in mode make the conservative assumption that participants within each mode do not differ, thus applying an unfair penalty to single-item measures, which are subjects to more random fluctuation than composite measures (Diamantopoulos, Sarstedt, Fuchs, Wilczynski, & Kaiser, 2012).

Table 4
Domain Satisfaction Means by Assessment and Condition and Interaction Tests Comparing Conditions Across Assessments

Domain	Omnibus Time × Condition interaction: Nested model *b* (*SE*)	Omnibus Time × Condition interaction: Unnested model *b* (*SE*)	$M_{baseline}$(*SD*)	Baseline to Posttest × Condition: $M_{posttest}$(*SD*)	Baseline to Follow-Up × Condition: $M_{follow\text{-}up}$ (*SD*)
Self	.29 (.18)	.26 (.10)		$F(1, 130) = 5.12^{*}$, $\eta_p^2 = .04$	$F(1, 124) = 5.66^{*}$, $\eta_p^2 = .04$
Control			4.77 (1.25)	5.05 (1.28)	5.00 (1.28)
ENHANCE			4.66 (1.41)	5.25 (1.17)	5.46 (1.16)
Cohen's *d*			−.08	.16	.38
Attractiveness	.12 (.10)	.12 (.09)		$F(1, 130) = .001$, $\eta_p^2 = .00$	$F(1, 124) = 1.39$, $\eta_p^2 = .01$
Control			4.43 (1.21)	4.65 (1.22)	4.58 (1.37)
ENHANCE			4.56 (1.29)	4.78 (1.02)	4.95 (1.24)
Cohen's *d*			.10	.11	.28
Abilities	26 (.18)	.22 (.09)*		$F(1, 130) = 2.56$, $\eta_p^2 = .02$	$F(1, 125) = 4.25^{*}$, $\eta_p^2 = .03$
Control			5.13 (1.29)	5.23 (1.17)	5.19 (1.31)
ENHANCE			5.28 (1.21)	5.62 (.87)	5.73 (.90)
Cohen's *d*			.12	.38	.48
Morality	07 (.09)	07 (.09)		$F(1, 131) = .96$, $\eta_p^2 = .007$	$F(1, 125) = .84$, $\eta_p^2 = .007$
Control			5.54 (1.00)	5.68 (.99)	5.78 (.98)
ENHANCE			5.55 (1.19)	5.82 (1.03)	5.98 (1.02)
Cohen's *d*			.01	.14	.20
Health	14 (.10)	14 (.10)		$F(1, 131) = .80$, $\eta_p^2 = .006$	$F(1, 125) = 2.77$, $\eta_p^2 = .02$
Control			4.78 (1.34)	4.86 (1.30)	4.86 (1.29)
ENHANCE			4.77 (1.54)	5.03 (1.41)	5.18 (1.20)
Cohen's *d*			−.01	.13	.26
Self-discipline	24 (.12)*	24 (.12)*		$F(1, 131) = .54$, $\eta_p^2 = .004$	$F(1, 125) = 2.23$, $\eta_p^2 = .02$
Control			4.08 (1.32)	4.15 (1.43)	4.23 (1.41)
ENHANCE			4.40 (1.59)	4.60 (1.41)	4.93 (1.33)
Cohen's *d*			.22	.32	.51
Role fulfillment	37 (.23)	31 (.12)*		$F(1, 130) = 5.11^{*}$, $\eta_p^2 = .04$	$F(1, 123) = 5.58^{*}$, $\eta_p^2 = .04$
Control			4.56 (1.23)	4.59 (1.43)	4.95 (1.20)
ENHANCE			4.53 (1.33)	4.98 (1.29)	5.47 (1.10)
Cohen's *d*			−.02	.29	.45

Note. ENHANCE = Enduring Happiness and Continued Self-Enhancement. The nested model takes nesting within administration mode into account and may thus partial out meaningful condition variance when there are differences between means at baseline within each mode of administration. The unnested model is akin to regular mixed analysis of variance model, comparing changes over time between treatment and control without assuming equality of means at baseline.
* $p < .05$. ** $p < .01$.

Negative Psychological Health

We next examined the effects of ENHANCE participation on indicators of negative psychological health. Means within condition and time for depression and stress are reported in Table 3 and depicted in corresponding figures in the online supplemental materials.

Levels of depression decreased somewhat for participants in the ENHANCE program (vs. control), with the linear omnibus test just below traditional levels of significance, $b(SE) = -.71(.31)$, $\beta = -.06$, $t(258) = -1.85$, $p = .066$, and no quadratic effect, $b(SE) = 5.81(4.78)$, $t(256) = -1.22$, $p = .225$. In probing these effects, there was a small Time (baseline vs. posttest) × Condition (ENHANCE vs. control) interaction, $F(1, 131) = 4.09$, $p = .045$, $\eta_p^2 = .03$, while there was not a Time (baseline vs. follow-up) × Condition interaction, $F(1, 125) = 3.01$, $p = .085$, $\eta_p^2 = .02$. ENHANCE led to slight reductions in depression at posttest that rebounded toward baseline levels at follow-up.

ENHANCE (vs. control) participants reported less perceived stress over time as reflected by a linear effect, $b(SE) = -.19(.05)$, $\beta = -.13$, $t(258) = -2.90$, $p < .001$, and no quadratic effect, $b(SE) = .43(.60)$, $t(256) = -0.73$, $p > .250$. There were Time × Condition interactions for baseline to posttest, $F(1, 131) = 8.45$, $p = .004$, $\eta_p^2 = .06$, and baseline to follow-up, $F(1, 125) = 13.29$, $p < .001$, $\eta_p^2 = .10$. ENHANCE lowered perceived stress and this reduction was sustained to follow-up. Although ENHANCE was designed to promote positive outcomes (rather than treat negative ones), this promising evidence suggests that ENHANCE might also be instrumental in alleviating depressive symptoms and reducing perceived stress.

Targeted Skills Development

Did ENHANCE participants also improve on the specific skills (e.g., gratitude, mindfulness) targeted in the program? If so, did changes in these skills mediate the changes in SWB? Means and Condition × Time (baseline vs. posttest/baseline vs. follow-up) interactions to probe the omnibus effects for all targeted skills, that we used to inform our interpretations of the effects are presented in Table 5 with corresponding figures presented in the online supplemental materials.

We first examined whether ENHANCE participants honed their happiness skills overall compared to controls by creating a com-

Table 5
Targeted Skills Measures Within Conditions and Assessments

Targeted skill	$M_{baseline}(SD)$	Baseline to Posttest × Condition $M_{posttest}(SD)$	Baseline to Follow-Up × Condition $M_{follow\text{-}up}(SD)$
Self-integrity		$F(1, 131) = 4.93^{*}$, $\eta_p^2 = .04$	$F(1, 125) = 1.42$, $\eta_p^2 = .01$
Control	5.57 (.79)	5.76 (.79)	5.62 (.98)
ENHANCE	5.66 (.85)	6.02 (.77)	5.91 (1.00)
Cohen's *d*	.11	.33	.29
Goals		$F(1, 131) = 1.05$, $\eta_p^2 = .008$	$F(1, 125) = 4.54^{*}$, $\eta_p^2 = .04$
Control	3.65 (.75)	3.68 (.82)	3.75 (.78)
ENHANCE	3.68 (.75)	3.84 (.76)	3.98 (.73)
Cohen's *d*	.04	.20	.30
Strengths use		$F(1, 131) = 5.52^{*}$, $\eta_p^2 = .04$	$F(1, 125) = 5.66^{*}$, $\eta_p^2 = .04$
Control	5.02 (1.02)	5.15 (1.12)	5.18 (1.11)
ENHANCE	5.25 (.95)	5.65 (.94)	5.72 (.82)
Cohen's *d*	.23	.48	.55
Mindfulness		$F(1, 131) = 6.71^{**}$, $\eta_p^2 = .05$	$F(1, 125) = .97$, $\eta_p^2 = .008$
Control	2.62 (.49)	2.71 (.48)	2.67 (.44)
ENHANCE	2.78 (.47)	2.99 (.46)	2.89 (.47)
Cohen's *d*	.33	.60	.48
Self-compassion		$F(1, 131) = 9.63^{**}$, $\eta_p^2 = .07$	$F(1, 125) = 5.86^{*}$, $\eta_p^2 = .05$
Control	2.93 (.65)	3.06 (.68)	3.07 (.56)
ENHANCE	3.03 (.72)	3.36 (.64)	3.42 (.61)
Cohen's *d*	.15	.45	.60
Savoring		$F(1, 131) = 12.30^{***}$, $\eta_p^2 = .09$	$F(1, 125) = 1.80$, $\eta_p^2 = .01$
Control	5.14 (1.03)	5.21 (1.03)	4.89 (1.11)
ENHANCE	5.03 (1.04)	5.44 (.91)	4.96 (1.15)
Cohen's *d*	−.11	.24	.06
Capitalization		$F(1, 131) = 8.64^{*}$, $\eta_p^2 = .06$	$F(1, 125) = 15.00^{***}$, $\eta_p^2 = .11$
Control	3.74 (.97)	3.65 (.91)	3.60 (.99)
ENHANCE	3.55 (.84)	3.78 (.83)	3.91 (.72)
Cohen's *d*	−.21	.15	.36
Gratitude		$F(1, 131) = 12.12^{***}$, $\eta_p^2 = .09$	$F(1, 125) = 1.26$, $\eta_p^2 = .01$
Control	5.42 (.80)	5.47 (.85)	5.30 (.72)
ENHANCE	5.40 (.85)	5.74 (.66)	5.37 (.82)
Cohen's *d*	−.02	.35	.09
Community		$F(1, 131) = 1.28$, $\eta_p^2 = .01$	$F(1, 125) = .004$, $\eta_p^2 = .00$
Control	4.69 (1.20)	4.75 (1.33)	4.89 (1.19)
ENHANCE	5.03 (1.24)	5.23 (1.25)	5.21 (1.30)
Cohen's *d*	.28	.37	.26
Prosocial impact		$F(1, 131) = 1.72$, $\eta_p^2 = .01$	$F(1, 125) = 1.00$, $\eta_p^2 = .008$
Control	5.50 (.79)	5.52 (.93)	5.66 (.82)
ENHANCE	5.64 (.89)	5.87 (.86)	5.93 (.75)
Cohen's *d*	.17	.39	.34
Overall skills		$F(1, 131) = 18.29^{***}$, $\eta_p^2 = .12$	$F(1, 125) = 10.81^{***}$, $\eta_p^2 = .08$
Control	.03 (.68)	−.13 (.76)	−.17 (.62)
ENHANCE	.12 (.65)	.21 (.65)	.15 (.68)
Cohen's *d*	.14	.48	.49

Note. ENHANCE = Enduring Happiness and Continued Self-Enhancement.
$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

posite measure of skills by standardizing, and then averaging, the scores for each of the 10 skills across conditions and sites within each time point. Omnibus tests showed a linear effect for the skills composite, $b(SE) = .13(.04)$, $\beta = .07$, $t(258) = 3.59$, $p < .001$; quadratic effect, $b(SE) = -1.30(.80)$, $t(256) = 1.63$, $p = .105$. Participants in the ENHANCE condition (vs. controls) improved overall on the targeted skills through treatment and maintained development of these skills to follow-up. We next examined each skill separately.

The core self: Self-integrity, goals pursuit, and strengths use. Omnibus tests showed no linear effect of Condition by Time for self-integrity, $b(SE) = .10(.08)$, $\beta = .04$, $t(258) = 1.19$, $p = .234$, and no quadratic effects, $b(SE) = -.68(.95)$, $t(256) = -0.71$, $p > .250$. A marginal linear effect was found for strengths use, $b(SE) = .18(.10)$, $\beta = .07$, $t(258) = 1.81$, $p = .072$,[3] but not a quadratic effect, $b(SE) = -1.17(.93)$, $t(256) = -1.26$, $p = .210$. A significant linear effect was found for goal pursuit, $b(SE) = .10(.05)$, $\beta = .05$, $t(258) = 1.99$, $p = .047$, but not a quadratic effect, $b(SE) = -.10(.86)$, $t(256) = -0.12$, $p > .250$. ENHANCE par-

[3] The effect on strengths use was significant when ignoring variance due to nesting within site, $b(SE) = .16(.1006)$, $\beta = .06$, $t(258) = 2.51$, $p = .013$.

ticipants showed superior improvement from baseline compared to controls on each of the core self-skills at either posttest or follow-up.

The experiential self: Mindfulness, self-compassion, and savoring. For mindfulness, omnibus tests for Condition by Time showed no linear effect, $b(SE) = .02(.08)$, $\beta = .02$, $t(258) = 0.32$, $p > .250$, but a quadratic effect, $b(SE) = -.92(.39)$, $t(256) = -2.35$, $p = .019$. For self-compassion, there was a linear effect, $b(SE) = .15(.06)$, $\beta = .09$, $t(258) = 2.33$, $p = .021$, but no quadratic effect, $b(SE) = -.70(.69)$, $t(256) = -1.01$, $p > .250$. For savoring, there was a linear effect, $b(SE) = .14(.07)$, $\beta = .05$, $t(258) = 1.98$, $p = .049$, but no quadratic effect, $b(SE) = -1.65(.95)$, $t(256) = -1.78$, $p = .083$. There was greater improvement on these experiential skills from baseline to posttest and/or follow-up in experiential skills within ENHANCE participants versus controls.

The social self: Capitalization, gratitude, sense of community, and prosocial impact. Within the domain of close relationships, we found linear effects for capitalization, $b(SE) = .23(.06)$, $\beta = .10$, $t(258) = 3.71$, $p = .021$, but not for gratitude, $b(SE) = .10(.06)$, $\beta = .05$, $t(258) = 1.74$, $p = .082$. There were not quadratic effects for either capitalization, $b(SE) = -.56(.82)$, $t(256) = -0.68$, $p > .250$, or gratitude, $b(SE) = -2.27(1.45)$, $t(256) = -1.57$, $p = .118$. Regarding skills associated with more distant social ties, we found no linear effects for sense of community, $b(SE) = .01(.09)$, $\beta = .01$, $t(258) = 0.13$, $p > .250$, or prosocial impact, $b(SE) = .09(.13)$, $\beta = .04$, $t(258) = 0.66$, $p > .250$. As well, no quadratic effect was found for sense of community, $b(SE) = -1.29(1.05)$, $t(256) = -1.23$, $p = .221$, or prosocial impact, $b(SE) = -.74(1.05)$, $t(256) = -0.71$, $p > .250$. ENHANCE participants improved more than controls from baseline to posttest and/or follow-up in the close relationships measures, but not the measures regarding weaker social ties.

Skills Development as Mediator of Well-Being Changes

Next, we examined the extent to which change in the targeted happiness skills accounted for change in the SWB measures from baseline to posttest and follow-up. To explore this, we computed an overall skills change metric. We used the standardized skills scores from the previous skills composite analyses to represent the overall skills ratings at each time point. We then computed change scores by subtracting baseline scores from posttest scores and then baseline scores from follow-up scores. Higher values, then, represent greater skills improvement over the course of the study. We then calculated indirect effects with PROCESS in SPSS (Hayes, 2017), using 5,000 bootstrapped resamples to provide a 95% confidence interval around the indirect effect of condition on SWB change via skills change; we examined changes from baseline to posttest and changes from baseline to follow-up, separately.

Baseline to posttest. We found evidence for indirect effects of condition on life satisfaction through targeted skill development from baseline to posttest, $b = .15$, $SE = .06$, 95% confidence interval (CI) [.05, .29]. Similarly, there was evidence for an indirect effect of condition on positive affect change from baseline to posttest through change in targeted skills over that time frame, $b = .23$, $SE = .07$, 95% CI [.11, .38]. Lastly, there was also an indirect effect of condition on negative affect through change in targeted skills from baseline to posttest, $b = -.11$, $SE = .05$, 95% CI [−.22, −.03]. These findings suggest that the extent to which ENHANCE participants improved upon the skills targeted in the program drove the evident changes in SWB from baseline to posttest.

Baseline to follow-up. Next, we tested whether participants' improved skills also mediated their longer term improvements in SWB by examining indirect effects of condition on SWB change from baseline to follow-up through change in skills over the same time frame. First, we found an indirect effect of program condition on changes in life satisfaction from baseline to follow-up through changes in skills over this time, $b = .13$, $SE = .06$, 95% CI [.03, .25]. There was also evidence for an indirect effect of condition on positive affect change from baseline to follow-up, through change in targeted skills over the same period, $b = .23$, $SE = .09$, 95% CI [.08, .43]. There was a mirrored indirect effect for condition driven change in negative affect through change in skills from baseline to follow-up, $b = -.15$, $SE = .07$, 95% CI [−.31, −.03].

Individual skills mediations. We also conducted the same PROCESS tests of the indirect effects of condition on change in each of the SWB measures from baseline to posttest and baseline to follow-up, through change in each of the individual skills over those same time frames separately. Results are reported in Table S3 in the online supplemental materials. We found indirect effects of condition on SWB for at least one timeframe comparison for each of the skills, with the exception of sense of community and prosocial impact, suggesting that no particular skill accounted for all SWB changes.

Durability and Replicability Checks

Lastly, we used the additional fourth assessment—immediately following treatment for the waitlist controls and 6 months post-treatment for the original ENHANCE group—to test the durability and replicability of the effects on SWB. We tested the durability of program effects using within-subjects growth curve models across the four assessments for the treatment group members who completed the fourth assessment. The linear growth curve model was statistically significant for life satisfaction, $b(SE) = 0.13$ (0.04), $t(39) = 3.32$, $p = .002$, but not for positive affect, $b(SE) = 0.09$ (0.05), $t(39) = 1.76$, $p = .086$, or negative affect, $b(SE) = -0.05$ (0.05), $t(39) = -1.02$, $p = .31$. Similar to the full-sample findings across the first three assessments, including the fourth assessment showed evidence of a quadratic effect for positive affect, $b(SE) = 3.00$ (1.07), $t(75) = 2.82$, $p = .006$, suggesting some decrease from initial gains in positive affect over time. Follow-up paired t tests comparing SWB at the third and fourth assessments showed no evidence for a further decay in SWB from 3 to 6 months after program completion (see Table 6). Furthermore, paired t tests comparing SWB at the fourth assessment to initial baseline levels showed differences for life satisfaction, paired $t(38) = 3.79$, $p = .001$, and positive affect, paired $t(38) = 2.16$, $p = .04$, but not for negative affect, paired $t(38) = 1.40$, $p = .17$. Overall, we find some indication of the durability of the primary intervention effects 6 months after treatment.

Next, we tested the replicability of treatment efficacy by examining comparing SWB in the waitlist control group before (third assessment) and after (fourth assessment) completing ENHANCE with within-subjects paired t tests (see Table 6). Waitlist participants reported higher life satisfaction and positive affect, and

Table 6
Within-Condition Comparisons of Subjective Well-Being in Follow-Up and Fourth Assessments for Online Sample Subset

Domain	Follow-up (third)	Additional (fourth)	Paired *t* test
Life satisfaction			
ENHANCE	3.83 (.90)	3.89 (.89)	$t(37) = .98$, $p = .33$
Waitlist	3.51 (.74)	3.93 (.77)	$t(35) = 4.97$, $p < .001$
Cohen's *d*	.39	.05	
Positive affect			
ENHANCE	3.89 (.75)	3.96 (.80)	$t(37) = .63$, $p = .53$
Waitlist	3.62 (.61)	3.95 (.58)	$t(35) = 3.63$, $p = .001$
Cohen's *d*	.39	.01	
Negative affect			
ENHANCE	2.03 (.95)	1.96 (.95)	$t(37) = .62$, $p = .54$
Waitlist	2.31 (.74)	1.92 (.51)	$t(35) = 3.69$, $p = .001$
Cohen's *d*	.33	.05	

Note. ENHANCE = Enduring Happiness and Continued Self-Enhancement. $N_{\text{ENHANCE}} = 38$ (one of the 39 participants completing the fourth assessment did not complete the follow-up assessment), $N_{\text{waitlist}} = 36$.

lower negative affect, after participating in the ENHANCE program at Assessment 4 compared to Assessment 3. These findings replicate the immediate treatment effects on SWB observed in the original ENHANCE group.

Discussion

The central goal of this study was to test the efficacy of the newly developed ENHANCE program for increasing SWB. We found RCT evidence for the efficacy of ENHANCE in increasing positive affect and life satisfaction and lowering negative affect from baseline to posttest, compared to waitlist control. The changes in life satisfaction endured through the 3-month follow-up assessment, while the effects on affect diminished somewhat over this period. These findings fit with conceptualizations of affective states as more transitory and responsive to current situations, compared to broader cognitive assessments of life satisfaction. ENHANCE also reduced perceived stress and slightly lowered depressive symptoms in a nonclinical sample; while designed to build positive well-being, ENHANCE also mitigated negative symptomology.

Beyond Self-Report

We took great care to mitigate demand characteristic and self-report bias concerns in this study by including a variety of non-self-report measures of SWB. First, in a positive and negative memory recall task, ENHANCE participants recalled an increasingly greater proportion of positive to negative life memories across the course of the study compared to control participants. A methodological note regarding this measure is warranted: We prompted participants to recall events "in your lifetime," following previous research (Seidlitz & Diener, 1993), and accordingly, participants frequently reported family deaths, sexual and physical assaults, divorces, marriages, and children's births among their event listings. Future researchers wishing to examine SWB changes over time might consider focusing the recalls on events from a more specified period of time (i.e., past month) to limit listings to those most representative of one's current life outlook.

We also examined peer perceptions of participants' well-being over the course of the study. Overall, we observed broadly consistent patterns between the peer reports and the self-report measures: We found a significant treatment effect on peer perceptions of participants' life satisfaction, but not on perceptions of affect. Notably, the corresponding peer reports matched participants' self-reports of life satisfaction more than their self-reports of affect. We found this pattern surprising as we had presumed that affect would be more visible to others—through nonverbal behavior like smiling or laughing—than would others' private evaluations of their lives. The observed pattern, however, suggests an intriguing alternative: While judging others' true affect in their nonverbal behavior may be obscured by social norms (e.g., smiling or not complaining too much in social settings), judging others' general sense of satisfaction in life may more readily be gleaned from verbal communication—at least such between close others. This reasoning points to the hypothesis that people are better judges of the life satisfaction, rather than the affect, of close others—but better judges of the affect, rather than the life satisfaction, of acquaintances or strangers. As the peers in our study were exclusively close others, we could not test this hypothesis directly, opening an important direction for future research.

Relatedly, we found evidence for domain specificity as ENHANCE participants increased their satisfaction with target life domains (e.g., the self, their abilities), but not with nontarget life domains (e.g., physical appearance). Participants in ENHANCE also demonstrated target specificity, rating their own SWB but not the SWB of others higher after the program. This pattern of specificity bolsters our confidence that the self-report measures captured real change over time, rather than reflecting only demand characteristics and response biases.

Mechanisms of SWB Change

Going beyond past work, we tested whether the efficacy of ENHANCE was driven by the proposed mechanisms, that is, by the target skills the program was designed to develop (e.g., capitalization, savoring). We found treatment effects for a majority of the target skill areas, and as hypothesized, overall skill develop-

ment mediated the observed changes in SWB. Though most individual skills also mediated at least some of the effects on SWB, these indirect effects were smaller than the indirect effect of the overall composite. This pattern suggests that the overall efficacy of ENHANCE for any one individual may be found in the sum of its components rather than in any single one of them. A second, nonmutually exclusive possibility is that different happiness activities work best for different people. If this is the case, then the benefits of a comprehensive PPI may accrue at the population level rather than the individual level. It would be informative for future research to compare ENHANCE to single skill training of a similar duration (e.g., mindfulness meditation). We propose that a program developing a single skill deeply may produce more variable effects across individuals as compared to a comprehensive program, such as ENHANCE, designed to maximize person–activity fit across individuals. These novel mediation effects provide the foundation for future work building toward a predictive model with which to determine the PPI modules that are most likely to benefit particular types of people with the eventual goal of developing personalized PPI programs.

Mode of Administration: Implications for Researchers and Preventative Mental Health

Our study design also allowed us to uniquely compare in-person and online modes of administration of the same program content—a test critical for online PPI research and utilization. We did not find evidence that the mode of administration—in-person group therapy sessions versus an online platform—moderated the efficacy of the program on the primary SWB outcomes. It remains possible that we were underpowered to detect administration mode effects in our interaction analyses or that the confounding of modality with location might have influenced our findings. Furthermore, it remains possible that administration differences could emerge if the social engagement element were completely removed from the online administration of ENHANCE, a possibility that requires future testing. Still, this finding is, to our knowledge, the first to directly demonstrate the viability of the online PPIs compared to PPIs in an RCT. Further, while retention is a major concern for online PPIs, we had similar attrition rates across modes. This was likely due to our retention strategy of including personal contact with participants (e.g., in-person assessments, introduction and conclusion sessions; personally addressed emails). While this strategy can be used to promote retention in similar well-resourced scientific settings to maximize the ability to address target empirical questions, it limits the direct scalability of the ENHANCE program. Future work should examine the effects of ENHANCE in the absence of these added features to support the promise of this program as a scalable PPI.

Indeed, scalability may be the strongest benefit of conducting a PPI online. Given the increasing demand on college mental health services (Center for Collegiate Mental Health, 2017), for example, college counselors may consider using online sessions in combination with in-person appointments. Stepped-care, whereby patients are first given low-intensity treatments, often self-administered online, has proven more efficacious than care-as-usual (Ho, Yeung, Ng, & Chan, 2016). In this vein, online PPIs may hold promise for the prevention of mental health issues by reducing stress and depressive symptoms.

Access to mental health services also does not meet the demand for these services, in general. One analysis found that 7.2 million people in the United States faced unmet mental health service needs in 2010 (Roll, Kennedy, Tran, & Howell, 2013). The most direct approach to addressing this mismatch is, of course, to invest more in mental health services to meet the demand. But the prohibitive costs of such an endeavor may be the very cause of the shortage of care: a catch-22. The World Health Organization, for example, estimates that in low and middle-income countries, over 75% of individuals who would benefit from mental health treatments are not receiving these treatments (Dua et al., 2011).

As suggested above, one solution may lie in preventative health care—an increasingly popular approach to both mental and physical health (Barbot, 2012). From a preventative perspective, mental health can be viewed along a continuum from flourishing to languishing. On the basis of measures of emotional, psychological, and social well-being, Keyes (2002) classified more than 3,000 participants in the Midlife in the United States Survey as flourishing, moderately mentally healthy, or languishing. Flourishing individuals were almost three times less likely than moderately mentally healthy individuals to have recently suffered a major depressive episode. In the context of these findings, the efficacy of ENHANCE documented here suggests that PPIs may indeed be a promising tool in preventative mental health care. The online version of ENHANCE may provide a particularly useful tool for low-cost scalability, and for reaching underserved populations with particularly limited access to mental health resources, such as low-income individuals (Dua et al., 2011), and ethnic and racial minorities (Alegría et al., 2008; Coker et al., 2009; Wells, Klap, Koike, & Sherbourne, 2001). Beyond overcoming logistical resource-based barriers to mental health care in underserved populations, the positive skills focus of ENHANCE and other PPIs might also sidestep important concerns regarding the stigma of seeking traditional problem-focused mental health treatment that deters individuals, and especially ethnic minorities, youth, and men, from seeking mental health care (Clement et al., 2015). Further research is necessary to test the efficacy of ENHANCE to prevent mental illness, especially in underserved populations.

Potential Downsides to Pursuing Happiness

While the pursuit of happiness is enshrined in the United States' Declaration of Independence, largely perceived as an "extraordinarily important" endeavor (Diener, 2000), and associated with a host of beneficial outcomes (Lyubomirsky et al., 2005), we must also consider the potential downsides of (raising) happiness (Gruber, Mauss, & Tamir, 2011). For example, extremely happy individuals, those rating their lives 10 on a 10-point scale, make less money than very happy individuals (rating 8 or 9 on the same scale; Oishi et al., 2007). Relatedly, avoiding or suppressing negative emotions can be detrimental for overall well-being by leading people to ignore risks and threats (e.g., Levenson, 1994). Importantly, our findings indicate that while ENHANCE participation led to increases in happiness, it did not cause participants to experience extreme levels of happiness; they did not report maximum scale values (5), but rather SWB means increased to around 4/5 following ENHANCE participation. Furthermore, while designed to promote happiness, ENHANCE does not endorse a happy-go-lucky attitude to life, emphasizing the development of

positive skills and habits of daily living instead. Consistent with strong empirically supported treatments, such as Cognitive Behavioral Therapy (Butler, Chapman, Forman, & Beck, 2006) and Dialectical Behavioral Therapy (Linehan, 1993), the Dealing With the Negative module, for example, teaches adaptive responding to negative thoughts and feelings through awareness, acceptance, and regulation (rather than disavowing negative emotions).

In addition to the pitfalls of being too happy, actively pursuing happiness may, ironically, lower happiness. While PPI research suggests that exerting effort toward assigned happiness activities is essential for producing changes in well-being (Lyubomirsky, Dickerhoof, Boehm, & Sheldon, 2011), closely monitoring one's progress toward the pursuit of happiness (Schooler, Ariely, & Loewenstein, 2003) or highly valuing positive emotions (Mauss, Tamir, Anderson, & Savino, 2011) can backfire, leaving individuals feeling less happy. We took great care in the design of ENHANCE to mitigate these potential ironic effects, for instance, we informed participants of this conundrum and emphasized "practicing each activity in the program for its own sake without expecting a particular result or trying to feel a certain way." The deleterious effects of happiness pursuit may have been further offset by the social focus of ENHANCE as actively pursuing happiness in a socially oriented manner is associated with feeling happier (as tends to be the case in individuals from collectivistic cultures; Ford et al., 2015).

Limitations and Future Directions

The current study has several notable limitations. First, while we took great efforts to recruit a broad community sample, our participants still represented a segment of the community population that were interested and engaged enough to actively respond to recruitment materials, limiting the generalizability of our results. Second, participants were aware that the goal of the program was to increase happiness, as this was explicitly stated in recruitment and throughout the program. Third, we utilized a waitlist control design. These features of our trial open the door for demand characteristics, potentially impacting self-reports. Our inclusion of alternate measures less prone to such biases in self-reports mitigates this concern, but does not overcome it fully.

In our own future work, we plan to continue to expand our understanding of the effects of the ENHANCE program across outcomes and contexts. Additional data from this existing trial can thus be leveraged to 1) determine the effects of ENHANCE on downstream outcomes in health and social domains, and 2) examine the weekly process measures to gain insight into the development of these SWB changes across the treatment phase of the study (Kushlev et al., 2019). In subsequent trials, we aim to extend the duration of the follow-up assessments from months to years to understand more completely the longevity of the effects, and to shift to the use of active control comparison groups. In addition, as mentioned above, we see great promise for the utilization of ENHANCE within a variety of populations, including communities with underserved mental health care needs. As this work expands, we also see potential to tailor this program for specific populations, amending content and altering details to best address the needs of each population.

Utility of ENHANCE for the Basic Science of Happiness

In addition to leveraging ENHANCE as an applied intervention program to promote happiness, this program can also be used as an experimental tool within the basic science of happiness to test the causal effects of changes in SWB. In an influential review, Lyubomirsky et al. (2005) examined cross-sectional, longitudinal, and experimental evidence to show that happiness is beneficial for outcomes across life domains, including relationships, income, work performance, and health. Acknowledging the limitations of the existing experimental evidence, primarily based on brief manipulations of affect in lab settings, these authors argue that "If these same behaviors are also increased by long-term interventions to enhance global happiness, the case for happiness being causally related to success will be strengthened even more" (Lyubomirsky et al., 2005, p. 841). Indeed, in the absence of experimental evidence testing the effects of increasing happiness outside the lab, doubts about the direction of causality between happiness and other positive outcomes persist (e.g., Liu et al., 2016). Having established its efficacy here, therefore, we are eager to see ENHANCE used by researchers to test the causal effects of increasing happiness on a wide range of outcomes, from work performance and organizational citizenship to physical health and exercise. Our existing web platform for online administration may be particularly useful in circumventing the necessity of expending great resources for PPI administration.

Conclusion

As the science of happiness continues to grow at an exponential rate (Diener et al., 2017), we can work to leverage the knowledge about the content and process of human happiness to promote this desired (Diener, 2000) and beneficial (Lyubomirsky et al., 2005) state. ENHANCE is one evidence-based and, now, evidence-supported approach toward attaining this goal.

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