

Persistent pursuit of need-satisfying goals leads to increased happiness: A 6-month experimental longitudinal study

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Abstract University-based community members ($N = 181$) participated in a four-wave, 6-month longitudinal experiment designed to increase treatment participants' happiness levels. Participants were randomly assigned to set goals either to improve their life circumstances (comparison condition) or to increase their feelings of autonomy, competence, or relatedness in life (treatment conditions). We hypothesized that sustained gains in happiness would be observed only in the three treatment conditions, and that even these gains would last only when there was continuing goal engagement. Results supported these predictions and the sustainable happiness model on which they were based (Lyubomirsky et al. in *Rev Gen Psychol* 9:111–131, 2005). Furthermore, participants with initial positive attitudes regarding happiness change obtained larger benefits. We conclude that maintained happiness gains are possible, but that they require both “a will and a proper way” (Lyubomirsky et al. in *Becoming happier takes both a will and a proper way: two experimental longitudinal interventions to boost well-being*, 2009).

Keywords Subjective well-being · Psychological needs · Sustainable happiness · Goal progress · Attitudes towards happiness

A central question for positive psychology, and for personality psychology more generally, is whether people's happiness levels can change for the better. Some theory and research suggest that people have a genetically determined “happiness set point” (Lykken and Tellegen 1996), which is inexorable and bound ultimately to prevail. This perspective implies that what goes up must come down, because the inherited temperamental factors that largely determine our well-being are stable and unchanging. Another obstacle to sustainable happiness is hedonic adaptation, the process by which people become acclimated to positive life changes such that they cease to have positive effects. This “hedonic treadmill” (Brickman and Campbell 1971) ensures that no matter how good things get, we will eventually cease to notice and appreciate them. Relatedly, a “satisfaction treadmill” may operate such that improving life circumstances cause raised expectations and standards, which may also cause people to de-value current positive aspects of life (Kahneman 1999).

Lucas and colleagues have addressed the happiness change question using large-scale longitudinal data, showing that negative life events such as divorce, disability, or unemployment can have enduring negative effects on peoples' happiness levels (e.g., Clark et al. 2008; Lucas et al. 2003, 2004; Lucas 2007). Although the results have led Lucas (2007) to conclude that the set point is not destiny, there are very few published studies showing that happiness can actually change for the better, and remain that way for the long term. If the only available shift is “down,” obviously, this would be a problem for any area of research concerned with emotion and behavior change, not to mention the genre of self-help books, the burgeoning industry of life coaching, and so on.

Lyubomirsky et al. (2005) proposed a “sustainable happiness model” (SHM), which suggests that lasting gains

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in happiness can occur, under specific optimal circumstances (Sheldon and Lyubomirsky 2004). First, the model suggests that it is better to focus on establishing new patterns of activity, rather than new life circumstances. Although people often strive to improve their circumstances or situations (such as in what house, town, or state they live, what car they drive, or how much money they make), the effects of such changes on happiness are only transient. This is because people adapt to their static configuration of life circumstances, falling prey to the hedonic or satisfaction treadmills. In contrast, by adopting a new life activity (such as a hobby, group membership, goal, or career), people obtain the potential to generate a steady stream of fresh positive experiences. Consequently, they may be able to achieve and maintain a higher level of happiness than their genetic predisposition alone would predict. In short, Lyubomirsky et al. (2005) made a case for a set range rather than a set point, such that people might be able to stay in the upper tail of their own range, if other happiness-relevant life factors besides genetics continue to make positive contributions to the equation.

Recent research supports the activities versus circumstances distinction, showing that happiness boosts due to self-reported positive activity changes last longer than boosts due to self-reported positive circumstantial changes (Sheldon and Lyubomirsky 2006), and that randomly assigned activity changes (when actually carried through) produce longer-lasting happiness boosts than randomly assigned circumstantial changes (Sheldon and Lyubomirsky 2009). Sheldon and Lyubomirsky (2006) also showed that people do indeed adapt more swiftly to changed life circumstances, compared to changed life activities.

Thus, this research suggests that the type or quality of activity makes a difference. Furthermore, other recent research also focuses on the *type* or *quality* of life change that people make as crucial for determining short-term and long-term effects on happiness. Lyubomirsky et al. (2009) argued that sustainable happiness changes require “both a will and a proper way.” They showed that participating in randomly assigned optimism or gratitude exercises produced 6-month gains in happiness compared to a “daily activities listing” control exercise. However, they also demonstrated an interaction such that these gains lasted only as long as participants continued to invest effort in practicing the optimism or gratitude (compared to the control) activity, thus suggesting that both a “will” (defined in terms of continued effort) and a “proper way” are required for sustainable well-being change. Furthermore, the effect was strongest when participants had signed up for a “happiness increase” study, rather than a “cognitive exercises” study. Thus, “will” (defined in terms of having self-selected into the study, knowing its purpose) was found to be important in a second way. But again,

these effects only occurred when the assigned activity was one hypothesized to affect happiness, not the comparison activity, indicating that more than mere expectancy or placebo effects were at work.

What mediates the sustainable positive changes in happiness that have been observed? The SHM proposes that global happiness levels are critically affected by the positivity of current proximal experience. If one can maintain an inflow of rewarding experiences over time, then one can maintain an increased happiness level. What are the essential types of positive experience to have? According to self-determination theory (SDT: Deci and Ryan 1985, 2000), all humans have basic psychological needs that must be met if they are to thrive. Specifically, SDT focuses on autonomy (needing to feel that one owns and agrees with one’s behavior), competence (needing to feel that one can do things well, or at least improve in one’s abilities), and relatedness (needing to feel meaningfully connected to at least some other people). These three needs are said to be evolved and species-typical, and the proposition that they are universally important has been supported in a wide variety of studies, conducted in a wide variety of cultural settings (see Sheldon 2004 or Deci and Ryan 2000 for reviews).

Lyubomirsky et al. (2009) found further support for these SDT postulates by showing that enhanced feelings of autonomy and relatedness in a person’s weekly experiences mediated the effects of the positive activity (i.e., optimism and gratitude) on changes on well-being. The third need postulated by SDT, competence, did not significantly mediate the treatment effects when autonomy and relatedness were in the equation, because the optimism and gratitude interventions in this study had smaller effects on increases in competence satisfaction. This divergent result provides one rationale for examining all three needs concurrently, to carefully assess their relative efficacy for increasing happiness.

In the current research, we addressed these important issues in a new way—namely, by assigning participants to pursue particular kinds of personal goals over a 6-month period. The study built on the previously cited well-being research in several ways. First, we advertised the study as a happiness-increase experiment, such that all participants selected themselves into the study with knowledge of, and some degree of commitment to, the study’s goals (thus, all of our participants began with “will” in the sense of conscious knowledge of the study’s purpose). We based this aspect of the design on Lyubomirsky et al. (2009) finding that happiness changes only occur for self-selected participants, and from other recent research suggesting that happiness interventions have larger effects for informed participants (Seligman et al. 2005) than for “blind” ones (Sheldon and Lyubomirsky 2006; Lyubomirsky et al.

2009). Of course, self-selection and hypothesis-awareness (rather than random assignment and hypothesis-blindness) is a potential threat to experimental validity, but the reality is that any positive psychology intervention likely involves precisely such self-selection and advance knowledge of hypotheses. Further, Lyubomirsky et al. (2009) found (as predicted) that self-selection only mattered when participants had been assigned “a proper way” to happiness, suggesting that self-selection alone is not sufficient to produce happiness gains.

Second, the current study used a novel means of prompting treatment participants to engage in potentially happiness-boosting activities. Instead of assigning participants to engage in particular exercises (such as practicing optimism or expressing gratitude), we assigned them to set and then pursue particular *personal goals*. Personal goals are self-generated initiatives that aim at positive change in one’s life (Sheldon 2004). Goals by definition involve activity, although they can have circumstance changes as their terminal focus (i.e., “purchase a new car” or “move to a new apartment”). In general, achieving goals has been found to produce enhanced well-being over time (Brunstein 1993). However, some *types* of goals, when achieved, engender more well-being than others. For example, when goals are self-concordant (pursued for autonomous, not controlled reasons) or intrinsic in content (concerning growth and connection, not money and status), then achieving them produces larger gains in well-being (Sheldon 2004; Sheldon and Kasser 1998). Notably, however, none of the prior published studies of the effects of varying goal types on changes in well-being have taken an experimental approach by randomly assigning participants to pursue various types of goal contents; instead they have relied on participants’ self-ratings of their self-listed goals. Thus, a strength of the current study is its experimental manipulation of the various contents of goals to be pursued.

What goal contents should be manipulated? In the present study, we extend the earlier SHM research comparing activity versus circumstance changes (Sheldon and Lyubomirsky 2006, 2009) by asking participants either to set goals to change their circumstances (discussed below) or to set goals that should lead to sustained positive activity. In the activity category, we asked participants to pursue goals directly relevant to the three psychological needs discussed above—autonomy, competence, and relatedness. Again, because Lyubomirsky et al. (2009) found that need-satisfying experiences mediated their activity change effects, we reasoned that the direct pursuit of goals relevant to the production of need-satisfying experiences may be effective as well. Such goals, like the gratitude, kindness, and optimism interventions discussed above, should produce a stream of positive emotions and positive experiences that will cumulate to increase and

sustain happiness. Also, by assigning participants to pursue goals only of one type or another (i.e., either four autonomy goals, or four competence goals, or four relatedness goals), we were able to examine whether any of the three needs are more or less effective for bringing about sustained change in well-being. Based on past SDT research and data concerning the three needs (Deci and Ryan 2000; Sheldon 2004), one could predict that there will be no such differences; successful participants in all three of the need-relevant activity goal (treatment) conditions should experience enhanced well-being.

Again, we also included a “circumstance goals” condition in the study. We believed this was an appropriate comparison condition because it also involved goals, but goals whose target is known to be of questionable benefit for sustained changes in well-being (Sheldon and Lyubomirsky 2006). Other comparison conditions were possible, such as asking participants to pursue known harmful goals (ethically problematic) or simply asking participants to list open-ended goals with no content constraints, as in typical idiographic goal research. We feared that an unconstrained condition might not offer a clear contrast with autonomy, competence, or relatedness because many idiographic goals naturally refer to themes of autonomy, competence, or relatedness (Sheldon 2004). Thus, we chose a comparison condition (circumstance change goals) that would presumably exclude explicit mention of need-satisfaction and that also references the targets of many consumer and cultural messages concerning how to become happier, i.e. buying a product, changing one’s look, or moving to a higher-status neighborhood.)

As a third way of extending previous research, the current study included three follow-up assessments, each 2 months apart, to more closely examine the processes by which initial gains can be sustained (versus eroded). This procedure allowed us to examine whether continued successful engagement in the assigned goals continues to serve as the crucial determinant of sustained change. For example, if a person fails at or stops pursuing their goal between T_3 and T_4 , does any gain between T_1 and T_3 dissipate, such that the person returns to the initial baseline at T_4 ? Although we expect need-relevant goal attainment to be more effective than circumstance goal attainment in bringing about enhanced well-being, even in the former case, successful activity must continue for the gains to last. In other words, hedonic adaptation will erode the positive effects of even need-relevant goal attainment, unless that activity continues successfully over time.

Finally, our study also examined a fourth important issue—namely, participants’ attitudes regarding the possibility of becoming a happier person. Although all participants in this study selected themselves into a “happiness study,” they may not have all held similarly strong

attitudes that such changes are really possible and desirable. We attempted to address this issue by developing a scale assessing participants' attitudes regarding the notion of happiness change. Our prediction was that such initial attitudes would have their own effects on later sustained change, independent of the processes already discussed. We also evaluated whether such attitudes would interact with condition assignment, such that they only have influence if the participant is pursuing need-satisfying activity, not circumstance change, goals.

Summary and hypotheses

In sum, we conducted a 6-month longitudinal study in which treatment participants were randomly assigned to pursue self-set autonomy, competence, or relatedness goals. Comparison participants, by contrast, were assigned to pursue goals to change their life circumstances. An additional important aspect of the study is that we recruited participants from the university community, rather than undergraduate students from psychology courses. The resulting wider range of ages and life experiences was expected to establish greater generalizability of effects. Our first "positive effects on well-being" hypothesis was that achieving one's goals would have positive effects upon well-being, but only in the three treatment conditions and not the comparison condition. In other words, those who successfully pursue autonomy, competence, or relatedness goals should evidence enhanced well-being 2, 4, and 6 months later, compared to those who successfully change a specified life-circumstance. We explored this moderator hypothesis by testing for Treatment (vs. comparison) \times Goal-Progress interaction effects on changes in well-being, at each assessment. When this effect was significant, we planned to examine each of the three need-relevant goal conditions separately, to assess which of the three types of goal is most effective for sustaining well-being. The four assessment occasions allowed us to test our crucial hypothesis at three different times—by examining change from T_1 to T_2 , from T_1 to T_3 , and from T_1 to T_4 .

Our second "maintained effects on well-being" hypothesis was that ongoing successful effort is crucial for maintained changes in well-being. Thus, we predicted that goal progress at the current time of assessment would be the most important predictor of well-being at that time, controlling for prior levels of well-being and goal progress, and that the earlier progress measures should drop out of the equation. Thus, progress made between T_1 and T_2 should not influence well-being at T_3 , because its influence is past; instead, well-being at T_3 should be influenced by progress during the T_2 – T_3 period. This prediction is derived from an important postulate of the SHM

(Lyubomirsky et al. 2005), that ongoing effort and activity are required to bring about lasting happiness change because such activities are what generate the inflow of novel positive experiences that are necessary for sustained happiness. It is also consistent with SHM's assumption that hedonic adaptation tends to erode earlier gains, unless successful activity continues to provide new positive experiences to support the earlier gains.

Our third "pre-existing attitudes about well-being" hypothesis was that participants' pre-existing attitudes about the possibility of becoming happier, as measured by new items developed for this study, would have their own independent effects on sustained well-being change. In other words, those who do not think they can or should become happier will be unlikely to experience benefits, no matter to what condition they have been assigned.

Method

Participants and procedure

The "Community happiness study" was advertised on a University of Missouri announcement listserv that goes out to students, staff, and faculty; interested readers were given an email address to contact in order to be enrolled into the study. When they arrived at the laboratory, participants were told the following: "The purpose of the study is to compare the effects of several exercises that research suggests can impact people's state of mind. As part of the study, we will ask you to do one exercise in particular, to examine its effects. However, it is up to you whether or not you follow through with the exercise; if you do not follow through, you will still be a participant in good standing." They were also informed that "participation in this study is not guaranteed to have positive effects. For example, you may be assigned to a condition that is expected to be less effective. Or, you may not successfully practice the assigned exercises. Thus, we make no promises that being in the study will improve your quality of life." Participants were first asked to complete an initial questionnaire, then were asked to generate and rate four personal goals of a particular type (see below).

One hundred and eighty-one participants (33 men and 148 women) supplied complete data at T_1 . (Three were excluded for incomplete data.) The imbalanced gender ratio suggests that women were more inclined to volunteer for a happiness increase study. There were 79 students, 12 faculty, 82 staff, and 7 administrators in the sample; their ages ranged from 18 to 64, with a mean of 33.6. One hundred fifty-eight participants were Caucasian, and 23 participants were African-American, Asian-American, Hispanic, or "other." Starting from a sample size of 181 at

T₁, participants numbered 173, 151, and 145 at T₂, T₃, and T₄, respectively (2, 4, and 6 months later), a good attrition rate for a study of such a relatively long duration. (Possible attrition effects will be considered below.) Notably, exploratory analyses revealed that gender, income, and occupation (student, faculty, staff, administrator) had virtually no influence on the patterns reported below, and thus we will ignore such demographic variables henceforth.

Participants received \$25 for completing the initial session and were entered into a lottery if they completed the entire study, with five \$100 prizes and one \$500 prize available. Although the initial session took place at the laboratory, all follow-up questionnaires were administered via the internet. Links to the follow-up questionnaires were emailed 2, 4, and 6 months after the initial session.

Goal assignment procedure

After completing an initial well-being questionnaire, participants were told the following: “Again, in this research we are studying positive mood, and the factors that sustain it. We will assess your mood and happiness several times during the next 6 months. We will also ask you to do something during this time that might affect your mood. This “something” has already been shown to have significant positive effects on peoples’ lives, and we want to further examine its potential.” After this, treatment participants were told that “For the next 6 months, we would like you to give special attention to a psychological need—namely, the need for (autonomy, competence, or relatedness).” Autonomy was defined as occurring when “you make your *own* decisions and choices, so that what you do is interesting, meaningful, and valuable to you.” Competence was defined as occurring when “you feel effective and capable in life, and that you are doing things that you are good at.” Relatedness was defined as occurring when “you feel a sense of connection with important others—you understand and care for these others, just as those others understand and care for you.” Comparison condition participants were told that “We would like you to try to change some important circumstances in your life.” Circumstances were defined as “facts about your life, such as where you live, what you own, what you look like.” Listed examples included changing where or who you live with, re-arranging your house, or changing your hairstyle, wardrobe, or look via cosmetic surgery. After hearing the examples, comparison group participants were told that all of them involved “making a one-time change regarding your life-circumstances that will have a positive effect in your life.”

Participants then brainstormed “some ways in which your (autonomy, competence, relatedness) need is not currently being met,” or brainstormed “some life

circumstances you could change.” After this open-ended task, treatment participants were asked, on the next page, to list “four goals you can pursue, over the next 6 months, to better satisfy your (autonomy, competence, relatedness) need,” while comparison participants were asked to list four goals they could pursue in order to change their life circumstances. Participants received some general suggestions about types of goals they could list in their assigned condition, but received no specific instructions about what to pursue. Initial condition *N*’s ranged between 44 and 47.

Measures

Subjective well-being (SWB)

At each time period, participants were administered the Positive Affect Negative Affect Schedule (PANAS; Watson et al. 1988) and the Satisfaction with Life Scale (SWLS; Diener et al. 1985), with reference to “right now in your life” and with a 1 (*strongly disagree*) to 5 (*strongly agree*) scale for the SWLS and a 1 (*very slightly to not at all*) to 5 (*extremely*) scale for the PANAS. Positive and negative affect scores were computed and in much past research (Sheldon and Elliot 1999; Sheldon and Kasser 1998; Sheldon and Lyubomirsky 2006), we computed a single SWB variable at each time by standardizing the three measures and then subtracting negative affect from positive affect and life-satisfaction (α ’s after recoding negative affect = .91, .91, .91, and .92 at T₁–T₄).

Goal rating variables

In order to test for initial perceived differences in the listed goals, all participants were asked to rate “how much effort will you put into each goal/each change” (intended effort) and “how well do you expect to do the goal/make the change” (initial expectancy), using a 1 (*not at all*) to 5 (*very much*) scale. Initial effort and expectancy variables were computed by averaging across the participant’s four goals. No differences by condition emerged on these two variables (for expectancy, means ranged from 3.63 to 3.81, $F(3,177) = .57, ns$; for intended effort, means ranged from 3.52 to 3.84, $F(3,177) = 2.22, ns$). Thus, initial expectancies about one’s effort and future success could not explain any later observed condition differences in SWB, which is reasonable since initial self-efficacy presumably influences changes in SWB only via later successful effort, and according to our hypotheses, only then when that “will” (effort) is supplemented with a proper “way” (treatment vs. comparison condition). Thus, initial expectancy and intended effort and will not be considered further. At T₂, T₃, and T₄, participants answered two questions regarding

each of their four goals: “How would you rate your current progress in each goal?” and “How hard have you tried to work on each goal?” A 1 (*not at all*) to 5 (*very much*) scale was employed. We computed aggregate progress and effort variables by summing across the relevant four goal ratings. However, because these scores correlated .80 (T_2), .78 (T_3), and .72 (T_4), we combined the ratings into a single eight-item “current progress” variable at each time point (α 's = .73, .77, and .76, respectively).

Initial happiness change attitudes

We generated 15 items to measure four types of attitudes about happiness change: that happiness might be difficult to change (e.g., “I think trying to increase one’s happiness level is nearly impossible” [4 items]), that pursuing happiness is maladaptive (e.g., “Happy people are often unprepared to deal with the negative side of life” [4 items]), that happiness is personally undeserved (e.g., “I may not be worthy of happiness” [4 items]), and that happiness is an inappropriate goal (e.g., “The idea that everyone ought to be happy is symptomatic of what’s gone wrong in our culture” [3 items]). These items were administered prior to the goal manipulation, with a 1–5 (no agreement to much agreement) scale. A principle components analysis revealed the expected four factor structure after two of the 15 items were eliminated for not loading above .50 on any of the factors. The reliabilities of the four subscales were .80, .74, .75, and .54, respectively. Because the four subscales correlated between .49 and .57 with each other and because they did not form a consistent discriminative pattern in the results, we recoded the 13 items and combined them into a single “positive attitudes towards happiness” measure ($\alpha = .87$). High scores on this measure indicate that the participant believes that becoming happier is a feasible and appropriate goal, whereas low scores indicate skepticism regarding the feasibility and appropriateness of this goal.

Results

Preliminary analyses

Table 1 contains descriptive statistics and correlations for the major study variables—SWB at four times, happiness attitudes, and progress at three times (the N 's decrease over time because of sample attrition). SWB ranged from -1.5 to 8.6 across the four SWB administrations, happiness attitudes ranged between .38 and 4.0 , and progress ranged between 1 and 6 across the three progress administrations. There were no condition main effects on the four SWB variables (all p 's $> .18$). Although there was no condition main effect on T_2 progress ($F(1,171) = .15$, *ns*), progress was significantly higher in the circumstance goal condition than in treatment conditions at T_3 (M 's = 3.92 vs. 3.23 , $F(1,149) = 20.60$, $p < .01$) and at T_4 (M 's = 3.57 vs. 3.17 , $F(1,143) = 7.95$, $p < .01$). We will consider these differences below.

We also examined attrition effects for the 6 dropouts at T_2 , the 29 dropouts at T_3 , and the 35 dropouts at T_4 . Dropouts did not differ from the rest of the sample in gender composition; however, younger participants were significantly more likely to have dropped out by T_3 and T_4 (both p 's $< .05$). Also, T_3 dropouts were significantly lower on T_2 SWB, and T_4 dropouts were significantly lower on T_2 and T_3 SWB, indicating that participants reporting less benefit from the study after it began were more likely to discontinue their participation over time. Most important for our purposes, however, T_2 , T_3 , and T_4 dropouts did not differ from non-dropouts on T_1 SWB. Thus, biased sampling due to dropout versus non-dropout differences in initial happiness cannot explain our results. Also, there were no attrition differences by condition. Thus, participants were no less likely to complete the study depending on the condition to which they had been assigned, again supporting the integrity of our design.

Table 1 Descriptive statistics and correlations for primary study variables

	M	SD	1	2	3	4	5	6	7
1. T_1 SWB	4.78	1.63							
2. T_2 SWB	4.78	1.62	.81**						
3. T_3 SWB	5.02	1.83	.67**	.67**					
4. T_4 SWB	5.18	1.72	.61**	.61**	.66**				
5. Happiness attitude	3.25	.65	.45**	.44**	.49**	.38**			
6. T_2 progress	2.75	.73	.22**	.23**	.23**	.27**	-.02		
7. T_3 progress	3.41	.85	.21**	.17*	.34**	.20*	.02	.40**	
8. T_4 progress	3.22	.79	.21**	.22**	.27**	.26**	.06	.28**	.74**

Note: * $p < .05$; ** $p < .01$. Because of attrition, N 's are slightly lower for later-time correlations

Table 2 Regression results predicting change in SWB

	T ₂ SWB	T ₃ SWB	T ₄ SWB
T ₁ SWB	.79**	.64**	.58**
Current goal progress	.06	.18**	.15**
Treatment (vs. comparison)	.04	.04	.02
Treatment × Progress	.15**	-.02	.14*

Note: * $p < .05$; ** $p < .01$. Because of attrition, N 's are slightly lower in the second and third columns. Each column represents a separate regression analysis

Hypothesis tests

Hypothesis 1 stated that goal progress would predict enhanced well-being, but only in the treatment conditions, not the comparison condition. We tested this hypothesis for three different time-periods: by examining change from T₁ to T₂, from T₁ to T₃, and from T₁ to T₄. Specifically, we regressed the later time's SWB score on the relevant earlier time's SWB score (so the analysis would be focused on rank-order change in SWB), and also entered the later time's (centered) goal-progress score and a dummy variable representing assignment to a treatment (either autonomy, competence, or relatedness; coded 1) versus the comparison condition (coded 0), and also an interaction product term created by multiplying the goal progress score by the dummy variable. When the Treatment × Progress effect was significant, we examined the three need-satisfaction conditions (autonomy, competence, or relatedness) separately to determine which types of need-relevant goal (if any) are most impactful when attained.

Table 2 contains the standardized coefficients resulting from the three analyses. As can be seen, T₁ SWB (the test-retest coefficient) was significant in all three analyses, indicating considerable stability in participants' SWB scores. There was a main effect of goal progress at T₃ and T₄ (not at T₂), and there were no treatment (vs. comparison) main effects at any time. Most important for our first hypothesis, significant Treatment × Progress interactions emerged at T₂ ($\beta = .15, p < .05$) and at T₄ ($\beta = .14, p < .05$; the interaction was not significant at T₃). For the T₂, T₃, and T₄ analyses the overall R -squared statistics were .67, .48, and .40, respectively, with corresponding F statistics for the entire model of $F(4,168) = 84.27, F(4,146) = 33.60, \text{ and } F(4,140) = 23.37, \text{ all } p$'s $< .01$.

In order to isolate the source of the Treatment × Progress effect, we re-ran the T₂ and T₄ analyses, substituting three product interaction terms created by multiplying goal progress by autonomy, competence, or relatedness dummy variables. At T₂, all three interactions were significant (β 's = .15 [$p < .01$], .11 [$p < .05$], and .16 [$p < .01$], respectively), indicating that progressing towards autonomy, competence, or relatedness goals were

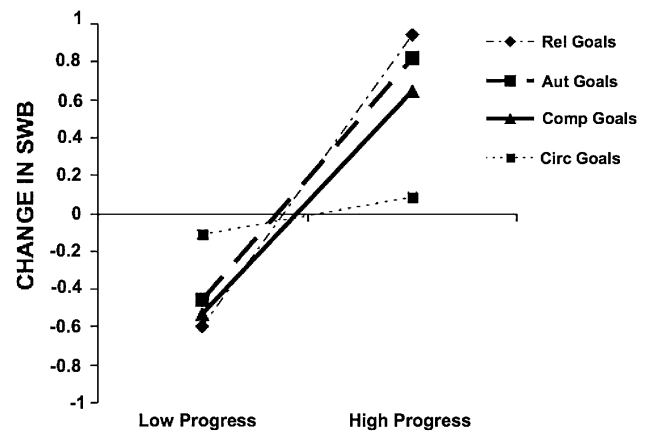


Fig. 1 Predicted effects of progress on changes in SWB from Time 1 to Time 2 in the four goal-type conditions

all more beneficial than progressing towards circumstance-change goals (R -squared = .67, $F(8,164) = 41.51, p < .01$). Figure 1 contains predicted values for participants one standard deviation above or below in goal progress in the four conditions, showing that all three of the treatment conditions were more impactful than the comparison condition. The figure also illustrates that treatment participants who failed to achieve progress experienced less at SWB at T₂, than comparison condition participants, consistent with Sheldon and Kasser's (1998) finding that failing at self-concordant or intrinsic goals resulted in reduced well-being, which Sheldon and Kasser interpreted as due to the potential riskiness of pursuing truly meaningful goals. We will consider this finding further in the discussion.

At T₄, the Relatedness × Progress interaction was significant ($\beta = .15, p = .05$), and the Autonomy × Progress interaction was nearly significant ($\beta = .12, p < .10$). However, the Competence × Progress interaction term was not significant ($\beta = .07, ns$), consistent with Lyubomirsky et al.'s (2009) finding that competence experiences (in contrast to relatedness and autonomy experiences) did not account for the positive activity condition effects. R -square for this equation was .40 and $F(4,140)$ was 23.37, $p < .01$. The predicted values are shown in Fig. 2, in which the competence slope is midway between the autonomy/relatedness and circumstance goal slope. Figure 2 contains a graph of the results.

According to our second hypothesis, it takes continuing successful effort in order to produce and maintain happiness gains. For example, any progress-related happiness gain between T₁ and T₂ should fade at T₃ if the person has not continued to exert effort between T₂ and T₃. To test this idea, we employed only the three treatment ("proper way") conditions, in which goal engagement had generally positive effects. First, we regressed T₃ SWB on T₂ SWB (again

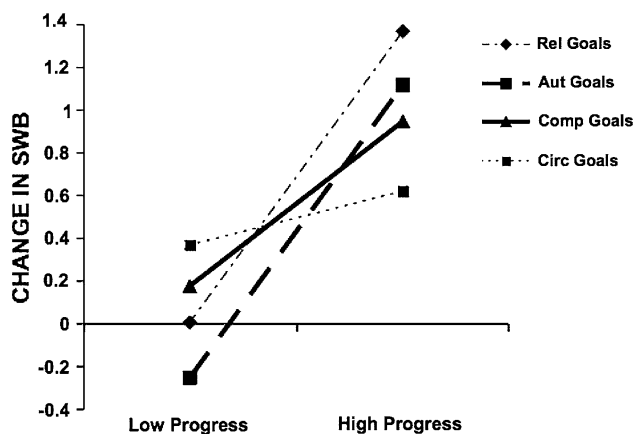


Fig. 2 Predicted effects of progress on changes in SWB from Time 1 to Time 4 in the four goal-type conditions

to focus the analysis on change between T_2 and T_3) and on both T_2 progress and T_3 progress. We expected progress between T_1 and T_2 to be a non-significant predictor of T_3 SWB because it concerns the T_1 – T_2 period, not the T_2 – T_3 period; people have adapted to its effects. We expected progress between T_2 and T_3 to be significant because T_3 progress (controlling for T_2 progress) represents additional effort between T_2 and T_3 . This was confirmed with standardized coefficients of .06 (*ns*) for T_2 progress and .18 ($p < .05$) for T_3 progress (see Table 3). The T_3 progress variable also remained significant when T_1 SWB was controlled, such that T_3 progress predicted change in SWB at T_3 relative to both T_1 SWB and T_2 SWB.

Second, we conducted an analysis predicting T_4 SWB from T_3 SWB and all three progress variables at that point (T_2 , T_3 , and T_4 progress), expecting progress between T_3 and T_4 to be significant and progress at T_2 and T_3 to be non-significant, for the same reason as before. This was also confirmed with standardized coefficients of .11 (*ns*), .08 (*ns*), and .20 ($p < .05$), respectively (see Table 3). The T_4 progress variable also remained significant when T_1 and T_2 SWB were controlled, such that T_4 progress predicted change relative to T_1 SWB and also relative to the T_2 and T_3 SWB scores. In sum, the data support the sustainable happiness model's proposition that continual successful effort is required for people to maintain themselves in the

Table 3 Change in SWB predicted by progress at Times 3 and 4

Goal Progress	T_3 change in SWB	T_4 change in SWB
T_1 – T_2	.06	.11
T_2 – T_3	.18*	.08
T_3 – T_4	–	.20*

Note: * $p < .05$. Because of attrition, N 's are slightly lower in T_4 compared to T_3 analyses. Bolded coefficients had been hypothesized to be significant

upper end of their own “set range.” In order to stay above their initial happiness levels, participants had to have tried hard and done well lately.

Our third hypothesis was that participants' initial attitudes about becoming a happier person would have their own independent effects on changes in SWB. To test this hypothesis, we re-ran the three regression analyses presented in Table 2, entering the “attitudes towards happiness” variable at a second step. In all three analyses, this variable made a significant contribution at the second step, with standardized coefficients of .12 at T_2 ($p < .05$), .25 at T_3 ($p < .01$) and .17 at T_4 ($p < .05$); the earlier coefficients were essentially unchanged. At the third step in these regressions we entered an interaction term by multiplying the treatment versus comparison dummy variable by the happiness attitude variable; none of these interactions were significant (β 's = $-.09$, .04, and .12, respectively, all p 's *ns*), suggesting that these pre-existing attitudes had positive effects on peoples' happiness levels whether or not they were in a condition hypothesized to provide a “proper way.” It is also noteworthy that the attitudes towards happiness variable was unrelated to participants' reported goal progress (see Table 1). The implications of these findings are considered below.

Discussion

This study went beyond previous experimental happiness intervention research in a number of ways. First, we assigned participants to pursue personal goals of particular types rather than assigning them to practice exercises of particular types; second, we tied the content of the assigned treatment goals directly to psychological needs, the experiential mediators to well-being shown within many past SDT studies and some past happiness intervention studies; third, we used an age-diverse adult sample; fourth, we tracked participants for 6 full months, across four waves of assessment; and fifth, we assessed participants' initial attitudes towards becoming happier. The study also advanced beyond prior goal research by randomly assigning participants to pursue particular goals, rather than relying on participants' unconstrained goal selections, and advanced beyond previous SDT research by asking participants to directly pursue need-satisfying experiences, rather than measuring need satisfaction as a byproduct of other types of motivation variables.

The data supported all three of our hypotheses. Most important, our first hypothesis, and the general notion that “becoming happier takes both a will and a proper way” (Lyubomirsky et al. 2009), received a new type of support. At T_2 and T_4 , there was no simple main effect of treatment versus comparison condition on changes in SWB, and also

no main effect of goal progress in the comparison condition. Only when participants had been assigned to pursue a type of goal expected (by theory) to be beneficial, and only when participants continued to invest effort and do well in their goals, did they gain long-term benefits. Notably, the Treatment \times Progress interaction was not observed at T_3 . At present we have no explanation why progress in the comparison condition predicted equally enhanced SWB at T_3 compared to the treatment conditions.

Worth further consideration is our finding that autonomy, competence, and relatedness condition participants who failed to achieve their goals evidenced lower well-being compared to all circumstance condition participants. In other words, whereas circumstance change goals convey neither an “up” when achieved nor a “down” when not achieved, need-relevant goals appear to carry a risk in that one may end up worse off (at least compared to those pursuing circumstance change goals) if one does not achieve them (see Figs. 1, 2). As noted earlier, Sheldon and Kasser (1998) found a similar longitudinal pattern and suggested that this reflects the risk of pursuing more meaningful or consequential goals. That is, need-relevance may amplify the consequences of goal pursuit, such that success has a stronger positive effect and failure a stronger negative effect on one’s subsequent state of mind. Still, a relevant maxim may be “nothing ventured, nothing gained.” This maxim implies that one may have to take a risk in order to obtain a real gain, and even if the effort backfires sometimes, it is still worth trying again. This should be especially true in the case of trying to meet one’s psychological needs, which presumably cannot be ignored if one is to be a psychological healthy person.

Our second hypothesis was that continuous successful effort is required in order for initial SWB gains to be maintained. We tested this by showing that enhanced SWB at each time point could be predicted from that time point’s goal-progress score, controlling for all previous goal-progress and previous SWB scores. These analyses demonstrated, for example, that progress between T_1 and T_2 did not predict enhanced SWB at T_3 ; its effects had dropped out, and only progress between T_2 and T_3 predicted T_3 SWB. Thus, if the initial gains were to be maintained, participants had to keep trying and doing well throughout each new phase of the study. This provides important new support for a central premise of the sustainable happiness model (Lyubomirsky et al. 2005; Sheldon and Lyubomirsky 2004), that only a continuing influx of positive experiences, generated by sustained effort (a continuous “will”), can maintain happiness in the upper tail of a person’s set range. Without such maintained effort, hedonic adaptation is likely to erode earlier gains even in the “positive way” conditions. This finding also supports the notion that well-being is characterized by a set-range rather

than a set-point, and the further notion that continued appropriate and successful activity can keep people in the upper end of their set-range (Lyubomirsky et al. 2005).

Our third hypothesis addressed the “will” question in a different way, by examining whether participants’ initial attitudes regarding becoming happier would influence their actual results in the study. This was indeed found to be the case, suggesting that it is important to have positive attitudes and expectancies when attempting to improve one’s happiness levels. Notably, these attitudes were unrelated to reported goal progress. This raises the question—might such attitudes distort participants’ later happiness ratings, making them believe that the study exercises have worked better than they really have? Perhaps—although there may be little difference between being happy and believing one is happy. It is worth pointing out, however, that demand effects cannot explain these results, as all participants were aware of the study hypotheses regarding happiness change, not just participants with positive attitudes towards happiness change. Still, these results suggest that some participants might benefit even from “neutral” interventions—that is, interventions that researchers do not believe are directly relevant to happiness—perhaps through a self-fulfilling prophecy or placebo effect. We suggest that intervention researchers might include our new “attitudes towards happiness” measure in their studies, in order to examine and control for such effects. It is also possible that the measure warrants further development, to incorporate other pre-existing attitudes or beliefs relevant to happiness-increase (such as religious prescriptions or previous experiences regarding happiness, or beliefs about what happiness means or consists of).

Limitations and last words

Our study had several limitations, although a number of factors mitigate these. The limitations include our use of self-report measures to assess well-being (although self-report is arguably the best way to assess such a subjective construct), the exclusively Western sample (although the age and job diversity of this university community sample renders it more generalizable than the average college sophomore sample), and the lack of long-term follow-ups to evaluate the sustainability of happiness gains (although the 6-month course of this experimental longitudinal study is relatively long for this type of research). Another limitation of these studies is that the circumstance change goals may have been more concrete or of a shorter time-scale than the activity (need-relevant) goals, such that they had already attained or had been abandoned later in the study. This might represent a potential confound between comparison and treatment conditions. Notably, however, mean rated progress for circumstance goals at T_4 was only 3.52

which was far under the potential ceiling of 5.0 and not that different from rated progress collapsed across the three treatment conditions ($M = 3.11, p < .03$). Thus, we do not believe this progress mean difference can explain our interaction effects.

Taken as a whole, our data suggest that pursuing and achieving need-relevant activity goals is a viable strategy for increasing one's happiness levels, that maintaining such increases depends on continued successful engagement in the optimal goals, and that believing it is possible to become happier is also an important factor in happiness-increase efforts.

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