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You Have to Follow Through: Attaining Behavioral Change Goals Predicts Volitional Personality Change

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Prior research has found that people's desires to change their personality traits predict corresponding subsequent trait growth over time. However, few studies have examined the processes through which people can volitionally change their personality traits. Thus, it remains unclear whether merely desiring change predicts trait growth or whether actively pursuing change is necessary. The present study was a 15-week intensive longitudinal design that tested whether engaging in trait-typical behaviors predicted trait change. Participants provided self-report ratings of their personality traits and were able to freely accept and complete weekly "challenges"—prewritten behavioral goals that would pull their thoughts, feelings, and behaviors in line with their desired traits. Results indicated that merely accepting behavioral challenges did not predict trait changes. Rather, only actually completing challenges (i.e., performing trait-typical behaviors) predicted trait change over time. Thus, merely wanting to change does not appear to be sufficient to evoke trait growth; successfully changing one's personality traits may require actively and successfully implementing behaviors to change oneself.

Keywords: adult personality development, trait change goals, volitional personality change

An avid reader perusing the bestsellers list in search of a literary adventure on a lazy weekend afternoon would likely *not* be surprised to find the list rife with self-help books. Indeed, as just one prototypical example: Of Amazon.com's top 10 bestselling books in the first week of September 2017, one promised to help people become more emotionally stable by practicing the art of "simply not caring." Two others advertised themselves as practical guides to improving one's career and relationships by fostering conscientious and agreeable patterns of behavior. These books continue the long tradition of encouraging volitional personality change, with a modern history stretching back to 1936 with the publication of *How to Win Friends and Influence People*, which remains a bestseller to this day. And such books are no strangers to bestsellers lists; Americans spend upward of $10 billion each year on self-help books and programs that promise to help them successfully change their personality traits and thereby improve their lives (Linder, 2009). But do readers of these books stand a chance at actually attaining the promised trait change? Here we evaluate the extent to which both making plans to change one's behavior as well as actually implementing behavioral changes predict trait change across time.

Do People Want to Change Their Personality Traits?

Beyond booming sales in the self-help industry, empirical evidence reaffirms the idea that most people want to change their personality traits (Baranski, Morse, & Dunlop, 2017; Hudson & Fraley, 2016b; Hudson & Roberts, 2014; Robinson, Noftle, Guo, Asadi, & Zhang, 2015). For example, using standard self-report/Likert-scale questionnaires, approximately 85–95% of participants indicate desires to increase with respect to the socially desirable pole of each big five personality domain—extraversion, agreeableness, conscientiousness, emotional stability, and openness to experience (Hudson & Fraley, 2016b; Hudson & Roberts, 2014). Although such *trait change goals* are slightly more prevalent among younger individuals, people report desires to change in all of the big five well into late adulthood (Hudson & Fraley, 2016b). Moreover, these desires are not an artifact of the questionnaires used. Even when asked in an open-ended fashion (e.g., "Is there any aspect of your personality that you would like to change?"), about two thirds of participants freely volunteer that they would like to change themselves—and they even tend to articulate their desires clearly in terms of the big five (e.g., "I would like to be able to be more outgoing;" Baranski et al., 2017).

Individuals likely have many reasons for wanting to change their personalities. Most directly, people intuitively understand

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that stable patterns of thoughts, feelings, and behavior have utility value in relevant domains of their lives. For example, students who are dissatisfied with their collegiate experience are more likely to report greater desires to increase in conscientiousness than their more-satisfied peers—perhaps because they reason that being more thorough, hardworking, responsible, and organized might assuage their academic woes (Hudson & Roberts, 2014). Similarly, most of the Big Five personality traits possess a socially desirable orientation (e.g., Dunlop, Telford, & Morrison, 2012)—and consequently research suggests that people who are low with respect to the socially desirable pole of any of the big five tend to especially desire to change that trait (Baranski et al., 2017; Hudson & Roberts, 2014).

Can People Volitionally Change Their Traits?

People clearly want to change their personalities—and are willing to spend their hard-earned money on resources that promise to help them do so. However, the extent to which individuals can *actually* change their personality traits is less clear. Promising evidence comes from a series of three intensive longitudinal studies in which participants' personality traits were measured weekly for approximately four months; growth in participants' personalities followed in line with their trait change goals (Hudson & Fraley, 2015, 2016a). For example, participants who reported desires to become more extraverted experienced more positive growth in extraversion across a period of four months, as compared with their peers who reported lesser (or no) desires to change. That said, there is not universal empirical support for this finding; Robinson and colleagues (2015) found that change goals did not predict trait growth across two measurement occasions spanning one year.

Nevertheless, when taken as a whole, the nascent body of literature on volitional personality change suggests that people tend to change in ways that align with their desires—at least across short periods of time. People who want to become more conscientious, for example, tend to increase in conscientiousness over time, relative to their peers who do not wish to change. That said, one critical ambiguity in these existing studies is that none of them have effectively measured the extent to which participants were *actively* working on changing their personality traits. Thus, the processes underlying volitional change remain poorly understood. It remains unclear whether *merely wanting to change* is sufficient to predict trait growth—or whether people must intentionally pursue cognitive, affective, and behavioral changes to experience trait growth across time.

More specifically, it is possible that change goals operate in a self-fulfilling fashion (see Jussim, 1986). In other words, merely wanting trait change—even without further intentional action toward pursuing those changes—may cause individuals to quasi-automatically behave in ways that elicit desired traits. For example, even without intentional action, an individual who wants to become more extraverted may experience subtle shifts in his or her identity (e.g., viewing him- or herself as more extraverted) or behavior (e.g., behaving in a slightly more friendly fashion toward others). These identity and behavioral changes alone may be sufficient to promote trait growth (Burke, 2006; Magidson, Roberts, Collado-Rodriguez, & Lejuez, 2014).

Alternatively, it may be the case that merely desiring change is not sufficient. Rather, people may need to actively change their thoughts, feelings, and behaviors to realize desired trait growth. To this end, research suggests that even without coaching or guidance, people naturalistically take steps to change their personality traits (see Hudson & Fraley, 2015; Quinlan, Jaccard, & Blanton, 2006; Stevenson & Clegg, 2011). For example, people who want to become more extraverted may intentionally engage in elevated levels of extraverted behaviors (e.g., socializing, assuming leadership roles) in an attempt to change their traits. This raises the possibility that merely desiring change is not sufficient; people may need to actively pursue behavioral change to experience trait growth. The purpose of the present study was to fill this gap in the empirical literature and examine the extent to which actively making cognitive, behavioral, and affective changes predicts desired trait growth.

How Can People Volitionally Change Their Traits?

Before discussing how people might be able to volitionally change their traits, it is useful to review how personality is thought to develop more generally. A large body of research suggests that personality traits can and do change (e.g., Lucas & Donnellan, 2011; Roberts & Mroczek, 2008; Roberts, Walton, & Viechtbauer, 2006). For example, people tend to become more agreeable, conscientious, and emotionally stable with age (Roberts et al., 2006; Soto, John, Gosling, & Potter, 2011). These changes are thought to occur partially because normative experiences shape people's personalities in similar ways. For example, most people commit to careers in young adulthood, and successfully committing to a career requires one to think, feel, and behave in conscientious manners (Hudson & Roberts, 2016; Lodi-Smith & Roberts, 2007). Similarly, romantic relationships foster emotionally stable thoughts, feelings, and behaviors (e.g., Lehnart, Neyer, & Eccles, 2010).

In short, experiences have the potential to shape *state-level* thoughts, feelings, and behaviors. Theoretically, if state-level changes are maintained for extended periods of time, they have the potential to coalesce into trait-level changes (e.g., Edmonds, Jackson, Fayard, & Roberts, 2008; Hutteman, Nestler, Wagner, Egloff, & Back, 2015; Magidson et al., 2014; Roberts & Jackson, 2008). This may occur because consistent patterns of thoughts, feelings, and behaviors simply become learned, automatized, and habitual—or chronic state-level changes may even alter biology, subsequently translating into trait changes (e.g., Hennecke, Bleidorn, Denissen, & Wood, 2014; Roberts & Jackson, 2008).

The idea that chronically maintained state-level changes can coalesce into trait-level changes has primarily been used to explain how people are *passively* shaped by their experiences and environments (e.g., workplaces make people more conscientious by reinforcing state-level conscientious behaviors; Hudson & Roberts, 2016). However, similar logic can be applied to people's attempts to actively, or volitionally, change their own personality traits (Hennecke et al., 2014; Hudson & Fraley, 2015; Hudson & Roberts, 2014). To the extent that individuals can volitionally change their state-level thoughts, feelings, and behaviors—and maintain those changes over extended periods of time—they may be able to educe enduring changes to their own personality traits (Hudson & Fraley, 2015).

Hudson and Fraley (2015) provided tentative evidence for the idea that actively attempting to change one's state-level thoughts, feelings, and behaviors might translate into corresponding trait changes. Across two longitudinal experiments, participants were randomly assigned to either a control condition or a goal setting condition in which they self-generated three weekly goals that would pull their thoughts, feelings, and behaviors in alignment with their desired personality traits (e.g., a person who wanted to become more extraverted might generate a goal such as "Invite two friends to lunch on Tuesday"). In one of the two studies, participants randomly assigned to the goal-setting condition experienced greater changes in extraversion, conscientiousness, and emotional stability, as compared with participants in the control condition. Although such a finding is consistent with the idea that active attempts to change oneself can increase trait growth, it remains somewhat ambiguous for at least four reasons. First, many of the goals that participants self-authored were vague and difficult to objectively evaluate in terms of concrete behavioral implications (e.g., "be more social"). Second, all participants in the goal-setting group generated exactly three goals each week, minimizing variation in the extent to which people could potentially attain goals. Thus, these studies did not tap individual variation in the quantity of goals people naturalistically generate, commit to, and attain. Third, Hudson, and Fraley's (2015) measure of goal attainment was subjective and difficult to interpret (participants self-reported goal attainment on a scale from 0–100—which especially when combined with vague participant-generated goals, may not represent a meaningful number). Finally, the intervention did not replicate in one of their studies. Thus, in sum, empirical evidence for the association between active attempts to change oneself and trait change remains relatively poorly understood.

Overview of the Present Study

The present research was a 15-week longitudinal study designed to examine the extent to which actively taking steps toward changing one's thoughts, feelings, and behaviors predict trait growth over time. Each week over the course of a college semester, students provided self-report ratings of their personality traits. Additionally, at the beginning of the study, participants were asked to nominate which big five traits they wanted to work on changing over the following few months. Subsequently, at each time point, all participants were presented with a new type of intervention intended to help them change their traits according to their wishes. Designed to be similar to the experience of following advice in a self-help book, all participants received a list of weekly "challenges," created by the authors of the study, which they could complete for each big five personality domain that they indicated a desire to change. The challenges were concrete, specific behaviors typical of persons high in each big five personality domain (e.g., a prototypical challenge for extraversion was "introduce yourself to someone new"). Each week, participants were asked to accept several challenges; the following week, they were asked to report the *number of times* they had completed each accepted challenge during the prior week. We measured the number of challenges that participants accepted and completed. These data were used to examine the extent to which performing state-level behaviors typical of high levels of each big five domain predicted desired trait growth (i.e., volitional personality change) over the course of 15 weeks.

Method

Participants

These studies were approved by the University of Illinois at Urbana-Champaign (UIUC) and Michigan State University (MSU) Institutional Review Boards (respective project numbers 17,087 and ×16-1002e). Participants were students in personality psychology courses at UIUC and MSU. Per individual instructors' preferences, students participated either to fulfill a course requirement or to earn extra course credit. At the beginning of the college semester, students were provided with a link to the study website and were required to register an account to participate. Participants were instructed to complete one wave of the study per week for the 15-week semester. However, to afford leniency and flexibility, the study website allowed students to complete waves as frequently as once every five days. Participants who waited longer than seven days between completing waves were sent automated e-mail reminders. After completing all 15 waves, participants were provided with personalized webpages that summarized their scores on the personality measures and contained graphs depicting how their traits had changed over the course of the semester (for students who completed fewer than 15 waves, results pages were made available after all data collection had ceased). At the end of the semester, participants were awarded prorated credit or extra credit in their respective personality course.

A total of 377 participants provided at least one wave of data (data were collected for only one semester and sample size was determined by the total enrollment in participating classes). At Time 1, the sample was 72% female with an average age of 20.67 years (SD = 4.53 years). Sixty-nine percent of the sample identified as White, 19% as Asian, 10% as Black, 7% as Hispanic, 3% as Asian Indian, and 1% each as Middle Eastern, Native American, and Pacific Islander. Participants could identify with multiple racial/ethnic groups.

On average, participants provided 11.25 waves of data (SD = 4.16), with 365, 335, 276, and 115 participants providing data at Times 2, 5, 10, and 15, respectively. Attrition analyses revealed that women tended to provide more numerous waves of data (r = .10, 95% CI [.03, .20])—as did participants who were higher in conscientiousness at Time 1 (r = .20, 95% CI [.10, .29]). No other personality or demographic variables, as measured at Time 1, were significantly related to number of waves of data provided, all $|r|$s $\leq$ .10.

Measures

In the following section, we report all measures and manipulations relevant to the present research questions.

Personality traits. At each wave, participants provided self-report ratings of their personality traits using the 60-item Big Five Inventory 2 (BFI2; Soto & John, 2017). The BFI2 contains separate 12-item subscales to measure extraversion (e.g., "I am someone who is outgoing, sociable"), agreeableness (e.g., "I am someone who is compassionate, has a soft heart"), conscientiousness (e.g., "I am someone who is systematic, likes to keep things in

order"), emotional stability (e.g., "I am someone who is relaxed, handles stress well"), and openness to experience (e.g., "I am someone who is curious about many different things"). All items were rated using a Likert scale running from *strongly disagree* (1) to *strongly agree* (5) and were averaged to form separate composites for each of the five personality dimensions. Time 1 αs ranged from .81 (agreeableness) to .90 (emotional stability).

Procedure

At each wave, participants provided self-report ratings of their personality traits. After completing the personality measure, at Time 1 only, participants were presented with brief descriptions of each of the big five dimensions and were asked to nominate which of the dimensions they would like to specifically work on changing throughout the course of the semester. Participants were encouraged to select one or two traits, but could select as many or few as they desired. Subsequently, at all waves including Time 1, participants who nominated at least one personality trait were presented with a list of prewritten "challenges."

The challenges were specific, concrete actions participants could take to pull their state-level thoughts, feelings, and behaviors in line with their desired personality traits. A total of 50 challenges were developed for each big five domain by the authors of the study. The challenges were developed by asking 11 experts in personality psychology (advanced graduate students and professors at major research universities) to brainstorm a list of "small, reasonable, measureable" cognitive, affective, and behavioral changes that someone could make to increase their levels of each big five trait. We then curated and expounded upon the brainstormed ideas. This oftentimes involved breaking down suggestions into multiple "scaffolded" challenges. As a hypothetical example, a suggestion to become more extraverted by "having a conversation with a stranger" might be broken into four challenges that progressively escalated in difficulty: (a) Brainstorm a list of questions to ask other people; (b) Go to a public place where people mingle and say "hello" to someone new; (c) Introduce yourself to someone new; (d) Introduce yourself to someone new and ask them at least two questions about themselves.

Most of the challenges instructed participants to perform behaviors that fall directly within the theoretical purview of each big five domain (see Goldberg, 1993). For example, the extraversion challenges asked participants to behave in gregarious, assertive, and active manners. The major exception was emotional stability. Emotional stability refers specifically to an *absence* of negative affect. Consequently, emotional stability tends to be one of the most difficult traits to observe in others as it primarily relates to internal affect, rather than manifest behaviors (Vazire, 2010). Thus, challenges *directly* targeting the trait (e.g., "stop feeling angry") seemed to be unlikely to be feasible and concrete enough for participants to actually implement. As such, the emotional stability challenges largely prescribed concrete behaviors that prior research suggests *indirectly* reduce negative emotions, such as physical exercise (Cooney, Dwan, & Mead, 2014), seeking social interactions/support (Lucas & Dyrenforth, 2006), expressing gratitude and noticing the positive aspects of one's life (Emmons & McCullough, 2003), journaling (King, 2002), meditating (Fredrickson, Cohn, Coffey, Pek, & Finkel, 2008), and practicing positive thinking techniques (e.g., Lightsey, 1994).

The challenges were rated in terms of difficulty on a scale from 1 to 10 (with 10 being the most difficult) by the first author—and ranged from very easy (e.g., agreeableness: "smile at someone you don't know;" conscientiousness: "organize the app icons on your phone's homescreen") to moderate (e.g., emotional stability: "spend at least an hour doing something active that you enjoy [e.g., sports, hiking, shopping]"; openness: "go on a photo hunt and take pictures of objects that you find beautiful") to difficult (e.g., extraversion: "download the app 'MeetUp' on your phone and plan an event centered around your interests;" conscientiousness: "volunteer to take responsibility for something [e.g., to help plan a social event, to bring supplies, to lead a group project]"). Because we used a rational/theoretical approach to constructing the challenges, the difficulty ratings were heavily influenced by the "scaffolding" progression built into the challenges (e.g., saying "hello" to someone new was rated as easier than saying "hello" and commenting on the shared environment, which was rated as easier than saying "hello" and asking him/her questions about him/herself).

Each wave, participants were presented with challenges only for domains that they had nominated at the beginning of the semester. To avoid overwhelming participants, the study website offered eight customized "suggested challenges" to participants, based on their individual histories of successfully completing and/or failing prior challenges (e.g., if participants successfully completed challenges, the website would suggest slightly more difficult challenges over time; if they failed challenges, the website would suggest slightly easier challenges over time)—although participants could click a link to see the entire list of challenges sorted and filtered by difficulty and domain, if desired. To ensure that participants understood how the challenge system worked, they were required to select at least one challenge per week—and they could select a maximum of four challenges. Participants were sent an email reminder with a list of challenges they had selected for the week.

From Time 2 onward, after rating their personality traits and before selecting new challenges, participants were presented with the challenges they had accepted at the prior wave. Participants were asked to indicate how many times they had completed each individual challenge during the prior week, on a scale from *I did not complete this challenge* (0), *once this past week* (1), *twice this past week* (2), *at least three times but not every day* (3), and *every single day this past week* (4). These response options were chosen to represent salient frequencies that participants would be likely able to accurately remember and report (e.g., asking participants to make overly precise estimates of the number of behaviors performed [such as numeric free response] has the potential to lead them to rely on semantic knowledge about themselves [i.e., their beliefs about their typical behavior] rather than their episodic knowledge [i.e., what actually happened the prior week]; see Robinson & Clore, 2002).

Each week, participants could select new challenges. To ensure constant progression, if participants opted to reuse prior challenges that they had already successfully completed, the suggested frequency of the challenge was incremented. Specifically, all challenges initially asked participants to engage in an activity *once per week* (e.g., "At least one time this week, introduce yourself to someone new"). Challenges that were successfully completed were reworded to ask participants to complete them multiple times per

week (e.g., "At least twice this week . . ."; "At least three times this week . . ."; "At least once per day this week . . ."). Importantly, when asking participants whether they had completed challenges, wording pertaining to suggested frequency was omitted. Consequently, a participant could accept a challenge (e.g., "At least three times this week, introduce yourself to someone new") and report completing the challenge at a lower frequency than suggested (e.g., s/he could indicate introducing themselves to someone new "once this past week").[1]

Finally, to make the challenges more engaging, they were presented to participants as a type of "game" similar to modern video game "achievement" systems. Namely, participants could earn bronze, silver, gold, or diamond "medals" by completing challenges multiple times at increasingly greater frequency (there was no reward for earning medals, other than a small icon appearing next to completed challenges in the list).

We measured (a) how many challenges participants accepted each week, (b) how many times participants reported completing each accepted challenge each week, and (c) the difficulty of each accepted challenge. These variables were used to predict growth in participants' self-reported personality traits across the semester.

Results

On average, participants nominated 2.08 (SD = 1.05) traits to focus on changing across the study's duration, with only one participant choosing to nominate no traits (and consequently being unable to accept or complete any challenges). A total of 200 (53%) participants nominated extraversion, 70 (19%) nominated agreeableness, 179 (48%) nominated conscientiousness, 225 (60%) nominated emotional stability, and 110 (29%) nominated openness. Each week, participants accepted an average of 2.36 (SD = 1.50) challenges. Participants reported the number of times they had completed each challenge within the prior week; on average, participants indicated that they had completed each accepted weekly challenge 1.51 times (SD = 0.95, with 79% of accepted challenges being successfully completed at least once).

Analysis Strategy

For our primary analyses, we examined whether accepting and completing challenges (i.e., performing trait-relevant behaviors) predicted growth in participants' personality traits. Because we wanted to examine the *cumulative* effect of completing challenges on trait change, we *summed* across the entire study duration the total number of challenges participants accepted for each domain, as well as the total number of times participants reported completing challenges for each domain across the study duration. We then examined whether the *total number* of challenges that participants accepted and completed for each domain predicted growth in their personality traits across the semester. All participants were included in all analyses.

Descriptive statistics and correlations for total challenges accepted and completed, summed across the entire study, are presented in Table 1. Collapsing across domains, on average, participants accepted 26.55 challenges across the study's duration—and completed each challenge an average of 1.51 times (totaling to approximately 40 completed challenges per participant across the study's duration). The breakdowns of accepted and completed challenges for each individual big five dimension are presented in Table 1. For example, on average, participants accepted 5.58 extraversion challenges and completed extraversion challenges 8.50 times across the semester (to be clear, the number of completed challenges is greater than the number of accepted challenges because participants could report completing the same challenge multiple times within a single week).[2]

We used multilevel models (MLMs) to examine whether (a) nominating to work on a trait, (b) the total number of trait-relevant challenges accepted, and (c) total number of trait-relevant challenges completed across the study duration predicted growth in participants' personality traits. For example, the MLM examining growth in trait extraversion as a function of challenges accepted and completed was:

$$\begin{aligned}&(\text{Trait Extraversion})_{ij} = b_0 + b_1(\text{Month})_{ij}\\&+ b_2(\text{Total Extraversion Challenges Completed})_j\\&+ b_3(\text{Month})_{ij}(\text{Total Extraversion Challenges Completed})_j\\&+ b_4(\text{Total Extraversion Challenges Accepted})_j\\&+ b_5(\text{Month})_{ij}(\text{Total Extraversion Challenges Accepted})_j\\&+ b_6(\text{Extraversion Nominated})_j\\&+ b_7(\text{Month})_{ij}(\text{Extraversion Nominated})_j + \ldots + U_j + \varepsilon_{ij}\end{aligned}$$

In all models, Time was scaled in terms of months and mean centered. Whether or not the trait was nominated was dummy-coded (i.e., 1 = trait nominated; 0 = trait not nominated). All other outcomes and predictors (i.e., personality traits, total number of challenges accepted and completed) were standardized across the entire sample (see Ackerman, Donnellan, & Kashy, 2011). Thus, the b_1(Month) parameter represents the expected monthly growth in trait extraversion, scaled in SDs per month, for participants who accepted and completed average numbers of extraversion challenges. The interactions represent the extent to which nominating a trait, accepting challenges, and completing challenges predicted greater or lesser monthly growth in trait extraversion. For example, a positive b_3(Month; Completed Challenges) coefficient would indicate that participants who completed greater numbers of challenges experienced greater trait growth each month, as compared with their peers who completed fewer challenges. Finally, a ran-

[1] Every time a participant accepted a challenge, we counted it as accepting one single challenge, irrespective of the suggested frequency. This was done for parsimony and consistency. Namely, the "base" challenges oftentimes varied in the number of behaviors required (e.g., "At least once this week, show up 5 minutes early for a class, appointment, or activity" versus "At least once this week, show up 5 minutes early for every class, appointment, or activity on your daily schedule") yet were nevertheless each counted as accepting a single challenge. Thus, for consistency, challenges with greater suggested frequency (e.g., "At least twice this week, show up 5 minutes early for a class, appointment, or activity") were also counted as accepting a single challenge, despite requiring multiple behaviors.

[2] The average number of accepted and completed challenges for individual traits may seem low. This is the result of the fact that not all participants nominated each trait. For example, 47% of participants did not choose to work on extraversion, and thus completed zero challenges. Moreover, participants who nominated multiple traits completed challenges across multiple traits. Thus, for example, a person who completed 25 total challenges across the study may have completed 16 for emotional stability and nine for extraversion.

Table 1
Descriptive Statistics and Correlations

Variable	*M*	*SD*	Correlations													
			1	2	3	4	5	6	7	8	9	10	11	12	13	14
Traits[a]																
1. Extraversion	3.30	.69	—													
2. Agreeableness	3.67	.55	.08	—												
3. Conscientiousness	3.53	.60	.20	.20	—											
4. Stability	2.96	.74	.33	.18	.33	—										
5. Openness	3.78	.62	.15	.15	.08	.05	—									
Challenges completed																
6. Extraversion	8.50	12.88	−.14	.05	.24	.08	−.10	—								
7. Agreeableness	3.62	11.19	.15	−.12	.08	.12	.00	−.07	—							
8. Conscientiousness	12.79	20.35	.07	−.01	−.18	.12	−.01	−.16	.03	—						
9. Stability	15.91	21.71	.09	−.01	.17	−.22	.04	−.03	−.01	−.13	—					
10. Openness	4.05	9.09	.09	.01	.07	.10	−.04	.01	−.01	−.03	.01	—				
Challenges accepted																
11. Extraversion	5.58	8.95	−.18	.24	.24	.06	−.11	.90	−.10	−.20	−.07	.00	—			
12. Agreeableness	1.86	5.26	.15	.07	.07	.12	−.01	−.07	.94	.03	−.01	−.03	−.10	—		
13. Conscientiousness	7.41	8.37	.07	−.19	−.19	−.01	.04	−.20	.00	.83	.14	−.07	−.22	.00	—	
14. Stability	8.60	9.47	.06	.06	.06	−.27	.05	−.08	−.05	.08	.84	−.05	−.09	−.06	.39	—
15. Openness	3.12	7.23	.06	.08	.08	.05	−.03	.03	−.05	−.06	−.03	.90	.03	−.06	−.09	−.07

Note. Challenges completed and accepted are summed across all waves. All correlations based on $n = 377$.
[a] The descriptive statistics and correlations for traits are for Time 1.

dom intercept for participants (U_j) was included to model and control for within-person dependencies in the data.[3]

In the sections that follow, we will review the extent to which trait growth over the course of the study varied as a function of (a) completing challenges, (b) accepting but not completing challenges, and (c) merely nominating to work on the relevant trait.

Did Completing Challenges Predict Trait Growth?

As can be seen by examining the Month × Completed Challenges parameter estimates in Table 2, successfully completing greater numbers of challenges (versus fewer challenges) predicted more positive growth in extraversion ($b = 0.04$, 95% CI [0.02, 0.06]), conscientiousness ($b = 0.04$, 95% CI [0.02, 0.06]), and emotional stability ($b = 0.04$, 95% CI [0.02, 0.06])—but not agreeableness ($b = 0.03$, 95% CI [−0.002, 0.07] or openness to experience ($b = -0.03$, 95% CI [−0.05, −0.00]). For example, as depicted in Figure 1, a person who completed no extraversion challenges over the course of the semester would be expected to *decline* 0.04 *SD*s in extraversion each month (95% CI [−0.06, −0.02]). In contrast, a person who completed two extraversion challenges per week (a total of 30) would be expected to *increase* 0.05 *SD*s in extraversion each month (95% CI [0.01, 0.09])—which accumulates to an increase of 0.17 *SD*s across the entire 15-week semester (95% CI [0.03, 0.31]).[4] As depicted in Figure 2, similar patterns were observed for the other big five domains except openness, as well.

Importantly, our models included multiple control variables (including the number of challenges accepted, the traits participants had nominated, and participants' personality traits at Time 1). The effect of completing challenges was not, however, contingent upon these control variables; with no control variables in the models (i.e., $[\text{Trait}]_{ij} = b_0 + b_1[\text{Month}]_{ij} + b_2[\text{Completed Challenges}]_j + b_3[\text{Month}]_{ij}[\text{Completed Challenges}]_j + U_j + \varepsilon_{ij}$), the pattern of findings was unchanged. Completed challenges predicted growth in extraversion ($b = 0.02$, 95% CI [0.02, 0.03]), conscientiousness ($b = 0.02$, 95% CI [0.01, 0.03]), and emotional stability ($b = 0.03$, 95% CI [0.02, 0.04]), but not agreeableness ($b = 0.01$, 95% CI [−0.00, 0.02]) or openness to experience ($b = -0.03$, 95% CI [−0.04, −0.01]).[5]

Did Accepting Challenges Predict Trait Growth?

As can be seen by examining the Month × Accepted Challenges parameter estimates in Table 2, for all traits except openness, controlling the number of challenges that were completed, *accepting* greater numbers of challenges predicted negative relative trait growth over time (*b*s ranged from $b = -0.05$, 95% CI [−0.09, −0.01] for agreeableness to $b = -0.02$, 95% CI [−0.04, −0.00] for emotional stability). This pattern of findings seems to indicate that individuals who accepted challenges but

[3] Participants who accepted and completed more numerous total challenges were likely to have provided more numerous waves of data (*r*s range from .08 to .24). Controlling for total waves of participation and the interaction thereof with month did not change any of the interaction parameters reported in Table 2 (or their confidence interval bounds) to two decimal places. Similarly, modeling trait growth as a function of the *average weekly* number of challenges participants accepted and completed (rather than total challenges completed and accepted across the entire study) produced nearly identical interaction parameter estimates to those in Table 2 (that differed by no more than ± 0.01; the statistical significance of all Completed Challenges × Month parameters was unchanged).

[4] The average person *who nominated* extraversion completed 15.83 total extraversion challenges (*SD* = 13.89). Thus, a person who completed 30 extraversion challenges would be approximately 1 *SD* above the mean in challenges completed *for persons who nominated extraversion*.

[5] Similarly, adding additional control variables into the models presented in the main text did not influence the results. Controlling for gender, age, and race did not change any of the Month × Completed challenges interactions reported in Table 2 in the main manuscript (up to two decimal places).

Table 2
Growth in Personality Traits as a Function of Accepting and Successfully Completing Weekly Challenges

	Outcomes: Personality traits									
	E		A		C		S		O	
Predictor	*b*	95% CI	*b*	95% CI	*b*	95% CI	*b*	95% CI	*b*	95% CI
Intercept	−.06	[−.13, .00]	−.02	[−.07, .04]	−.06	[−.13, .01]	.14	[.05, .22]	−.02	[−.08, .04]
Month	**−.02**	[−.03, −.00]	.01	[−.01, .02]	−.01	[−.03, .00]	**.05**	[.02, .07]	**.03**	[.02, .05]
Completed challenges	.13	[.05, .22]	.00	[−.14, .14]	**.12**	[.03, .21]	**.12**	[.04, .20]	−.03	[−.13, .07]
Accepted challenges	**−.11**	[−.19, −.02]	−.02	[−.18, .13]	−.08	[−.15, .00]	−.06	[−.14, .02]	−.05	[−.16, .06]
Trait nominated	.01	[−.08, .11]	.12	[−.07, .31]	−.07	[−.19, .05]	−.10	[−.23, .01]	−.02	[−.16, .11]
Month × Completed Challenges	**.04**	[.02, .06]	.03	[−.00, .07]	**.04**	[.02, .06]	**.04**	[.02, .06]	**−.03**	[−.05, −.00]
Month × Accepted Challenges	**−.03**	[−.05, −.01]	**−.05**	[−.09, −.01]	**−.03**	[−.05, −.01]	**−.02**	[−.04, −.00]	.02	[−.01, .05]
Month × Trait Nominated	.02	[−.01, .05]	.04	[−.01, .11]	−.01	[−.04, .02]	.00	[−.03, .03]	**−.06**	[−.09, −.01]

Note. E = extraversion, A = agreeableness, C = conscientiousness, S = stability, O = openness, CI = confidence interval. All models controlled for the appropriate Time 1 trait and the interaction thereof with Month. Ninety-five percent CIs for parameter estimates in boldface do not include zero.

continually failed to accomplish them experienced *declines* in personality traits each month, relative to their peers.

Specifically, in models where number of challenges completed was not statistically controlled (i.e., $[\text{Trait}]_{ij} = b_0 + b_1[\text{Month}]_{ij} + b_2[\text{Accepted Challenges}]_j + b_3[\text{Month}]_{ij}[\text{Accepted Challenges}]_j + U_j + \varepsilon_{ij}$), the number of challenges accepted was generally unrelated to trait growth. With no control variables in the model, number of accepted challenges was positively related to growth in extraversion ($b = 0.02$, 95% CI [0.01, 0.03]) and emotional stability, ($b = 0.01$, 95% CI [0.00, 0.02]), but not agreeableness ($b = 0.00$, 95% CI [−0.01, 0.01]), conscientiousness ($b = 0.00$, 95% CI [−0.01, 0.01]), or openness ($b = -0.02$, 95% CI [−0.03, −0.01]). Thus, the average Accepted Challenges × Month interaction term was approximately zero.

Put differently, on an uncontrolled, "zero-order" level, accepting more numerous challenges was inert—it did not predict trait growth. However, when challenges *completed* was held constant, accepting more numerous challenges appeared to backfire, predicting negative growth in the relevant trait. This indicates that accepting challenges but not completing them may produce growth opposite people's desires.

Did Merely Nominating Traits Predict Trait Growth?

As can be seen by examining the Month × Trait Nominated parameters in Table 2, when total number of challenges completed was held constant, the mere act of nominating a trait was generally unrelated to subsequent trait growth (average $b = 0.00$). Thus, mere participation in an intervention did not appear to predict change in participants' personality traits across time. Rather, it was only successfully completing challenges that predicted trait growth.

Follow-up analyses revealed that, without any control variables in the model (i.e., $[\text{Trait}]_{ij} = b_0 + b_1[\text{Month}]_{ij} + b_2[\text{Trait Nominated}]_j + b_3[\text{Month}]_{ij}[\text{Trait Nominated}]_j + U_j + \varepsilon_{ij}$), whether or not participants had nominated to work on changing a trait predicted monthly growth in the trait for extraversion ($b = 0.04$, 95% CI [0.03, 0.06]), conscientiousness ($b = 0.03$, 95% CI [0.01, 0.05]), and emotional stability ($b = 0.05$, 95% CI [0.03, 0.07]), but not agreeableness ($b = 0.03$, 95% CI [−0.00, 0.06]) or openness ($b = -0.06$, 95% CI [−0.08, −0.03]). As seen in Table 2, however, once completed challenges were held constant, the traits that participants nominated no longer statistically significantly predicted trait growth for extraversion ($b = 0.02$, 95% CI [−0.01, 0.05]), agreeableness ($b = 0.04$, 95% CI [−0.01, 0.11]), conscientiousness ($b = -0.01$, 95% CI [−0.04, 0.02]), or emotional stability ($b = 0.00$, 95% CI [−0.03, 0.03]). Thus, merely nominating traits at the beginning of the semester only spuriously predicted trait growth on a "zero-order" level because people who nominated traits were more likely to accept and complete challenges—and it was, in fact, completing challenges (not merely nominating traits) that predicted trait growth.

Did the Difficulty of Completed Challenges Matter?

We next examined whether the *difficulty* of the challenges that participants completed moderated our findings. Specifically, we computed the average difficulty of all challenges each participant had accepted for each domain across the entire study duration. This "average challenge difficulty" variable was allowed to interact with every variable in the MLM presented above. The key parameter of interest was the three-way (Month; Challenges Completed; Challenge Difficulty) interaction. A positive coefficient would indicate that participants who completed more difficult challenges experienced greater trait growth, as compared with participants who completed an equal number of easier challenges.

We did not find strong support for the idea that accomplishing more-difficult challenges predicted greater trait growth. Although the three-way interaction was positive for extraversion ($b = 0.01$, 95% CI [0.001, 0.01]) and emotional stability ($b = 0.02$, 95% CI [0.01, 0.04]), it was not significant for conscientiousness ($b = 0.00$, 95% CI [−0.01, 0.02]), and it was *negative* for agreeableness ($b = -0.01$, 95% CI [−0.02, −0.002]) and openness ($b = -0.01$, 95% CI [−0.02, −0.003]). Thus, collapsing across the big five dimensions, the average three-way interaction was essentially zero—suggesting that completing more difficult challenges did not have an appreciably different effect on trait growth than completing easier challenges.

Exploratory Robustness Checks

Challenges' discriminant validity. Because we used a rational/theoretical approach to constructing the challenges, we ran

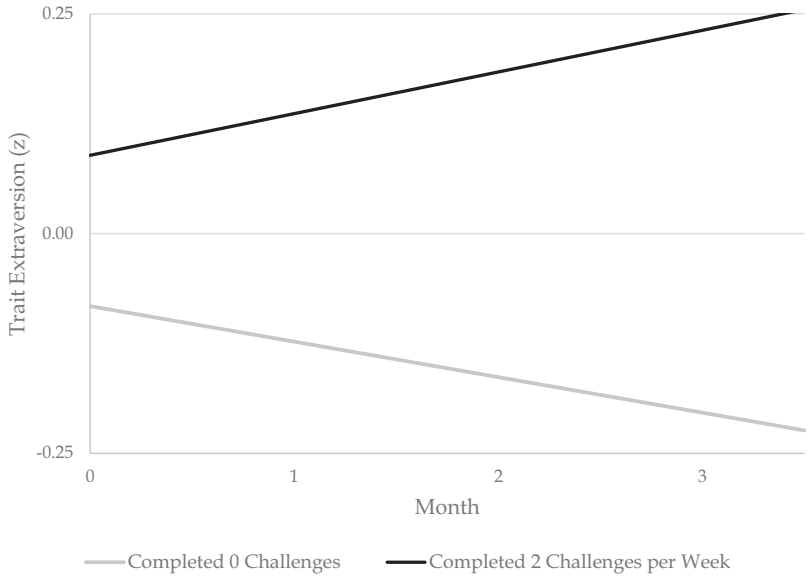

Figure 1. Growth in trait extraversion as a function of total number of challenges completed over the course of the semester. The black line represents an individual who, over the course of the entire 15-week study, completed two extraversion challenges per week ($z = 1.67$). The gray line represents an individual who, over the course of the study, completed no extraversion challenges ($z = -0.60$).

several exploratory analyses to evaluate their criterion and discriminant validities. First, we wanted to validate that the challenges targeted the intended trait. We ran models examining trait growth as a function of completing challenges *for nontarget traits* (e.g., predicting growth in extraversion as a function of agreeableness challenges accepted and completed, controlling growth in agreeableness). Generally, the challenges exhibited high discriminancy in targeting the desired traits; completing challenges did not predict growth in nontarget traits (all bs ≤ 0.03). Thus, for example, completing extraversion challenges predicted growth in only extraversion—and not in any of the other four traits. The only exceptions were that completing more numerous agreeableness challenges predicted growth in extraversion ($b = 0.03$, 95% CI [0.00, 0.06]) and conscientiousness ($b = 0.04$, 95% CI [0.01, 0.07]). It is not necessarily surprising that the agreeableness challenges predicted growth in extraversion. Expressing kindness, warmth, and tenderheartedness to other people *requires* social interaction (i.e., gregariousness and sociability). Thus, behaving agreeably seems to require one to engage in some level of extraverted behavior, as well. Similarly, agreeableness and conscientiousness tend to be moderately correlated and may share common variance in terms of concern for others and regulating behavior (e.g., effortful control; see Rothbart, 2007; Tobin, Graziano, Vanman, & Tassinary, 2000). Seemingly arguing against this possibility, however, challenges designed to increase conscientiousness did not have a "collateral effect" in increasing agreeableness, as well. Alternatively of course, when testing several cross-dimension effects, a number of significant growth effects may simply be false positives.

As an additional test of the challenges' validity, an average of 6.91 undergraduate research assistants (RAs) rated the extent to which each challenge was relevant to each big five domain. There was, on average 87% agreement between the RAs and our ratings regarding which traits the challenges targeted, excluding emotional stability, where agreement was 42%. As mentioned previously, emotional stability represents a difficult set of cognitive and affective processes to target with specific behavioral challenges. Therefore, it may not be surprising that undergraduates may have interpreted doing something enjoyable with friends as an extraversion challenge or giving money to charity as an agreeableness challenge. Despite this lack of agreement, the emotional stability challenges demonstrated empirical validity in that they did predict change in emotional stability (and not other traits).

Challenge difficulty. Our primary analyses examining whether the challenges' difficulty moderated their efficacy used difficulty ratings from only the first author. These same ratings were used by the study website to suggest challenges of an appropriate difficulty to participants, based on their histories of successfully completing or failing challenges. The difficulty ratings were assigned based, in part, on the logical scaffolding of behavior (e.g., identifying social clubs one is interested in joining is easier than actually attending a club meeting, and both of these challenges are less difficult than planning a social gathering oneself). To test the robustness of these analyses, an average of 4.00 RAs rated the difficulty of each challenge. There was moderate agreement among the RAs regarding the difficulty of the challenges (average ICC = .54), except for challenges pertaining to emotional stability (ICC = .22). Using the RAs' difficulty ratings instead of the first author's ratings produced similar results. There was a positive three-way interaction for emotional stability ($b = 0.02$, 95% CI [0.01, 0.04]), but not extraversion or conscientiousness (bs = 0.00), and the interaction was negative for agreeableness and openness to experience (respective bs $= -0.02, -0.01$). Thus, irrespective of whether the first author's or RAs' ratings were used, completing more-difficult challenges (as compared with easier ones) did not predict greater trait growth.

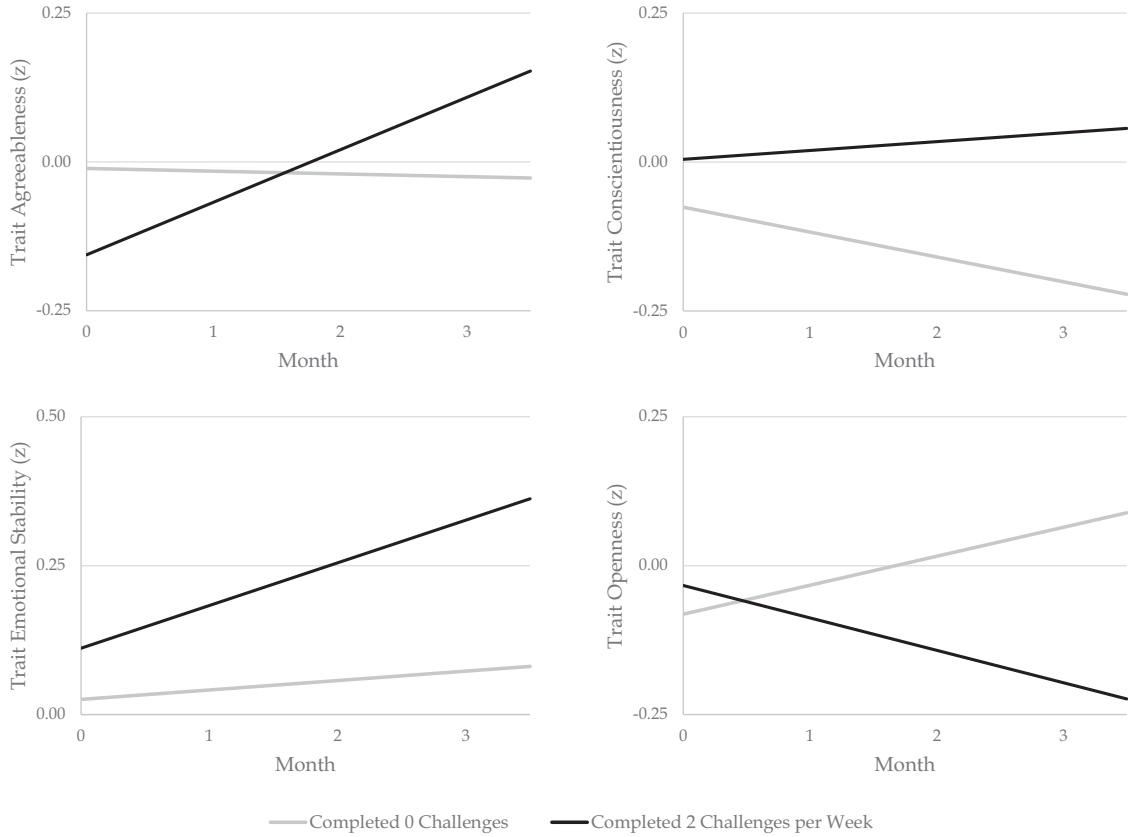

Figure 2. Growth in trait agreeableness, conscientiousness, and emotional stability as a function of total number of challenges completed in the relevant domain over the course of the semester. The black lines represent individuals who, over the course of the entire 15-week study, completed two challenges in the relevant domain per week. The gray lines represent individuals who, over the course of the study, completed no challenges in the relevant domain.

Discussion

Previous research suggests that most people want to change their personality traits (Baranski et al., 2017; Hudson & Fraley, 2016b; Hudson & Roberts, 2014; Robinson et al., 2015). Moreover, people tend to actually change in ways that align with their desires (Hudson & Fraley, 2015, 2016a; cf. Robinson et al., 2015). For example, people who want to increase in agreeableness tend to actually become more agreeable across time, relative to their peers who do not wish to change. However, few studies have explicitly examined the extent to which actively engaging in behaviors designed to change one's traits predicts trait growth.

In the present study, participants were presented with a new type of intervention in which they could accept prewritten "challenges" each week. Designed to mimic the experience of following advice in a self-help book, the challenges were concrete, specific behaviors prototypical of individuals high in each big five personality trait (e.g., a prototypical agreeableness challenge was "Give a friend or family member a genuine compliment"). We measured the extent to which accepting and completing weekly behavioral challenges predicted trait growth across a 15-week period.

Our findings indicated that, for all traits except openness to experience (and perhaps agreeableness), *successfully completing* greater numbers of challenges (i.e., engaging in greater numbers of prototypically high-trait behaviors) predicted greater trait growth across time. For example, participants who completed zero extraversion challenges across the semester were predicted to experience declines in extraversion across time. In contrast, participants who completed even 30 extraversion challenges (only two per week; about 1 *SD* above the mean in completed challenges for persons who were working on extraversion) were predicted to increase nearly a fifth of a standard deviation in extraversion across the course of the semester.

This pattern of results seems to suggest that taking even small but consistent steps toward pulling one's behaviors in alignment with one's desired traits has the potential to produce trait growth (Hennecke et al., 2014; Hudson & Fraley, 2015). This supports the theory that state-level changes that are maintained for extended periods of time (e.g., performing highly extraverted behaviors) have the potential to coalesce into trait changes. This transformation of state-level changes into trait-level ones could occur because state-level behaviors become learned, automatized, and habitual—or even perhaps because state-level changes have the potential to shape biology (Hutteman et al., 2015; Magidson et al., 2014; Roberts & Jackson, 2008; Wrzus & Roberts, 2017).

Interestingly, although completing challenges was related to trait change, the difficulty of the challenges did not predict trait growth. This finding is somewhat ambiguous. On the one hand, it may indicate that simply putting oneself in the mindset of a specific domain (e.g., enacting any level of extraverted behaviors) is sufficient to induce trait change—and that it is not necessary to push oneself to the limit with difficult or extreme behavioral changes. On the other hand, this finding may indicate that participants were choosing challenges that were calibrated to their existing trait levels. Indeed, people with higher levels of any trait tended to choose more difficult challenges for that trait (*r*s ranged from .08 to .22; e.g., more extraverted people tended to choose harder extraversion challenges). Thus, moderate challenges may promote growth for those with middling trait levels and more difficult challenges may promote similar amounts of *change* for those with higher trait levels; however, challenges that are more difficult may be required to promote growth on the extreme ends of the trait spectrum. These possibilities should be evaluated in future studies.

Importantly, only when number of challenges *attained* was held constant, the number of challenges that participants *accepted* was negatively correlated with trait growth. This seems to indicate that desiring trait change and making plans to change oneself, yet not following through on those plans has the potential to backfire (Hudson & Fraley, 2015). There are several potential reasons this phenomenon might occur. For one, accepting and continually failing challenges may have implicitly provided participants with feedback regarding their traits. For example, a participant who continually accepted extraversion challenges but failed them may have begun to reason, "Maybe I am even less extraverted than I thought, because I cannot seem to complete these challenges." This may have translated into drops in their self-rated extraversion across time.

As an alternative potential mechanism for why accepting but not completing challenges might backfire, sometimes the very act of declaring a goal is construed by individuals as progress toward that goal (Gollwitzer, Sheeran, Michalski, & Seifert, 2009). The perception that one has already "done something" to progress toward one's goals can subsequently undermine motivation to perform further actions that would actually advance the goal (e.g., Fishbach, Dhar, & Zhang, 2006). Research suggests that, even sans experimenter intervention, people naturalistically take steps toward pursuing volitional personality change (e.g., Hudson & Fraley, 2015; Quinlan et al., 2006; Stevenson & Clegg, 2011). Thus, for participants in our study who made goals but did not follow through on them, our intervention may have undermined their motivation to engage in even naturalistic attempts to change themselves, ultimately producing negative trait growth relative to their peers (who, even holding constant number of challenges completed for the study, may have been engaging in other naturalistic attempts to change their traits).

Although this explanation is ultimately speculative, the finding that our intervention may have backfired for certain participants dovetails nicely with prior findings that desiring change and making no progress predicts worsening well-being across time—but actually attaining desired trait changes predicts gains in well-being (Hudson & Fraley, 2016a). Collectively, these studies suggest that volitional personality change may be a complex process with potentially paradoxical consequences. The mere act of desiring change may be associated with negative psychological consequences, but successfully following through and attaining desired changes may be associated with positive psychological phenomena.

Similarity With Other Behavioral Change Paradigms

The current study was relatively unique in its goal of inducing self-directed change in normal-range personality traits. However, there exists a huge literature on interventions designed to alter individuals' thoughts, feelings, and behaviors—albeit without the explicit goal of changing personality. Below, we highlight three related areas of behavioral change research, and compare and contrast them with the present study.

First, cognitive–behavioral therapy aids individuals in becoming more aware of their thoughts and feelings for therapeutic ends. Thus, on some level, the goals and mechanisms of therapy—producing enduring behavioral change—are similar to those in the present study. Indeed, many of the challenges designed to change emotional stability in the present study were inspired by cognitive–behavioral therapy techniques. And moreover, there is preliminary evidence that clinical interventions may change personality traits (Roberts et al., 2017). That said, there are numerous differences between typical clinical interventions and the present study. Namely, clinical interventions typically focus on changing targeted thoughts, feelings, or behaviors in extreme populations, whereas our study focused on changing broad traits in normal samples. Moreover, the finding that clinical interventions have the potential to shape personality traits remains somewhat ambiguous (e.g., Roberts et al., 2017). For example, to the extent that manifest measures of extraversion are sensitive to variation in both latent extraversion and latent depression, it is possible that successfully treating depression creates illusory growth in extraversion on manifest measures, despite not affecting latent extraversion. In other words, the onset of depression may "artificially" dampen people's scores on extraversion measures. Once the depression has remitted, people's extraversion scores may return to their "true" levels, creating the illusion of personality growth during psychotherapy when none truly occurred. Ruling out this possibility would entail tracking patients *prior* to the onset of their clinical conditions and throughout the course of their treatment—an important direction for future research.

Second, motivational interventions also share similarities with the current approach. For instance, interventions in the expectancy-value tradition attempt to improve child academic outcomes by demonstrating that academic success is useful in life (increasing task value) and is obtainable (increasing expectancies for success; Eccles & Wigfield, 1995). This literature tends to focus on the motivational aspect of the interventions: increasing students' desire to study hard and apply themselves. From a personality perspective, those motivational increases are likely to have behavioral ramifications such as getting to class on-time, turning in homework, and studying for exams—potential markers of increased conscientiousness. Motivational interventions and volitional personality change may be complimentary frameworks for describing a common phenomenon. In a similar vein, growth mindset interventions encourage motivation by informing students that they can improve their abilities if they try. Again, to be effective, more than this belief must change; there must be some sort of downstream effect on behavior. Mindset interventions tend to have minimal effects on average (Sisk, Burgoyne, Sun, Butler, & Macnamara, 2018), but nevertheless some social-psychological interventions

can be effective (Yeager & Walton, 2011). There may be an opportunity for personality psychologists to engage with this literature by identifying when such interventions produce behavioral change, compared with simply changing a transient belief. After all, such interventions—even if framed around motivation or beliefs—are ultimately interested in changing relatively enduring patterns of thoughts, feelings, and behavior (i.e., traits).

Finally, considerable research has evaluated whether gamification—similar to our use of medals as markers of challenge completion—are useful for health interventions. For example, Cugelman (2013) identified several key ingredients of successful gamified health interventions including goal setting, overcoming challenges, obtaining feedback, reinforcement, and playfulness. Our intervention design included each of these aspects. Cugelman (2013) also suggested that social connections are important terms of interacting and comparing progress with friends. Personality psychology, as the study of consistent patterns of behavior, has the potential to unify these separate realms of behavioral change into one coherent framework.

In sum, although our intervention is unique in its explicit focus on changing broad personality traits, it shares similarities with more narrowly focused behavioral interventions. Future research could explore the common, active ingredients in these interventions—and also more thoroughly determine whether broad interventions (such as ours) are necessary for trait change, or whether narrower behavioral interventions (such as psychotherapy focused on specific issues) can also spur generalized trait change.

Implications, Limitations, and Future Directions

The single largest implication of our study is that actively engaging in behaviors designed to change one's personality traits does, in fact, predict greater amounts of trait growth across time. Participants who completed more challenges—and thus engaged in greater amounts of trait-typical behaviors—experienced the greatest changes to their personality traits across the course of the semester. That said, one limitation of our study is that ultimately, our data were correlational in nature and based on self-reports. We did not, for example, randomly assign participants to complete differing numbers of challenges each week or confirm that peers also noticed changes in the participants' personality traits. However, when studying *volitional* personality change attempts, a person's free choice and internal psychological states might be important. Our work elucidates that it is those who *actively pursue* behavioral change that attain trait change, rather than just those who ostensibly commit to behavioral change goals without following through. Although our study augments the understanding of naturalistically occurring phenomena (e.g., how people approach self-help suggestions, and how those different approaches predict trait change), future studies might consider randomly assigning participants to generating differing numbers of goals to increase the internal validity of our findings.

Along these lines, the challenges in our study were written to target the big five on a domain-level, rather than to target more-specific facets (e.g., assertiveness). Future research could write challenges to target facets of each domain and explore the extent to which facet-specific challenges promote growth in facets versus the overarching trait—and whether facet-level change generalizes to trait-level change over time and vice versa (see Hudson & Fraley, 2015).

A second implication of our study is that merely acquiescing to questions or receiving an intervention does not necessarily predict trait changes. One potential criticism of Hudson and Fraley's (2015, 2016a) prior findings is that placebo effects or experimental demand may have accounted for their findings. For example, participants who were randomly assigned to a goal-setting intervention in their prior studies may have *believed* the intervention would change their traits, producing placebo-like trait growth. In our study, all participants received the intervention, and merely *accepting* challenges (i.e., setting goals) did *not* predict trait changes. Indeed, only successfully attaining challenges (i.e., making actual behavioral changes) predicted greater trait growth across time—and accepting challenges without attaining them was associated with relative *decrements* in traits. Thus, our study suggests that making plans or setting goals is not enough to foster volitional trait change: Volitional change appears to occur only when participants follow through on their plans and successfully implement behavioral changes.

That said, future research should explore the exact processes that link behavioral change to trait change—and also what types of behavioral changes are most effective. Specifically, our study generated many novel challenges designed to motivate participants to change their personality traits. We largely relied on face validity and a rational/theoretical approach when constructing the tasks. An important area for future refinement will be to identify characteristics of challenges that are maximally effective for specific participants. It is unlikely that challenges that motivate a highly extraverted individual to become more extraverted will work equivalently for someone low on extraversion, for example. Further, there may be certain behaviors that carry forward in time—such as establishing a lasting friendship due to a lunch date—that may have larger impacts than other behaviors. The initial analyses here found little evidence that experimenter- or undergraduate research assistant–rated difficulty led to differences in personality development, but there are many possible avenues to generate and manipulate the implementation of challenges.

Along these lines, although our study seems to suggest that *mere participation* in an intervention does not produce placebo-like trait growth, we cannot soundly rule out the possibility that *perceived success* in an intervention might produce illusory trait growth. In other words, participants may have *believed* their personality traits had changed (despite no change actually occurring) because they observed their own continual success in completing the challenges. Future studies might attempt to rule out this possibility by randomly assigning participants to receive "placebo challenges" that should theoretically be inert in changing traits, and compare the efficacy of "real challenges" versus "placebo challenges."

A third implication of our study is that people's desires and active attempts to change their personality traits may have paradoxical effects, depending on their efforts. In our study, participants who indicated desires to change their traits and accepted challenges *but failed to complete those challenges* experienced negative growth in their traits. In other words, the "challenges" intervention may have backfired for these participants (see Study 1 in Hudson & Fraley, 2015). In contrast, participants who followed through in completing their behavioral challenges experienced trait changes that aligned with their desires. Indeed, a similar phenomenon has been observed in previous studies. For example, Hudson and Fraley (2016a) found that change goals for some traits predicted decrements in well-being, holding trait growth constant

(i.e., assuming participants did not attain their goals), whereas attaining desired trait changes predicted gains in well-being. Collectively, these studies illustrate the need for much deeper understanding of volitional change processes and the psychological correlates of desiring, pursuing, and attaining trait change. Indeed, whether or not volitional change is an *advisable* pursuit may depend entirely on one's chances of successfully attaining desired changes. Much future research is needed to understand the precise boundary conditions under which volitional change interventions may backfire—and the processes by which they backfire. For example, we speculated that committing to a goal may be perceived as progress toward the goal and undermine further action that might actually advance the goal (e.g., Fishbach et al., 2006; Hudson & Fraley, 2015). Future studies should directly test this hypothesis by examining individual differences in the extent to which participants feel they have made progress toward their volitional change goals simply by making plans to change their behavior—and the extent to which this sense of progress predicts negative trait growth, relative to their peers.

To this end, future research should also explore the different aspects of interventions that make them more or less efficacious in helping people attain trait change. Many peripheral aspects of our intervention—such as offering "medals" for completing challenges or suggesting a limited number of challenges of appropriate difficulty to participants based upon their histories of successfully completing and failing challenges—may have affected its efficacy. Ultimately, however, these features of our intervention were not directly tested and could be isolated and tested individually by future research.

Finally, speaking more broadly about the volitional change literature as a whole, future research is needed to understand (a) the extent to which individuals can volitionally change their traits, and (b) whether these changes can be maintained over time. As an analog, one recent meta-analysis of the effect of psychotherapy on personality growth found that (a) traits change quickly in response to psychotherapy, (b) trait growth is maximized and levels off after about six weeks, and (c) this trait growth is maintained for up to several years after psychotherapy has ceased (Roberts et al., 2017). Studies on volitional change, including ours, have thus far found that people tend to experience relatively linear growth in their traits over the course of approximately four months (Hudson & Fraley, 2015, 2016a). However, as with psychotherapy, it is likely that people will eventually experience diminishing returns in attempting to change their own personality traits. And it remains an open question whether those changes can be maintained over years—as appears to be the case with psychotherapy-driven change—or whether people will eventually revert to their baseline levels of each trait. Thus, future research should study volitional change processes over extended periods of time (e.g., several years) to more fully elucidate how much and how permanently people can change their traits. Similarly, there may be dynamic volitional change processes that unfold over extended periods of time (e.g., ebbs and flows in desires and attempts to change and corresponding undulations in personality traits). Future studies should employ larger samples over longer timespans to test these ideas.

Conclusion

Our study provides evidence that actively making behavioral changes that pull one's behaviors in alignment with desired traits is a viable strategy for volitionally changing one's own personality. Although this appears to be a promising prognosis for those who might seek out programs designed to help them change their traits, our findings emphasize a major caveat: Merely desiring change and formulating plans is not enough; it is necessary to follow through.

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(*Appendix follows*)

Appendix

List of Challenges

Trait	Diff.	Freq.	Challenge text
E	1	24	Before you go to bed, reflect on a positive social experience you had during the day, and what you liked about it
E	1	16	Say hello to a cashier at a store
E	1	54	Smile and wave at someone new on campus or near your home. Don't worry if they don't smile or wave back!
E	1	54	Say hello to someone you've never met. Don't feel pressured to say more unless you want to!
E	1	30	Download the app "Meet Up" on your phone, and identify one or two events you're interested in going to
E	1	43	Prepare a few well-rehearsed and brief responses to commonly asked questions, such as "What do you do for a living?"
E	2	40	Make a positive comment on someone else's Facebook post
E	2	29	Ask a cashier at a store how their day is going
E	2	48	Say hello to someone you've never met and comment on your shared surroundings (e.g., "The weather is nice!", "These flowers are beautiful!", "I love the song this store is playing!")
E	2	72	Call a friend that you haven't spoken with in a while
E	2	82	Do some research and identify a club on campus you're interested in joining. You can Google search for campus clubs
E	2	81	Ask a friend to coffee
E	2	63	Go to a familiar sit-down restaurant or bar and chat with your server
E	2	8	Write a list of questions to ask new people
E	2	28	Write down one interesting or funny story that happened to you during the day
E	3	19	Update your Facebook status, sharing a positive or interesting experience you've had
E	3	47	Introduce yourself to someone new
E	3	54	Ask a friend to a meal
E	3	27	Go to a new restaurant or bar and chat with your server
E	3	65	Go to a restaurant, coffee shop, or bar where people mingle and say hello to someone new
E	3	15	Find a volunteer organization and attend a volunteer event
E	3	33	Make a list of everything you are excited to do this week. Even if this is a regular, seemingly boring week for you, there are always things to be excited about!
E	4	41	Raise your hand and answer a question or give your opinion in class
E	4	35	Find people playing casual/pick-up sports (e.g., volleyball, soccer, Frisbee) in parks or on campus, and ask to play with them
E	4	13	Ask friends over to play games or watch a TV show
E	4	10	Find a party or social gathering and attend
E	4	25	Open up and honestly tell a close friend how your day went—whether good or bad. Ask them how theirs went
E	4	56	Tell a friend one an interesting or funny story that happened to you
E	4	44	Ask a friend or acquaintance to accompany you to a social event (even one that's been planned by someone else)
E	4	45	Ask a friend or acquaintance to go to see live music, a movie, or a show
E	4	92	Invite friends or acquaintances to participate in a hobby you enjoy (e.g., games, sports, etc.)
E	4	118	When someone asks for your opinion (e.g., "where should we eat?"; "what do you think about this topic?"), give your honest opinion
E	4	18	Make a list of thoughts or opinions you've never told anyone. Share at least one of these thoughts or opinions with a friend (note: it's probably not a good idea to share a negative thought or opinion about that friend)
E	5	20	Meet someone new and ask them at least two questions about themselves (e.g., "What do you do?" "What are you studying?"). Don't feel pressured to say more unless you want to!
E	5	23	Make weekend plans with friends
E	5	47	Go to a public place where people mingle and chat with someone new
E	5	19	Make a list of new restaurants or activities that you would like to try. Try at least one new activity or restaurant you've not tried before
E	5	32	During a time that you would normally relax at home, go out and do something active (e.g., go to a coffee shop, do something athletic, meet friends)
E	5	20	Identity an active activity that you would be excited to do. Go do that activity!
E	6	115	Download the app "Meet Up" on your phone, and go to an event you are interested in. It's okay to take a friend with you!
E	6	29	Find a club on campus you're interesting in joining. Attend a meeting. It's okay to take a friend with you!
E	6	63	Open up and honestly tell a close friend about your hopes and dreams for the future. Ask them about theirs
E	7	73	Ask a coworker, neighbor, or classmate to coffee. Don't worry if they say they're not free!
E	7	76	Go to a restaurant, coffee shop, or bar where people mingle and chat/make small talk with someone new
E	7	62	Open up and honestly tell a close friend about a problem you're currently experiencing
E	7	117	Take the lead on organizing a social outing. Plan an activity to do, and invite one or more friends to join you

(*Appendix continues*)

Appendix (*continued*)

Trait	Diff.	Freq.	Challenge text
E	8	43	Plan an event with friends (e.g., games, movies, meals). Meet someone new and ask them to join you and your friends for that event
E	9	18	Ask a coworker, neighbor, or classmate to lunch or dinner. Don't worry if they say they're not free!
E	9	72	Volunteer to take a leadership role. For a class project. For planning a social event. Or whatever else you would like.
E	10	48	Download the app "Meet Up" on your phone, and plan an event centered around your interests (e.g., photography, games, etc.)
A	1	2	Smile at someone you don't know
A	1	1	Say "please" and "thank you" when asking for something
A	1	23	Hold the door open for someone
A	2	18	Write down a nice thing someone else did for you today
A	2	29	Spend 5 minutes writing down a list of things you're grateful for in one of your relationships
A	2	21	Before you go to bed, reflect on something kind someone did for you that day and how it made you feel—even something small (e.g., smiling at you)
A	3	17	Give a friend or family member a hug
A	3	15	Say "thank you" to someone you normally wouldn't (e.g., thank a teacher for the lecture; thank a friend for hanging out)
A	3	13	When someone compliments you, say out loud, "Thank you."
A	3	20	Take a few minutes to reflect on the good qualities of people you love (e.g., friends, family members)
A	3	20	Spend five minutes writing down reasons why people in general are generally good
A	4	8	Pay for someone else's coffee in line
A	4	18	Take money that you would spend on coffee or alcohol and instead donate it to charity
A	4	12	Give a friend or family member a genuine compliment
A	4	14	Identify someone who is very kind and loving toward others, and ask them about what motivates them to be that way
A	4	13	Buy a friend a drink (platonically)
A	4	23	Spend five minutes making a list of times people have kept their promises to you
A	4	28	Say something kind to a server, check-out clerk, or other person you interact with
A	5	11	Do a small kindness for someone close to you
A	5	20	Ask someone how they are doing and really listen
A	5	21	Surprise someone with a thoughtful gift or card
A	5	21	Express appreciation for someone in your life (e.g., tell a friend that you appreciate their friendship)
A	5	16	Think about someone you know who is currently going through a difficult time. Reflect on how you would feel if you were in their circumstances
A	5	18	Send a friend or family member a thank-you card for something kind they did
A	5	14	Give a friend or family member a small, unexpected gift
A	5	7	Think about someone that you don't really like, and spend 5 minutes reflecting only on their good qualities instead
A	5	20	Buy a friend dinner (platonically)
A	5	14	Give money to a charity
A	6	19	Ask a friend if you can help them with anything; help them without expecting anything in return
A	6	13	Do a small kindness for a stranger
A	6	15	Volunteer helping someone
A	6	31	Genuinely compliment someone's personality (not their looks!) by telling them something you like about who they are
A	6	10	Send a friend an encouraging text
A	7	33	Talk to a stranger, and ask them about themselves
A	7	12	Genuinely tell a friend why you appreciate them
A	7	13	When someone irritates you, take at least 30 seconds in that moment to reflect on their good qualities instead of their bad qualities
A	7	3	Send a friend or family member a friendly card genuinely telling them why you appreciate them
A	7	6	If someone asks you for a favor, do it
A	7	5	Join a charitable / volunteer organization and attend at a volunteer event
A	8	7	Take someone else's perspective
A	8	7	When you disagree with someone, honestly try to take their perspective and understand why they feel how they do
A	8	19	If you get into an argument with someone or say something irritable, apologize to the other person even if they won't apologize to you
A	8	5	When you feel tempted to say or think something mean about someone, say or think something positive about that person instead
A	8	21	Compliment a stranger (platonically)

(*Appendix continues*)

Appendix (*continued*)

Trait	Diff.	Freq.	Challenge text
A	9	16	If you get into an argument with someone or get irritated with them, take the other person's perspective (i.e., assume they have good motives and think about how you would feel if you were in their position)
A	9	5	Choose to forgive someone who has hurt you in the past. Whenever you think of what happened, simply say to yourself, "I choose to forgive them; they no longer owe me anything"
A	9	32	Talk with a friend who is going through a hard time, and just really listen to them without trying to solve their problems for them
A	9	9	Tell a friend what good qualities you see in them; ask them what good qualities they see in you
A	9	24	When you think something negative about someone else, take 30 seconds in the moment to mentally list reasons why they are probably a good person, and how they are probably just being affected by their circumstances (e.g., stress)
A	10	17	When someone irritates you, spend 30 seconds reflecting on the CIRCUMSTANCES (e.g., stressful day) that might be contributing to their behavior
C	1	40	Put your phone in your pocket during class, and do not look at it for the whole class period
C	2	90	Begin preparing for an event 10 minutes earlier than usual
C	2	86	Organize the app icons on your phone's homescreen
C	2	77	Spend at least 5 minutes journaling about the benefits (e.g., for the future, your career, for you personally) of being thorough, hardworking, and productive
C	2	46	Write down a list of people who are counting on you (e.g., to attend events, to contribute to assignments/work, to provide supplies)
C	3	96	Show up 5 minutes early for a class, appointment, or other activity
C	3	54	Set out your clothes the night before
C	3	50	Carefully proofread an email or text before you send it
C	3	105	When you notice something you need to buy (e.g., household supplies), make a note on your phone
C	3	71	When you notice something you need to do (e.g., an assignment/chore/bill) make a note on your phone and/or calendar
C	3	71	Spend 30 minutes writing down a list of your long- and short-term goals.
C	3	59	Identify something you're putting off (e.g., a chore, assignment). Spend 5 minutes journaling about why you're putting the task off (e.g., not sure how to start, etc.).
C	4	90	Clean up the dishes as soon as you're done with them
C	4	28	Pay a bill as soon as you receive it
C	4	60	Complete a class assignment at least one week early
C	4	40	Identify one specific assignment from one of your classes, and finish it at least two days early
C	4	89	When you wake up, make a list of things you would like to accomplish that day
C	4	22	At least 15 minutes before leaving to attend a class or social event, anticipate any supplies you might need and pack them in a bag to take with you
C	4	58	Spend at least 5 minutes journaling about the types of things that typically distract you from getting to work, and brainstorm strategies on how to minimize those distractions
C	5	27	Before you go to bed, make a to-do list for the next day
C	5	67	Schedule a one hour block of time to study or do classwork on your calendar, and actually spend that time studying
C	5	34	Clean up a small mess in your apartment/home/room
C	5	38	Organize and clean up your desk
C	5	95	Identify a chore you've been putting off (e.g., laundry, cleaning, paperwork) and do it
C	5	40	Make lunch or dinner plans with a friend at least two days in advance. Show up on time!
C	5	23	Identify one specific assignment from one of your classes, and carefully double-check or proof-read your answers/responses before turning it in
C	5	50	Identify a specific task you would like to accomplish. Write a list of all of the supplies you will need to accomplish the task before you begin
C	6	61	Create reminders on a calendar for upcoming assignment due dates and social activities
C	6	100	Take 30 minutes to focus on a productive activity (e.g., cleaning, studying) without any distractions. Silence your phone and do not browse the internet, chat, or watch TV. Focus only on the activity at hand
C	6	65	When a friend asks you to make plans, make plans, commit to those plans, and follow through
C	6	45	Make flashcards for important terms and concepts in one of your classes. Spend at least 30 minutes practicing with your flashcards
C	6	25	Talk with your TA or professor about study strategies or how to best succeed in their class. Take at least 30 minutes to implement whatever strategies they suggest
C	6	51	Identify a specific chore or assignment you've completed recently. Honestly critique your work to identify areas you can improve. Write these areas down
C	7	81	When you notice something you need to do (e.g., an assignment/chore/bill), schedule a time to do it on your calendar. Actually perform that activity at the scheduled time!
C	7	43	Attend every class on your daily schedule

(*Appendix continues*)

Appendix (*continued*)

Trait	Diff.	Freq.	Challenge text
C	7	33	Identify a short- or long-term goal you would like to achieve. Identify the first (or next) concrete, small step you need to take toward that goal and do it
C	7	82	Write down any promises/commitments you make in a note on your phone or calendar. Follow through with your promises!
C	7	42	When you feel like giving up on a task, take a several-minute break to clear your head (e.g., take a short walk), but then return to the task and finish it
C	7	71	Make a list of things you need (e.g., responsibilities that need to be done; needs for social time, food, etc.) and schedule time for each of those needs
C	8	39	Take an hour to focus on a productive activity (e.g., cleaning, studying) without any distractions. Silence your phone, and do not browse the internet, chat, or watch TV. Focus only on the activity at hand
C	8	112	Clean up any messes in your apartment/home/room
C	8	40	Pick one specific class assignment, and do your absolute best on it–not just enough to get by
C	8	45	Set a daily sleep schedule and go to bed and wake up on time
C	8	44	Identify an assignment or chore you need to do, schedule a time to do that task on your calendar. Start the task immediately at the scheduled time, without any distractions or procrastinating
C	8	34	Identify one specific chore or assignment you need to complete. Actually complete the task, doing the most thorough job you're capable of
C	8	73	Show up 5 minutes early for every class, appointment, or activity on your daily schedule
C	9	56	Plan out a full day, hour by hour, putting all classes, appointments, and social activities on a calendar
C	9	39	Identify a specific chore or assignment you need to complete. Complete the task, but go above and beyond normal expectations for that task (i.e., do a better job than would normally be expected)
C	10	22	Identify one specific chore (e.g., cleaning) or assignment that you have completed recently but feel you could have done better. Re-do that task, being more thorough and complete, producing your best work
C	10	29	Volunteer to take responsibility for something (e.g., to help plan a social event, to bring supplies, to lead a group project)
S	1	33	When you wake up, say aloud to yourself, "I choose to be happy today"
S	2	61	When you feel overwhelmed, stop and take several deep breaths
S	2	176	Before you go to bed, write down a positive thing that happened to you during the day, and how it made you feel
S	2	180	Take at least 5 minutes to intentionally smile. This can be on your own, or while performing an activity (e.g., driving, walking to class)
S	2	33	Hug a close friend or family member
S	3	124	When you wake up, spend at least five minutes mentally listing everything you are grateful for (e.g., friends, family, safe place to live, clean air)
S	3	57	Schedule 30 minutes to engage in an activity you enjoy
S	3	91	Express gratitude to another person (e.g., thank a teacher for a good lecture; tell a friend why you appreciate them)
S	3	63	Before you go to bed, write down one good thing you can look forward to tomorrow
S	3	58	If you are religious, spend at least 5 minutes praying. If you are not religious, spend at least 5 minutes meditating.
S	3	101	When you are worried about something, write it down
S	3	71	Spend at least an hour with loved ones (friends, family) or go out and meet someone new
S	3	60	Before you go to bed, spend at least 5 minutes meditating upon positive relationships with people in your life (e.g., friends, family)
S	3	46	Go to a yoga class, or spend 10–20 minutes doing yoga at home (hint: YouTube has lots of beginners' videos)
S	4	35	Exercise at least 15 minutes
S	4	51	When you wake up, spend at least five minutes meditating
S	4	49	When you feel worried about the future, spend at least two minutes visualizing the best case scenario
S	4	146	Spend at least 5 minutes journaling about your day. Write about what happened, but also about your feelings
S	4	67	When you feel stressed, take at least two minutes to reflect on similar circumstances in the past where you have succeeded (e.g., if you are nervous about giving a speech, reflect on past times when you've succeeded in giving speeches)
S	4	90	Update your Facebook status with something you're grateful for
S	4	83	When you feel anxious about a decision, make a pros and cons list for both options
S	4	96	When someone gives you a compliment, say "Thank you" out loud. Mentally say to yourself, "I believe this person truly feels this way"
S	4	54	Spend at least one hour doing something active that you enjoy (e.g., sports, hiking, shopping) with one or more friends or acquaintances
S	4	38	Call a friend or family member to catch up
S	5	59	Connect with a friend (e.g., over coffee) and be honest about both the good and bad parts of your life

(*Appendix continues*)

Appendix (*continued*)

Trait	Diff.	Freq.	Challenge text
S	5	50	Spend at least 5 minutes journaling about all of the good things in your life. There are always positive things, even if they seem trivial (e.g., clean air, sunshine, friends or acquaintances)
S	5	115	When you are worried about something, tell a close friend or family member about it
S	5	98	When you feel discouraged, write down a potentially positive outcome. Can you PROVE this outcome won't happen?
S	5	82	Honestly discuss your life and feelings with a close friend or family member
S	5	113	Spend at least 30 minutes going on a photo hunt with your phone. Take pictures of things that make you happy (e.g., pretty flowers, friends, a comfortable bed, yourself)
S	5	51	Tell a close friend or family member why you appreciate them
S	5	27	Take at least 5 minutes to slowly savor something beautiful. Examples: close your eyes and slowly eat good food, noticing its flavor; sit by a river and close your eyes, savoring the sound of running water; find some beautiful art or flowers and really look at them, taking time to reflect on the feelings you feel
S	5	94	Give money to a charity
S	5	140	Laugh out loud. Either do something enjoyable with friends, or seek out a comedic show/clip/story and laugh
S	5	75	When you feel a negative emotion (e.g., sad, angry, stressed) take at least 5 minutes to write about WHY you feel that emotion
S	6	27	Exercise at least 30 minutes
S	6	51	Do something kind for another person, without expecting anything in return
S	6	75	Spend at least 5 minutes journaling about your good qualities and strengths as a person. Everyone has good qualities and strengths!
S	6	75	Throughout the day, notice at least 5 positive things (e.g., "the sky is pretty today," "I'm grateful I got to see my friends today," "This couch is comfortable," "The river makes such wonderful sounds"). Say those things to yourself.
S	6	58	When you feel a positive emotion, take at least two minutes to really explore it in your mind. What did you enjoy and why? Mentally re-experience the situation and the positive feeling
S	6	124	Identify at least three "unsaid positives" that you take for granted, and say them out loud (e.g., "I really like my apartment;" "I enjoy walking around campus")
S	7	66	Exercise at least 45 minutes
S	7	43	When you notice a negative thought, acknowledge the negative thought, but think 3 true positive thoughts about the same topic (e.g., "I hate that it's raining on my Saturday. But we need the rain, slow weekends help me appreciate fast ones, and this gives me time to catch up on work")
S	7	32	When a situation seems negative, acknowledge the bad, but also mentally list off three positives
S	7	107	Make a list of fun things you would like to do. Actually go do one activity on your list
S	7	55	When you feel angry or upset with someone, take at least 2 minutes to reflect on that person's good qualities, rather than their bad
S	8	48	When you experience a negative thought, write it down. Spend at least two minutes writing the evidence AGAINST that negative thought (e.g., "I feel that no one likes me. This is not true because I don't know how other people feel, and there are certainly at least a few acquaintances, teachers, or family members who honestly like me")
S	8	74	When you feel hurt or angry with someone, give them the benefit of the doubt and spend at least one minute reflecting on the CIRCUMSTANCES that might have caused their behavior (e.g., they're having a bad day)
S	8	104	Seek social support (e.g., from friends or family members, clubs of people that share your interests or are working toward the same goals as you)
S	9	96	Identify someone who has hurt you in the past and choose to forgive them
O	2	13	Read a news story about a foreign country
O	2	13	Read a news story about recent scientific discoveries and technologies
O	2	17	Watch a new movie that you've never seen before
O	2	32	Watch an episode of a new TV show that you've never seen before
O	2	7	Subscribe to a new podcast and listen to the first episode
O	2	11	Spend five minutes reflecting on your goals and values in life
O	3	36	Try a new entree that you've never had before at a restaurant you like
O	3	4	Visit a museum or art gallery
O	3	30	Read a news story about political beliefs that differ from your own
O	3	50	Spend five minutes imagining where you would go and what you would do if you could time travel
O	3	29	Spend five minutes imagining what you would do if you could fly
O	3	27	Spend at least 5 minutes meditating
O	4	16	Try a new restaurant that you've never been to before
O	4	18	Go to a poetry reading
O	4	15	Close your eyes and listen to a song you enjoy. Reflect for a few minutes on what you like about it and what feelings it makes you feel

(*Appendix continues*)

Appendix (*continued*)

Trait	Diff.	Freq.	Challenge text
O	4	12	Write down a question about something in your daily life that you don't already know the answer to (e.g., "What is plastic made of?")
O	4	13	Go to a store that sells art (including big-box retailers like Walmart or Target). Find a piece of art you like and reflect on what you like about it and what it makes you feel
O	4	46	Attend a live music event
O	4	6	Spend at least 5 minutes reflecting upon a philosophical topic (e.g., "What is the meaning of life?")
O	5	17	Identify a new activity you've never done before and try it
O	5	29	Find something you're curious about in your everyday life (e.g., "how does soap work?") and find the answer online
O	5	42	Spend five minutes daydreaming about a new place you would like to visit and what you would like to do there
O	5	4	Spend at least 30 minutes reading a novel or non-fiction book
O	5	23	Spend at least 20 minutes making art–drawing, coloring, painting, sculpting, or taking photos
O	5	34	Visit a new park or part of town that you've never been to before
O	5	44	Try something new (food, event, activity, etc.). Before you go to bed, spend five minutes reflecting on everything you liked about the new experience
O	5	13	Before you go to bed, reflect upon all the beauty you noticed today (both physically, e.g., in nature; but also abstract beauty, such as in friendships, etc.)
O	6	42	Spend five minutes journaling about your feelings. Don't write about what happened; just write about your feelings
O	6	24	Read a news story about politics or a foreign country, and tell a friend about it. Ask them for their thoughts
O	6	39	Go on a photo hunt and take pictures of objects (man-made or natural) that you find beautiful
O	6	46	Tell a friend about something new you've learned recently. If they seem interested, have a conversation about the topic
O	6	28	Spend a few minutes reflecting on something new you learned in a class. Generate at least two questions about the topic that you'd like to know the answer to
O	6	45	Think about something you don't understand in life (e.g., "How does sunscreen work?"). Spend at least five minutes brainstorming potential explanations BEFORE trying to look up the answer
O	6	33	Watch a debate and try to understand both sides' perspectives
O	6	6	When you notice something beautiful (e.g., in nature, art) point it out to whoever is around, whether a friend or stranger
O	7	19	Ask a friend what they believe the meaning of life is. Seek to understand their answer and have a discussion
O	7	20	Identify a topic that interests you and go to a lecture on that topic. Schedules for talks are typically listed on Departments' websites
O	7	47	Find a friend who knows about a topic you're not familiar with (e.g., different majors, growing up in different countries, different types of food or activities). Learn about that topic by asking your friend questions
O	7	40	Make a list of new experiences you would like to try. Try one of them
O	7	37	Search your local events calendar or download the app "Meet Up" to your phone, and go to a new event that you've never been to before
O	7	20	Strike up a conversation with friends about the content of their dreams; share your dreams, too
O	7	33	Start a conversation with friends about a philosophical topic (e.g., "Do you think there is life outside of Earth and why?"). Discuss the topic and explore your reasons for your beliefs
O	7	45	Find a song or piece of art that you dislike. Spend a few minutes reflecting on the GOOD qualities of that song or piece of art
O	7	12	Go to a book discussion club
O	8	15	Ask a friend or family member a deep question about their life, and honestly seek to understand their answer
O	8	26	Find a friend or acquaintance from a different culture, and ask them questions about their culture, seeking to understand it better
O	9	31	Find someone with a different opinion from your own (e.g., on politics, religion, culture, activities they enjoy) and ask them questions to understand their opinion. Do not argue with them
O	9	39	Seek to understand some else's thoughts on a controversial topic. Don't argue with them, but rather try to understand their perspective
O	9	38	Think about your opinion on a controversial topic. Spend at least five minutes thinking about why people with the opposite opinion might be right instead of you
O	9	22	Ask a friend about their opinion on a controversial topic. Honesty try to understand their perspective without worrying about who is right or wrong

Note. E = extraversion; A = agreeableness; C = conscientiousness; S = stability; O = openness; Diff. = difficulty of challenge; Freq. = frequency with which challenge was accepted by participants.

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