

# How to Change Conscientiousness: The Sociogenomic Trait Intervention Model

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Conscientiousness, the propensity to be organized, responsible, self-controlled, industrious, and rule-following, is related to numerous important outcomes including many forms of psychopathology. Given the increasing awareness of the importance of conscientiousness, it is becoming common to want to understand how to foster it. In this paper we first describe and update a recent model that was put forward as a theoretically informed intervention to change conscientiousness. We then consider recent life span theories focused on conscientiousness that might inform how best to use existing interventions as well as identify potential moderators of the effectiveness of intervention. Finally, we integrate these perspectives into a framework for how to foster conscientiousness that we label the Sociogenomic Trait Intervention Model (STIM).

**Keywords:** conscientiousness, intervention, personality traits, behavioral activation, sociogenomic

Conscientiousness is a collection of constructs describing individual differences in the propensity to be self-controlled, responsible to others, hardworking, orderly, and rule-abiding (Roberts, Lejuez, Krueger, Richards, & Hill, 2014). It is a personality trait, which in turn is defined as the relatively enduring, automatic patterns of thoughts, feelings, and behaviors that are elicited in isomorphic situations and that develop with time and age (Roberts, 2009). Conscientiousness is currently considered one of the most consistently predictive trait domains within the Big Five with respect to positive outcomes in most, if not all areas of life. In the case of school, conscientiousness is the most important factor next to cognitive abilities when examining school performance (Poropat, 2009). In work, conscientiousness is considered the primary personality factor for predicting better job performance (Dudley, Orvis, Lebiecki, & Cortina, 2006), occupational success (Judge, Higgins, Thoresen, & Barrick, 1999), and lifelong earnings (Duckworth, Weir, Tsukayama, & Kwok, 2012). Conscientiousness predicts outcomes such as relationship quality and duration (Hill, Nickel, & Roberts, 2014; Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007). Conscientiousness also predicts physical health (Hampson, Edmonds, Goldberg, Dubanoski, & Hillier, 2013; Is-

rael et al., 2014; Moffitt et al., 2011), the onset of Alzheimer's disease (Wilson, Schneider, Arnold, Bienias, & Bennett, 2007), and longevity (Hill, Turiano, Hurd, Mroczek, & Roberts, 2011; Kern & Friedman, 2008). Finally, conscientiousness is an important factor for mental health because it predicts all major forms of psychopathology (Kotov, Gamez, Schmidt, & Watson, 2010), and especially externalizing disorders (Krueger, Markon, Patrick, Benning, & Kramer, 2007). Succinctly, conscientiousness is a personality trait that promotes better success in school, work, relationships, and physical and mental health.

Given the increasing awareness of the importance of conscientiousness, it is becoming common for people to want to understand how to foster conscientiousness. This is a question on the minds of both parents and societies around the globe. Most parents and social communities are invested in having their children and citizens be responsible, hardworking, and appropriately self-controlled adults. It is also a developmental fact that people tend to be less conscientious when they are young (Roberts, Walton, & Viechtbauer, 2006). This invites the question that we attempt to answer in this paper. If we want to foster conscientiousness, how should we intervene? To address this overarching question, we first review and update a recent model that was put forward as a theoretically informed intervention to change conscientiousness that was based on behavioral activation (BA) theory, a form of cognitive behavior therapy used to treat depression (Magidson, Roberts, Collado-Rodriguez, & Lejuez, 2014). Second, to address several oversights in our original conceptualization of the BA-inspired model, we describe how the process of development and the developmental context surrounding conscientiousness might inform how and when to intervene. Third, we merge the BA-informed model with the information from developmental research

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into a synthesis that we label the Sociogenomic Trait Intervention Model (STIM).

### A BA Model of Personality Trait Change

We recently introduced a model (Magidson et al., 2014) for how to change personality traits, and conscientiousness in particular, that was built on an integration of BA, motivational theories, and the sociogenomic model of personality traits (Roberts & Jackson, 2008). One of the key tenets of a sociogenomic perspective on personality is that traits do not reflect perfect or absolute consistency with respect to how one behaves in any given situation (Roberts, 2009). Instead, most recent accounts of traits consider the role of the given environment on behavioral manifestations of the trait. For instance, the sociogenomic approach to personality traits (Roberts, 2009; Roberts & Jackson, 2008) emphasizes that traits are systems of consistent and fluctuating factors—traits and states. The trait aspect of the system is the relatively enduring signal of consistency that is manifest in states. States are simply the moment-to-moment fluctuations in thoughts, feelings, and behaviors. Although we often approach states and traits as if they are different constructs, in actuality one can see that a trait is simply a specific pattern found in a frequent assessment of states. Consider the hypothetical situation in which an individual is followed over a year's time, during which that person's states (e.g., moment-to-moment behaviors) are continuously tracked. All one needs to do to extract a "trait" from the data would be to identify the state manifestations that are repeated often over time and situation. For example, one could do this by specifying a latent unchanging or slowly changing latent variable in a multilevel model. At the same time, the episodic variability of the state level of analysis is retained and could also be examined.

The synthesis of state and trait provides key insights into how an intervention for conscientiousness might be conceived. First, it is likely easier to develop intervention programs that motivate individuals to act consistently in ways reflective of conscientious states, as opposed to planning interventions that attempt to influence the trait as a whole. Relatedly, focusing on changing states avoids the inevitable hostility many would feel about a program designed to "change your personality" because efforts instead are focused on enhancing more narrow behavioral states such as being more organized or avoiding impulsive behavior. Third, counter to most other broad personality traits, researchers have identified clear and specific behavioral states associated with trait conscientiousness (e.g., Jackson et al., 2010). For instance, examples of behaviors associated with general conscientiousness include paying bills on time, double-checking or proofreading one's work, and remembering materials needed to complete jobs at work or school. Accordingly, these states provide researchers with potential intervention targets (and presumably desirable ones for participants) that with consistent achievement may ultimately produce trait-like change.

With these basic assumptions about personality traits in mind, we recently introduced a framework for changing conscientiousness that reflected a synthesis of modern personality trait theory, combined with motivational systems, and a BA approach to therapy (Magidson et al., 2014). The framework builds on the sociogenomic model of personality traits. Drawing on our previous description, if a trait is a system of continuous and changing states,

then changing a trait is deceptively simple: Change the states associated with the trait in a way that ensures that the change is enduring. The focus on states as a bottom-up approach can be conceptualized in terms of an exercise regimen. Like any other skill, practice can improve one's performance over time. Just like learning to ride a bike or play piano is assumed to lead to lasting changes, insofar that one hopefully possesses these abilities with some aptitude in the long term, acting in a conscientious manner with regularity may encourage individuals toward increases in trait conscientiousness.

Specifically, we believe that BA provides an ideal approach with which to change conscientiousness-related states and ultimately foster higher levels of conscientiousness (Magidson et al., 2014). BA centers on creating structure, accountability, and value- and goal-driven behavior (Dimidjian, Barrera, Martell, Muñoz, & Lewinsohn, 2011). Although never specifically targeted at personality traits, per se, BA has been used for treatment of depression and substance use disorders (e.g., Cuijpers, van Straten, & Warmerdam, 2007; Daughters et al., 2008). In the brief version of BA (Lejuez, Hopko, Acierno, Daughters, & Pagoto, 2011), individuals initially monitor their daily behavior and rate activities on levels of importance and enjoyment. This is meant to illustrate specific times of day or behavior patterns that may be contributing to low mood. The focus of therapy then moves to the identification of values, consideration of daily activities consistent with those values, and a structured plan for engaging in those valued activities, which includes exercises such as creating a hierarchy of potential activities based on perceived difficulty and scheduling activities into specific periods of one's day. The primary goal of BA is to increase engagement in goal-directed activities that are considered important, enjoyable, and in accordance with individual values across numerous domains of one's life.

Although BA has not yet been tested as an intervention to change personality traits, or conscientiousness specifically, there are important conceptual links between BA and conscientiousness given that BA programs hold a strong focus on individual values, structure, and accountability. In BA, individuals monitor their daily activities and subsequently identify alternative activities to introduce in one's life that align activities with values. This process requires individuals to attend closely to existing schedules, plan their days, set goals, and persist in an effort to achieve behavior change. These components of BA—monitoring of behavior and progress, goal-setting, planning, value alignment, and persistence—map onto the core of the trait domain of conscientiousness. Presumably, if these behavioral changes are practiced and continued over time, then we would expect that they ultimately reach a level of automaticity that is more reflective of trait-level changes in conscientiousness.

To these basic elements of BA, we would add two aspects of personality development and the sociogenomic model of trait change that have been articulated elsewhere (Roberts, 2006, 2017). The first has to do with the nature of the changes in states demanded of the person going through a conscientiousness-targeted BA intervention. For the intervention to impart change, it would have to induce behaviors, thoughts, and feelings that are not typical of a person's already existing repertoire, or, in other words, their personality. Ideally, these changes would reflect desired behaviors called upon and rewarded by the person's environment and/or situation (Roberts, 2006). In the developmental models

informing personality development, it is assumed that personality change comes about because of the changes in expectations and rewards for behaviors that had, until that point, not been expected or performed by a person (Roberts, Wood, & Caspi, 2008). This idea is at the core of the social investment principle, in which it is assumed that the acquisition of adult roles brings expectations for levels of discipline and civility above what the typical teenager exhibits (Hudson & Roberts, 2014). In this way, these atypical behaviors are also akin to the idea of deliberate practice (Ericsson & Pool, 2016) in which people effect change in themselves by repeated efforts that challenge their usual or typical way of functioning.

The second insight from the sociogenomic model of personality traits is that for change in a trait to be achieved, the changes have to be so thorough and deeply ingrained that they become automatic. According to the sociogenomic model (Roberts & Jackson, 2008), long-term shifts in thoughts, feelings, and behaviors are the primary route to personality trait change. However, it would not be sufficient simply to change states to infer a change in traits. Only if these state changes become extended, internalized, and automatic would they then qualify as changes in traits (see also, Wrzus & Roberts, *in press*). This presumably could only happen if the changes themselves are practiced often enough and well enough for the changes to become nonconscious.

In sum, these initial sketches of how to intervene to change conscientiousness were largely consistent with the typical approaches taken to intervene with patients suffering from clinical disorders, such as substance use disorders or depression. The focus is on the state manifestations of thoughts, feelings, and behaviors thought to be reflected in the phenotype trying to be changed (e.g., conscientiousness) rather than attempting to intervene at the trait level. A key part of the process is to motivate the individual to change, typically by helping them see that it is in their best interest to do so, by helping them to see that it would lead to the achievement of desirable goals. This change in thoughts, feelings, and behaviors is followed by a supervised period of practice in which the interventionist holds the person accountable and rewards behavioral changes that are then pursued until they are routinized.

To design a practical framework for changing conscientiousness, this initial discussion did not consider broader issues, such as the enabling contexts or the developmental period in which a person lived, which may moderate the effectiveness of the intervention. We next turn to these developmental considerations.

### **How Does Conscientiousness Develop and How Might This Inform Interventions to Change It?**

In terms of their theoretical framework, most interventions similar to the BA inspired one described earlier derive from cognitive-behavioral approaches, which focus on tangible behaviors and make little or no assumptions about the trait-like nature of the phenotype in question. The adoption of a behavioral approach seems well justified from a pragmatic standpoint because focusing on changing what is tangible is less daunting than attempting to change a broad, cross-situational syndrome such as a personality trait. Although adopting a behavioral frame to create an intervention system to change conscientiousness appears to be a good start, coming from a life span developmental perspective there are broader conditions and factors that may be important to consider

when implementing this or any type of intervention (e.g., Roberts et al., 2008; Shanahan, Hill, Roberts, Eccles, & Friedman, 2014). Moreover, we would argue that these conditions may moderate the effectiveness of any attempt to change a broader phenotype such as conscientiousness. In particular, we will use a recent life span theoretical framework used to discuss the development of conscientiousness (Roberts & Hill, *in press*) as a guide for insights into the broader developmental context surrounding conscientiousness and the potential moderating factors that might emerge from considering this context. In particular, we recently argued in Roberts and Hill (*in press*) that the development of conscientiousness was analogous to making sourdough bread. Succinctly, to make a good loaf of sourdough bread necessitates (a) good starting ingredients; (b) optimal conditions for proofing the dough; (c) time for the ingredients to blend, come together, and blossom; and (d) timing (e.g., choosing the optimal time to bake the loaf). The same can largely be said for the “creation” of a conscientious person.

First, we consider the potential role of the “ingredients” that go into the development of conscientiousness. In particular, it is clear that children start with widely varying values on temperamental precursors to conscientiousness, such as effortful control (Deal, Halverson, Havill, & Martin, 2005). Some children appear more ready to control their impulses and delay gratification whereas others start with a much more impulsive, active approach to the world. Children are clearly not blank slates but come to the world with tendencies that are partially genetically preprogrammed (Krueger & Johnson, 2008). We view these tendencies as starting values in the sense that they are prone to develop and change with experience, but these values do dictate where a person starts the process of development. The path between one’s starting value and what would be construed as conscientiousness entails the dynamic interplay between temperament and context, at least early on, and then in the future the interplay of context and the eventual trait of conscientiousness.

As such, we hypothesize that where children and adults start out in relation to conscientiousness-related traits will moderate the success (and time until success) of any given intervention. Those who start out with a deficit on conscientiousness or conscientiousness-related traits, which is typically assumed in clinical settings, will most likely take more effort and time to adequately change. Conversely, children and adults who are more moderate on these precursors to conscientiousness may only take minor interventions to be brought up to adaptive levels of conscientiousness. We would draw an analogy to the recent research on deliberate practice and performance in sport, in which it was shown that exceptionally gifted athletes did not need as much practice and benefitted less from additional practice even if it was undertaken (Macnamara, Moreau, & Hambrick, 2016). Likewise, where a person starts on the spectrum of conscientiousness may be an important moderator of how likely it is that they will change.

The second contributor to the development of conscientiousness would be the broad environmental conditions in which the person is embedded. Similar to the ambient temperature and humidity affecting the speed at which sourdough rises, conditions such as the stability of the family environment and supportive social institutions (e.g., good schools, community services) also may be important factors for the development of conscientiousness and any attempt to intervene to change conscientiousness. In our review of the delinquency intervention literature (Hill, Roberts,

Grogger, Guryan, & Sixkiller, 2011), one of the key factors for the success of any given intervention was the number of contexts that were incorporated into the intervention—the level of immersion experienced by the child. If family, school, and peers were woven into the intervention, then it appeared to be much more successful. Thinking in terms of changing conscientiousness, if any of these environments contravenes efforts to enhance or change, then this may undermine even well-designed behavioral interventions. Consistent, stable, and supportive environments, similar to warm, humid kitchens for bread, may be necessary for the successful development of conscientiousness and for the successful implementation of any intervention.

The third hypothesized factor that should contribute to the development of conscientiousness and the effectiveness of interventions would be time, which could manifest in two ways. One manifestation would be analogous to how time is used to make bread; the sheer length of time that a bread proofs is strongly associated with the complexity and desirability of the resulting loaf. Likewise, experiencing stable, consistent, and supportive environments for a long period of time may be a critical ingredient for the development of conscientiousness-related traits. At a fundamental level, living in a consistent, supportive environment affords people the opportunity to consider the possibility of benefiting from delaying gratification, a key component of conscientiousness (Roberts et al., 2014). In contrast, unstable, unsupportive environments would militate against making long-term plans or controlling one's impulses. There is little reason to plan for the future if one does not see a future to plan for. Delaying gratification and long-term planning will be more likely to occur if people have stable structures around them that have been in place and will be in place for a long time.

Another manner in which time may be critical is alluded to in the definition of a personality trait. By definition, a trait needs to be an automatic pattern. By extrapolation, to change a personality trait necessitates practicing changes in that trait until they become automatic. Thinking in terms of changing conscientiousness, this means not only having stable environments but also ones in which a child or adult may have multiple opportunities across time to ingrain specific patterns of thoughts, feelings, and behaviors. In terms of an intervention, it may entail designing interventions explicitly considering time as a factor and that may be variable across participants. First, instead of designing an intervention around the needs of the therapist or institution (e.g., insurance company), we would design the intervention around each person and their needs. Some people may need more time to learn a lesson, some less. Second, interventionists should incorporate timing into programs to afford the opportunity for “spaced” practice. People could experience the primary intervention, which is followed up at periodic intervals with booster sessions. As such, one can envision a person-centered intervention that takes the “long view” on change such that experiencing stable environments over time is an intrinsic component to the intervention, along with the opportunity to revisit the intervention as needed.

The final life span developmental factor thought to affect the development of conscientiousness is timing: When is the optimal time during the life course for people to have conscientiousness-related experiences? When in the life course is it optimal to intervene? In the case of baking bread, this is critical to the quality of the final product. Baked too early the loaf lacks character and

flavor. Baked too late the loaf will fail to rise, resulting in a flat, almost inedible brick of bread. Given that most interventions are based on need—typically when a person runs into severe difficulties—the timing in life course is seldom objectively considered when treating people. In terms of the timing of the development of conscientiousness, the best opportunity appears quite clear. Most people start to increase in conscientiousness in the transition out of adolescence and into and throughout young adulthood (Roberts et al., 2006). Adolescence is a surprisingly unremarkable period in which there appear to be few systematic gains or losses in conscientiousness (Göllner et al., 2016). This developmental fact motivates several important considerations. Is late adolescence the optimal time to teach conscientiousness? Does this period of the life course represent a time when people are ready to receive the message? Given the transition to adulthood and the adoption of adult roles, which may be intrinsically more important and motivating, this may actually be the optimal time in the life course to intervene.

In contrast, some scholars have argued that we should intervene and intervene early (Heckman & Kautz, 2012). The logic, which is difficult to argue against, is that low conscientiousness has negative, cumulative effects starting quite early in life. If these children end up doing less well in school and getting caught in the snares of adolescence (e.g., drugs, teenage pregnancy; see Moffitt et al., 2011), then waiting to intervene makes little sense. On the other hand, a fair question may be whether children are ready to receive this type of lesson and profit from it. The period of adolescence in which most children start to pay more attention to their peers than their parents may, for example, render any lessons learned in childhood inadequate, especially if the peer group promotes risky behaviors. We have no clear answers for many of these questions of timing, but we acknowledge that when in the life course one intervenes may be an important factor to consider.

In sum, in this section we considered the broader context surrounding the development of conscientiousness and how that might affect how and when one would intervene. In this case, we propose that broader contextual and life span developmental factors can and should be considered when thinking of and planning interventions. Specifically, considering who a person is to begin with, what kind of conditions they live in outside of the intervention, and how time and timing might factor into the intervention might be important to consider. We now offer a synthesis of these different points in the STIM.

## The STIM

We have attempted to bring all of these threads together in the schematic model shown in Figure 1. Starting with the outcome, our goal is to change conscientiousness. As noted with the sociogenomic model of personality traits (Roberts & Jackson, 2008), we assume that the best way to create change in conscientiousness is to change the relevant states associated with conscientiousness and to do so in such a manner that the changes become ingrained and automatic. We proposed one way of creating change in conscientiousness-related states, which emerged out of a BA model of therapy. This model leverages motivations for change. Thus, we see the motivational components of the model as a mediator of the intervention. If one does not properly motivate change in the behaviors associated with conscientiousness, then it

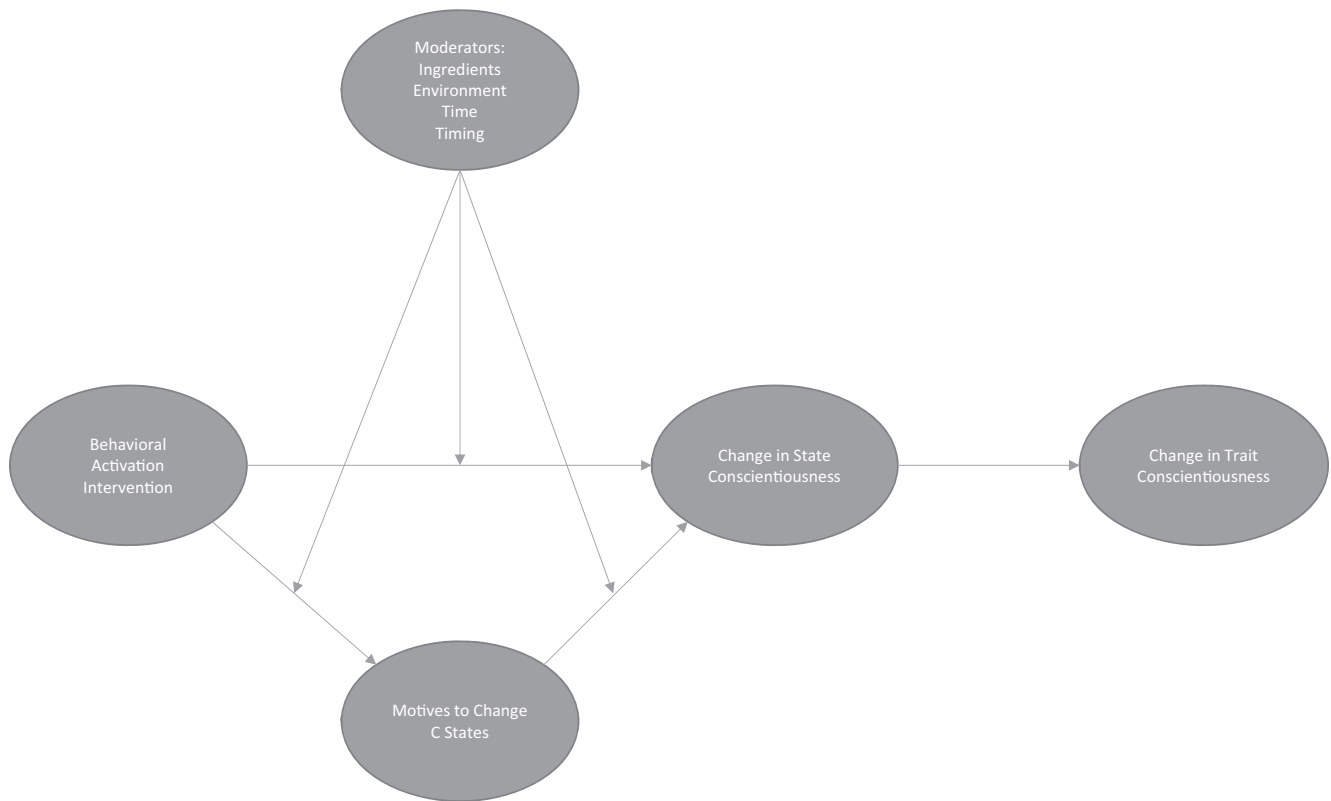


Figure 1. The Sociogenic Trait Intervention Model.

is unlikely that the changes would come about by themselves. The BA component reflects the effort on the part of a therapist/coach/teacher to structure the person's behaviors around pursuing long-term goals, teaching them how to organize their lives so as to achieve these goals, and rewarding them for making progress on changing their thoughts, feelings, and behaviors necessary to achieve those ends.

The four developmentally inspired moderators as outlined are (a) the ingredients or temperamental starting values on conscientiousness, insofar that those individuals most in need of intervention may be the most difficult to change; (b) the environment surrounding the individual, suggesting that a stable, supportive, predictable environment is probably the best for addressing long-term change; (c) time, which involves both having enough time to learn the lessons necessary and the repeated doses of training to help maintain changes made; (d) timing, such that the wrong timing may lead the person to not be receptive to the intervention and in turn fail to retain any short-term changes.

The STIM provides a clear set of ingredients that should go into an intervention as well as the broader factors to consider. Ideally, interventions would focus on concrete thoughts, feelings, and behaviors that people wanted to change. These people would be challenged to achieve changes outside of their normal range of typical behaviors and be given the opportunities to practice these changes long enough to achieve automaticity. A thorough assessment of where people stand on the traits of interest would factor into the planning of the intervention. In addition, efforts should be made to create or leverage broader environments that would sup-

port the changes for as long as is necessary to achieve trait change. Finally, some consideration of when during a person's life the intervention is happening also should factor into the planning. In this respect, the STIM provides a concrete set of ideas that all provide testable hypotheses that themselves could be refuted and thus could inform scientific investigations of personality trait change and interventions to change personality traits such as conscientiousness.

In closing, there are several issues that deserve additional attention. The first concerns the ethics of changing personality traits. Both researchers and the general public have been known to balk at the idea of interventionists changing the personality traits of people. One need only ponder the reaction from parents if their children brought home a slip describing the new program at school to fix their bad personality traits. However, the concerns expressed by the public and researchers alike are mitigated by several facts. The foremost fact to consider is that clinicians and researchers have been changing personality traits for decades. In particular, according to our recent review (Roberts et al., 2017), clinical psychologists have been changing personality traits for a very long time. In that review, we found more than 200 studies that had tracked the relation between therapy and change in personality trait measures dating back to the 1960s. Moreover, in the case of neuroticism, the trait most appropriately focused on by therapists, the amount of change is remarkable—more than  $[1/2]$  of a standard deviation, often as fast as 4 weeks (Roberts et al., 2017). If the negative reaction to changing personality traits is predicated on it being a new idea, then there is clearly no need to be concerned.

The second reason to avoid being overly concerned is that many people would actually like to change their personality traits (Hudson & Roberts, 2014). In fact, many people who see themselves as being low on desirable traits (e.g., low in conscientiousness) readily admit that they would like to change their personality traits. Presumably, people experiencing problems as a result of personality-related disorders such as substance use disorders would be the first to admit that they would like to change their personality. It seems unreasonable to deny individuals the opportunity to do so, especially if we have the tools to make that change come about.

The third reason to view personality trait change as a positive development is that it is the type of change we often want. That is to say, when we socialize children, or teach students new ideas, or train managers to be better leaders, we typically do so under the assumption that the lessons learned will not fade with time. For example, many professors readily claim that their goal, if not their achievement, is to teach their students how to think. We do this to make students more effective citizens when they leave the comforts of higher education. Therefore, we want our efforts to enact "relatively enduring" changes in "patterns of thoughts, feelings, and behavior." In other words, we want change to be either like personality or to occur in our students' personalities.

Of course, it would be naïve of us to argue that there are no ethical issues to confront when interventionists openly admit that they are trying to change personality. For example, while the motivation and justification for intervening with people who possess maladaptive scores on traits is warranted, it is a different story when considering those who are already at modestly high levels of adaptive traits. Nonetheless, if it becomes clear that we can change personality traits and know how to do it, what would stop people from trying to optimize their personalities, so to speak? One sees this in educational settings where highly capable students are put through rigorous preparations to gain entry into the most prestigious schools without much consideration for the students' well-being.

In conclusion, we have revisited our initial efforts at outlining a program to change the personality trait of conscientiousness. We considered our original BA framework for changing conscientiousness, and then we identified developmental factors that may moderate any of these efforts to change conscientiousness. We describe the resulting synthesis as the STIM. Although the emerging framework appears richer and better informed, it remains untested and we hope future research will continue to address the details and questions broached herein.

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